

# Constructive Consumer Choice Processes

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Consumer decision making has been a focal interest in consumer research, and consideration of current marketplace trends (e.g., technological change, an information explosion) indicates that this topic will continue to be critically important. We argue that consumer choice is inherently constructive. Due to limited processing capacity, consumers often do not have well-defined existing preferences, but construct them using a variety of strategies contingent on task demands. After describing constructive choice, consumer decision tasks, and decision strategies, we provide an integrative framework for understanding constructive choice, review evidence for constructive consumer choice in light of that framework, and identify knowledge gaps that suggest opportunities for additional research.

Consumer choices concerning the selection, consumption, and disposal of products and services can often be difficult and are important to the consumer, to marketers, and to policy makers. As a result, the study of consumer decision processes has been a focal interest in consumer behavior for over 30 years (e.g., Bettman 1979; Hansen 1972; Howard and Sheth 1969; Nicosia 1966). One can infer from recent trends in the nature and structure of the marketplace that the importance of understanding consumer decision making is likely to continue. Rapid technological change, for instance, has led to multitudes of new products and decreased product lifetimes. In addition, new communications media such as the World Wide Web have made enormous amounts of information on options potentially available (Alba et al. 1997). Further, consumers are often asked to make difficult value trade-offs, such as price versus safety in purchasing an automobile, environmental protection versus convenience in a variety of goods, and quality of life versus longevity in complex health care decisions.

How do consumers cope with the decisions they must make, some of which involve difficult trade-offs and uncertainties? One approach to studying consumer decisions has been to assume a rational decision maker with well-

defined preferences that do not depend on particular descriptions of the options or on the specific methods used to elicit those preferences. Each option in a choice set is assumed to have a utility, or subjective value, that depends only on the option. Finally, it is assumed that the consumer has ability or skill in computation that enables the calculation of which option will maximize his or her received value and selects accordingly. This approach to studying consumer decisions, often attributed to economists and called rational choice theory, has contributed greatly to the prediction of consumer decisions.

Over the past twenty-five years, an alternative, information-processing approach to the study of consumer choice (e.g., Bettman 1979) has argued that rational choice theory is incomplete and/or flawed as an approach for understanding how consumers actually make decisions. The information-processing approach endorses *bounded rationality* (Simon 1955), the notion that decision makers have limitations on their capacity for processing information. Such limitations include limited working memory and limited computational capabilities. In addition, decision makers are characterized by perceptions attuned to changes rather than absolute magnitudes and diminishing sensitivity to changes to stimuli (Tversky and Kahneman 1991). More generally, behavior is shaped by the interaction between the properties of the human information-processing system and the properties of task environments (Simon 1990).<sup>1</sup>

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<sup>1</sup>For a recent comparison of these alternative perspectives on decision making, see McFadden (1997). As McFadden notes, economists vary in terms of the degree to which they believe rational choice theory describes actual decision behavior. A middle ground adopted by some economists is that individuals have a consistent set of preferences but that such preferences become known by the individual (are "discov-

The notions of bounded rationality and limited processing capacity are consistent with the growing belief among decision researchers that preferences for options of any complexity or novelty are often constructed, not merely revealed, in making a decision (Bettman 1979; Bettman and Park 1980; Payne, Bettman, and Johnson 1992; Slovic 1995; Tversky, Sattath, and Slovic 1988). People often do not have well-defined preferences; instead, they may construct them on the spot when needed, such as when they must make a choice. Thus, consumer preference formation may be more like architecture, building some defensible set of values, rather than like archaeology, uncovering values that are already there (Gregory, Lichtenstein, and Slovic 1993).

The idea of constructive preferences denies that individuals simply refer to a master list of preferences in memory when making a choice and also asserts that preferences are not necessarily generated by applying some invariant algorithm such as a weighted adding model (Tversky et al. 1988). Rather than one invariant approach to solving choice problems, consumers appear to utilize a wide variety of approaches, often developed on the spot. Consumers may also develop problem representations on the spot by structuring or restructuring the available information (Coupey 1994). One important property of this constructive viewpoint is that preferences will often be highly context dependent. In addition, because decision approaches are developed on the fly, processing will be highly sensitive to the local problem structure. This implies that processing approaches may change as consumers learn more about problem structure during the course of making a decision.

Why are preferences constructive? One reason individuals may construct preferences is that they lack the cognitive resources to generate well-defined preferences for many situations (March 1978). A second important reason is that consumers often bring multiple goals to a given decision problem.

Preferences are not always constructed; people do have firm and stable preferences for some objects. For example, the first author has a well-defined and highly positive value for chocolate. In such cases, consumers may simply retrieve these previously formed evaluations from memory and select the option with the highest evaluation (i.e., affect referral [Wright 1975]).

People are most likely to have well-articulated preferences when they are familiar and experienced with the preference object, and rational choice theory may be most applicable in such situations. Even in such cases, however, situational factors may intrude; although a consumer has a strong preference for chocolate, he or she may

sometimes order another dessert. The probability that prior preferences will be retrieved from memory and used will depend on their relative accessibility and diagnosticity, among other factors (Feldman and Lynch 1988). Also, preferences may be more constructive to the degree that the decision problem is complex or stressful.

As noted above, an important implication of the constructive nature of preferences (and evidence for such construction) is that choices often are highly contingent on a variety of factors characterizing decision problems, individuals, and the social context. For example, the following are some of the major conclusions from research on consumer decision making: (1) Choice among options depends critically on the goals of the decision maker. The option that is selected will depend on the extent to which the consumer's goals are minimizing the cognitive effort required for making a choice, maximizing the accuracy of the decision, minimizing the experience of negative emotion during decision making, maximizing the ease of justifying the decision, or some combination of such goals. (2) Choice among options depends on the complexity of the decision task. Options that are superior on the most prominent attribute are favored as the task becomes more complex because the use of simple decision processes increases with task complexity. (3) Choice among options is context dependent. The relative value of an option depends not only on characteristics of that option but also on the characteristics of other options in the choice set. (4) Choice among options depends on how one is asked: strategically equivalent methods for eliciting preferences can lead to systematically different decisions. (5) Choice among options depends on how the choice set is represented (framed) or displayed, even when the representations would be regarded as equivalent by the decision maker on reflection. A key issue in framing is whether the outcomes are represented as gains or losses, with losses impacting decisions more than corresponding gains.

Thus, constructive processing generally implies contingent choices. However, the fact that a choice is contingent need not imply that the processing was constructive, that is, developed on the spot. For example, a consumer may have a well-established, but contingent, preference for hot chocolate on a cold day and a cold soda on a warm day; such a preference is not constructive.

The constructive view of consumer decision making raises fundamental theoretical issues. It is clearly not sufficient to respond "it depends" when asked to describe consumer choices. A major purpose of this article, therefore, is to provide a conceptual framework for understanding constructive consumer choice. This framework then allows us to accomplish the two other major goals of the article: (1) reviewing consumer decision research with the framework serving as an organizing device, and (2) using this review to find gaps in our knowledge that suggest new research directions. The remainder of the article is structured as follows: We begin with a discussion of

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ered") only through thought and experience (Plott 1996). In a similar vein, Lucas (1986, p. S402) has argued that economists tend "to focus on situations in which the agent can be expected to 'know' or to have learned the consequences of different actions so that his observed choices reveal stable features of his underlying preferences."

**TABLE 1**  
AN EXAMPLE OF A CONSUMER DECISION TASK

Car	Reliability	Price	Safety	Horsepower
A	Worst	Best	Good	Very poor
B	Best	Worst	Worst	Good
C	Poor	Very good	Average	Average
D	Average	Poor	Best	Worst
E	Worst	Very poor	Good	Best

NOTE.—Attributes are scored on seven-point scales ranging from best to worst, with best indicating the most desirable value for the attribute and worst indicating the least desirable value.

the nature of consumer decision tasks and decision strategies as necessary background for presenting the proposed framework. Then we present the conceptual framework, provide a selective review of the literature on consumer decision making, and enumerate proposed areas for new research.

## CONSUMER DECISION TASKS AND DECISION STRATEGIES

### Decision Tasks and the Consumer Information Environment

A typical consumer choice, such as the simplified automobile choice task illustrated in Table 1, involves a set of alternatives, each described by some attributes or consequences. The set of alternatives can vary in size from one choice to the next, with some choices involving as few as two options and others potentially involving many more (in some cases the two options may be simply to either accept or reject an alternative). The attributes may vary in their potential consequences, their desirability to the consumer, and the consumer's willingness to trade off less of one attribute for more of another. For example, a consumer may be fairly certain about the values of some of the attributes (e.g., horsepower) but more uncertain about others (e.g., reliability). The consumer may not have information for all of the options on some attributes (e.g., reliability information would not be available for a new model). In addition, some attributes, such as safety, may be difficult for consumers to trade off; making trade-offs requires possibly accepting a loss on such an attribute, with potentially threatening consequences. Finally, some choices may not correspond to the above example, in which all options are from the same product category. Individuals can be faced with choices in which the attributes defining the options may differ, such as deciding whether to spend money on a vacation or on a new stereo. Such choices have been called noncomparable (Bettman and Sujan 1987; Johnson 1984). The difficulty of the choice problem faced by the consumer will increase with more options and attributes, with increased uncertainty

about the values of the attributes, if there are more attributes that are difficult to trade off, and if the number of shared attributes is smaller, among other factors.

We have presented some general properties of consumer decision tasks above. One of the most important findings from prior consumer research is that the same individual may use a variety of different strategies when making decisions. A great deal of research has focused on characterizing such strategies, their properties, and the factors influencing their usage. In the next section we provide a brief overview of consumer decision strategies and their properties. We examine the determinants of strategy use in a later section.

### Consumer Decision Strategies

*Characteristics of Decision Strategies.* We begin by considering four primary aspects that characterize choice strategies: the total amount of information processed, the selectivity in information processing, the pattern of processing (whether by alternative [brand] or by attribute), and whether the strategy is compensatory or noncompensatory.

First, the amount of information processed can vary a great deal. For example, an automobile choice may involve detailed consideration of much of the information available about each of the available cars, as implied by most rational choice models, or it may entail only a cursory consideration of a limited set of information (e.g., repeating what one chose last time).

Second, different amounts of information can be processed for each attribute or alternative (selective processing), or the same amount of information can be processed for each attribute or alternative (consistent processing). For example, suppose a consumer considering the cars in Table 1 decided that safety was the most important attribute, processed only that attribute, and chose car D, with the best value on that attribute. This choice process would involve highly selective processing of attribute information (since the amount of information examined differs across attributes) but consistent processing of alternative brand information (since one piece of information is considered for each car). The fact that working memory capacity is limited effectively requires selective attention to information. In general, the more selective consumers are in processing information, the more susceptible their decisions may be to factors that influence the salience of information, some of which may be irrelevant.

Third, information may be processed primarily by alternative, in which multiple attributes of a single option are processed before another option is considered, or by attribute, in which the values of several alternatives on a single attribute are examined before information on another attribute is considered. For example, a consumer might engage in attribute processing by examining the price of each of the five cars, concluding that car B was

the most expensive, car A was the least expensive, and that car C had a very good price. However, the consumer could process in an alternative-based fashion by examining the reliability, price, safety, and horsepower of car A in order to form an overall valuation of that car. Many standard models of decision making (e.g., weighted adding) assume alternative-based processing, although attribute-based processing is often easier (Tversky 1972).

Finally, an important distinction among strategies is the degree to which they are compensatory. A compensatory strategy is one in which a good value on one attribute can compensate for a poor value on another. A compensatory strategy thus requires explicit trade-offs among attributes. Deciding how much more one is willing to pay for very good rather than average reliability in a car involves making an explicit trade-off between reliability and price, for example. Frisch and Clemen (1994), among others, have argued that making trade-offs is an important aspect of high quality, rational decision making. In a noncompensatory strategy, a good value on one attribute cannot make up for a poor value on another. If a consumer decides to choose the safest car, then car D will be chosen regardless of its high price and regardless of the high ratings for car B on reliability or car E for horsepower.

*Specific Decision Strategies.* There are many different decision strategies, and these strategies can be characterized by the above aspects of choice processing. One classic decision strategy is the weighted adding strategy. Assume that the consumer can assess the importance of each attribute and assign a subjective value to each possible attribute level. Then the weighted adding strategy consists of considering one alternative at a time, examining each of the attributes for that option, multiplying each attribute's subjective value times its importance weight (e.g., multiplying the subjective value of average reliability in a car times the importance of a car's reliability), and summing these products across all of the attributes to obtain an overall value for each option. Then the alternative with the highest value would be chosen. Weighted adding is therefore characterized by extensive, consistent (not selective), alternative-based, and compensatory processing. Because weighted adding is extensive, compensatory, and involves explicit trade-offs, it is often considered to be more normatively accurate than heuristics that do not possess these characteristics (Frisch and Clemen 1994). Weighted adding, however, potentially places great demands on consumers' working memory and computational capabilities. Nevertheless, weighted adding is the decision model that underlies many of the techniques used by market researchers to assess preferences.

The lexicographic strategy provides a good contrast to weighted adding: the alternative with the best value on the most important attribute is simply selected (assuming that there are no ties on this attribute). If a consumer believed that reliability was the most important attribute for cars, he or she could use a lexicographic strategy,

examine reliability (and no other information) for all five cars, and choose car B. The lexicographic strategy involves limited, attribute-based, noncompensatory processing that is selective across attributes and consistent across alternatives.

Satisficing is a classic strategy in the decision-making literature (Simon 1955). Alternatives are considered sequentially, in the order in which they occur in the choice set. The value of each attribute for the option currently under consideration is considered to see whether it meets a predetermined cutoff level for that attribute. If any attribute fails to meet the cutoff level, processing is terminated for that option, the option is rejected, and the next option is considered. For example, car A might be eliminated very rapidly because it has the worst level of reliability. The first option that passes the cutoffs for all attributes is selected. If no option passes all the cutoffs, the levels can be relaxed and the process repeated. One implication of satisficing is that which option is chosen can be a function of the order in which the options are processed. The satisficing strategy is alternative based, selective, and noncompensatory. The extent of processing will vary depending on the exact values of the cutoffs and attribute levels.

Elimination-by-aspects (EBA) combines elements of both the lexicographic and satisficing strategies. Elimination-by-aspects eliminates options that do not meet a minimum cutoff value for the most important attribute. This elimination process is repeated for the second most important attribute, with processing continuing until a single option remains (Tversky 1972). In our car example, suppose that the consumer's two most important attributes were reliability and safety, in that order, and that the cutoff for each was an average value. This consumer would first process reliability, eliminating any car with a below-average value (cars A, C, and E). Then the consumer would consider safety for cars B and D, eliminating car B. Hence, car D would be selected. Elimination-by-aspects is attribute based, noncompensatory, and the extensiveness and selectivity of processing will vary depending on the exact pattern of elimination of options.

The equal weight strategy, a variation on weighted adding, considers all of the alternatives and all of the attribute values for each alternative. However, processing is simplified by ignoring information about attribute weights. A value is obtained for each alternative by summing all of the attribute values for that option, and the alternative with the highest value is selected. The equal weight strategy is thus a special case of weighted adding if unit weights are assumed. The equal weight strategy has often been advocated as a highly accurate simplification (Dawes 1979). Processing is extensive, consistent, alternative based, and compensatory.

The majority of confirming dimensions strategy was first described by Russo and Doshier (1983). Alternatives are processed in pairs, with the values of the two alternatives compared on each attribute, and the alternative with

a majority of winning (better) attribute values is retained. The retained option is then compared to the next alternative from the choice set, and this process of pairwise comparison continues until all the alternatives have been evaluated and one option remains. This strategy is a simplified case of a more general model of choice, additive difference (see Tversky [1969] for a presentation of the additive difference model and a discussion of the relationship between additive difference and adding models). Processing is extensive, consistent, attribute based, and compensatory.

Alba and Marmorstein (1987) proposed that consumers may evaluate and choose alternatives using counts of the number of good or bad features characterizing the alternatives. Consumers develop cutoffs for specifying good and bad features, and depending on the consumer's focus (i.e., good features, bad features, or both), different versions of the strategy could be developed. Note that this strategy can be seen as a voting rule applied to multiattribute choice, where each attribute has one vote. Weber, Goldstein, and Barlas (1995) provide evidence consistent with such a strategy, noting that encoding of such outcomes is often simple. For example, whether an outcome is a gain or a loss may have a larger impact on preferences than the actual magnitude of the outcome. The amount and selectivity of processing for this strategy, as well as whether it is compensatory or noncompensatory, will depend on the variant of the rule used. Processing is alternative based for all variants, however.

Consumers also use combinations of strategies. A typical combined strategy has an initial phase in which some alternatives are eliminated and a second phase where the remaining options are analyzed in more detail (Payne 1976; see Beach's [1990] image theory for further analysis of the role of elimination or screening processes in decision making). One frequently observed strategy combination is an initial use of EBA to reduce the choice set to two or three options followed by a compensatory strategy such as weighted adding to select from among those remaining.

The strategies presented thus far have been those most commonly addressed in consumer research; they range from weighted adding to more heuristic strategies such as EBA that process information in a more selective and noncompensatory fashion. However, recent work utilizing more perceptual approaches (e.g., Simonson and Tversky 1992) has suggested the use of decision heuristics that are relational and perceptual in nature. Such heuristics emphasize the ratings of a given option relative to other alternatives. For example, one heuristic of this type might examine dominance relationships among pairs of alternatives and use such information to make a choice (e.g., the choice of an asymmetrically dominating option; Huber, Payne, and Puto 1982). Another exemplar might assess relative trade-offs between pairs of options on pairs of attributes, compare these trade-off rates, and use these comparisons as inputs to a choice (e.g., trade-off contrast;

TABLE 2  
CHARACTERISTICS OF DECISION STRATEGIES

Strategy	Amount of information processed	Selective (S) versus consistent (C)	Attribute-based (AT) versus alternative-based (AL)
WADD	Extensive	C	AT
LEX	Limited	S	AL
SAT	Variable	S	AL
EBA	Variable	S	AT
EQW	Extensive	C	AL
MCD	Extensive	C	AT
FRQ	Variable	Variable	AL
CCM	Variable	C	Both AT, AL

NOTE.—WADD = weighted adding; LEX = lexicographic; SAT = satisfying; EBA = elimination-by-aspects; EQW = equal weight; MCD = majority of confirming dimensions; FRQ = frequency of good and/or bad features; CCM = componential context model.

Simonson and Tversky 1992). Finally, a consumer might compare the relative advantages and disadvantages of an option to those of other options (e.g., compromise effects; Simonson and Tversky 1992). For other work on relational heuristics, see Drolet (1997).

Tversky and Simonson (1993) propose a model called the componential context model that includes these types of relational heuristics as special cases. In specific, they define

$$V_B(x, S) = \sum_{i=1}^n \beta_i v_i(x_i) + \theta \sum_{y \in S} R(x, y),$$

where  $V_B(x, S)$  is the value of option  $x$  given a choice set  $S$  and background context  $B$ ,  $\beta_i$  is the weight of attribute  $i$ ,  $v_i(x_i)$  is the utility of the value  $x_i$  of option  $x$  on attribute  $i$ ,  $R(x, y)$  is the relative advantage of option  $x$  over option  $y$ , and  $\theta$  is the weight given to the relative advantage component of the model. The relative advantage term is obtained by taking utility differences between the two options on each attribute and combining them. This model is compensatory, consistent, and has both alternative-based and attribute-based components. It is difficult to assess the amount of processing for this model; for the small problems typically used in this research stream (e.g., three options and two dimensions), the relative advantage component may be assessed essentially perceptually, with little effort. For larger problems where direct perceptual assessment may not be feasible, the amount of processing could be extensive, although simpler versions could certainly be specified (e.g., only examine the relative advantage term for the two attributes with the largest weights). We will return to issues in specifying the processes implied by this model. For another model of relative advantage combining absolute and comparative components, see Shafir, Osherson, and Smith (1989, 1993).

Table 2 provides a summary of the properties of the strategies considered above. Note that one can make infer-

ences about the types of strategies consumers use by observing such characteristics as the amount, selectivity, and degree of alternative-based versus attribute-based processing.

We have argued above that consumer choices are constructive and have briefly noted some of the major findings from research on consumer decision making. In the next section we attempt to provide an integrated framework that can explain such contingent choice patterns.

## AN INTEGRATED FRAMEWORK FOR CONSTRUCTIVE CHOICE PROCESSES

Payne (1982) reviewed two major frameworks for understanding contingent choice: a cost-benefit (accuracy-effort) approach and a perceptual approach. The basic premise of the accuracy-effort approach is that each decision strategy can be characterized by its accuracy and the effort it requires in any given situation. Decision makers select strategies in a situation based on some compromise between the desire to make an accurate decision and the desire to minimize cognitive effort. Since the accuracy and effort characteristics generally differ across strategies for a given decision environment and across environments for a given strategy, strategy usage will vary depending on the properties of the decision task.

The perceptual framework is usually associated with the work of Tversky and Kahneman; they prefer explanations of constructive decision making based on principles of human perception. For example, Kahneman and Tversky (1979) argue that our perceptions are attuned to noticing changes rather than absolute magnitudes of stimuli and that outcomes will naturally be coded as gains and losses relative to some reference point. They also argue that different ways of framing a problem may lead to different choices, much like the effect of taking different perspectives on perception; that subjects are often unaware of the effects of framing; and such that effects are likely to persist in the same way that perceptual illusions persist (Tversky and Kahneman 1981, 1988). Thus, incentives may be less effective for problems involving perceptual factors than for problems involving accuracy-effort trade-offs. Finally, Simonson and Tversky (1992) explicitly invoke the analogy to perceptual contrast effects in motivating their trade-off contrast results.

Although the accuracy-effort and perceptual frameworks, considered separately, can each account for some findings in constructive choice, we believe that an integrated framework that extends each approach and then combines the two approaches is both possible and would be extremely useful. The key to integrating the approaches is to note that the perceptual approach has much to say about which aspects of a choice task are noticed and how tasks are represented, and the accuracy-effort approach is well suited for considering how consumers utilize the information they notice in order to attain their goals. Thus, the two approaches complement each other

by providing insights into different aspects of the decision process. In addition to integrating them, each approach can be extended in important ways. For example, we propose that the goals considered in the accuracy-effort approach be augmented by including goals for minimizing the experience of negative emotion during decision making and for maximizing the ease with which a decision can be justified. We propose extending the perceptual approach by considering some perceptual processes as choice heuristics whose properties and use could be examined in a manner similar to other heuristics. We call our integrated framework a choice goals framework. In the next section we outline the general principles of that framework.

## A Choice Goals Framework

In this section we outline the basic postulates of our framework for understanding constructive decision making. Similar to Bettman's (1979) outline for an information-processing theory of consumer choice, we consider what consumers are trying to accomplish (goals), what influences the information they attend to and how it is perceived or encoded, and what factors affect the heuristics consumers utilize to combine information and make a decision. For each topic, we summarize our major conclusions as propositions; these propositions underlying our integrated framework are summarized in Appendix A.

*Consumer Goals.* Choices are made to achieve goals. Bettman (1979) instantiated this notion by postulating that a consumer making a decision has a goal hierarchy, often developed constructively on the spot, specifying the goals and subgoals he or she must attain. More recently, interpretive research on consumer behavior has focused on what choices and consumer possessions *mean* to consumers (Belk 1988). Thus, it is critical to characterize a consumer's goals for a particular task when trying to ascertain why his or her choice processes take a certain form.

A fruitful level of analysis for developing an explanatory framework is to examine consumers' metagoals for choice processing. Examples of such metagoals are maximizing the accuracy of a decision, minimizing the cognitive effort required for the decision, minimizing the experience of negative emotion while making the decision, or maximizing the ease with which a decision can be justified. Note, however, that the usefulness of a choice goal framework is compromised if too many goals are postulated, such as a different goal for each decision. To gain explanatory power, we focus on the limited subset of such goals postulated above and examine the degree to which such goals can explain observed constructive decision making.

The selection of these particular goals is not arbitrary; we believe that as a set they capture many of the most important motivational aspects relevant to decision mak-

ing. Historically (e.g., in the rational choice approach), accuracy was the first goal considered; the goal of making a choice was considered to be maximizing utility. Simon (1955) and others were instrumental in bringing effort-related goals to bear on understanding choice in response to the realization that humans have limited processing capacity, as discussed above. Computational problems are not the only factors that make choices difficult, however. Humans are emotional beings, and choices can involve wrenching trade-offs. Thus, we believe that the goal of minimizing experienced negative emotion is important in some situations. Finally, humans are also social beings, and one of the most decision-relevant characteristics of the social context is that decisions are often evaluated, either by others or by oneself. Hence, the decision maker often must be able to justify a decision to others or to himself or herself.

We argue that different subsets of these goals are relevant in different situations. We will specify further some of the many problem characteristics that influence a decision when various goals are relevant. For example, irreversible decision problems that are very important to oneself or one's spouse may evoke goals for increased accuracy, minimizing negative emotion, and increased ease of justification. The relative weight placed on various goals will also reflect the individual's ability to obtain timely and unambiguous feedback on his or her performance relative to these goals. In general, effort feedback is much easier to obtain than accuracy feedback. The individual usually has a very good notion about how hard he or she is working and thus has timely and unambiguous feedback on effort, whereas feedback on accuracy is often delayed and ambiguous (Einhorn 1980). The consumer also can assess his or her emotional state fairly easily. Finally, feedback on ease of justification is often immediate but can be ambiguous, since what makes for a good explanation in a given situation may not be clear. Reasonable justifications may be easier to predict in situations where the choice task is relatively simple with limited information, because the options for justification are more limited. Thus, the ability to obtain timely and relatively unambiguous feedback on effort and emotion may make those goals particularly salient in many situations. However, there has not been nearly enough research on the factors determining the relative salience of goals in choice situations. We summarize with two propositions:

*Proposition 1.1:* Consumers make choices in order to accomplish goals. Four of the most important goals for consumer decision making are (a) maximizing the accuracy of the choice, (b) minimizing the cognitive effort required to make the choice, (c) minimizing the experience of negative emotion when making the choice, and (d) maximizing the ease of justifying the decision.

*Proposition 1.2:* The relative weight placed on various goals will be influenced by a variety of problem characteristics, including the importance and irreversibility of the decision and the timeliness and ambiguity of the feedback available on performance relative to each goal.

*Attention, Information Selectivity, and Perceptual Interpretation.* As noted earlier, the fact that consumers have limited processing capacity means that they generally cannot process all of the available information in a particular situation. Hence, selectivity is necessary, and which information is selected for processing can have a major impact on choice. Put another way, it is critical to understand the determinants of the focus of attention, since many contingent choice effects are brought about by making salient different aspects of the choice environment.

Based on the psychology of attention, we know that there are two major types of attention, voluntary and involuntary (Kahneman 1973). Voluntary attention describes when attention is devoted to information that is perceived to be relevant to current goals (i.e., is labeled as "diagnostic" in Feldman and Lynch's [1988] accessibility-diagnostics framework). Individuals will devote more effort to examining information they believe will help them attain whichever goals are more heavily weighted in that situation.

Attention also may be captured involuntarily by aspects of the environment that are surprising, novel, unexpected, potentially threatening, or extremely perceptually salient, thus exemplifying one aspect of accessibility in the Feldman and Lynch (1988) framework. For example, changes and losses may be particularly salient (Kahneman and Tversky 1979), and particular problem representations may make certain aspects stand out and gain involuntary attention. Thus, attention and selectivity can be influenced both by goal-driven and more involuntary perceptual factors (for a similar distinction, see Tversky [1977]).

The effects of goals and perceptual factors can go beyond attention. For example, preexisting goals can lead to motivated reasoning and distortion of the meaning of new information (Kunda 1990; Russo, Medvec, and Meloy 1996). In addition, aspects of the environment that capture involuntary attention may also set in motion perceptual interpretations and behavioral responses (e.g., interpreting a loud noise as a threat and the corresponding orienting response). As we discuss further below, we believe that particularly salient aspects of the choice task can at times not only capture attention but also suggest certain types of heuristics. For example, simple problem displays that make asymmetric dominance visually transparent may make heuristics that are based on relational properties of the options more accessible and thus more likely to be used. We believe that the connection of both goal-driven and more perceptual processes to selectivity and interpretation is a critical factor enabling a more integrated framework for understanding constructive consumer choice. To summarize:

*Proposition 1.3:* Two major influences on the selectivity of attention are current goals (voluntary attention) and surprising, novel, threatening, unexpected, or otherwise perceptually salient aspects of the choice environment (in-



voluntary attention). Such factors can also affect the perceptual interpretation of focal aspects of the environment.

*Choice Heuristics.* First, we assume that individuals have a repertoire of strategies for solving decision problems, perhaps acquired through experience or training. Different consumers may vary in terms of the strategies they possess; for example, many children's processing deficits may be due to lack of knowledge of appropriate strategies (John and Whitney 1986; Roedder 1981; Roedder, Sternthal, and Calder 1983).

Second, different strategies vary in their advantages and disadvantages with respect to accomplishing different goals in a given situation. That is, different strategies will be more or less accurate, effortful, emotionally wrenching, or easy to justify in a given choice environment. For example, the weighted adding strategy may tend to be accurate, effortful, and potentially more emotionally difficult because it requires making trade-offs, which may be emotion laden in some situations. It is less clear how weighted adding would fare in terms of ease of justification; its thorough processing would aid justification, but the many subjective trade-offs required could hinder justification. Elimination-by-aspects, on the other hand, may be easy to explain and defend (Tversky 1972), avoids emotion-laden trade-offs, and varies in its effort and accuracy depending on characteristics of the choice task.

Third, the advantages and disadvantages for a given strategy will be affected by individual differences in computational skills and expertise in the choice domain, both of which can affect how easily and accurately a heuristic can be implemented (Stanovich and West 1998). For example, the ability to analyze and select the most relevant information improves with expertise (Alba and Hutchinson 1987; Russo and LeClerc 1994; West, Brown, and Hoch 1996); with increased expertise a consumer might be more able to evaluate the safety of a car, for instance.

Fourth, the relative advantages and disadvantages for a particular strategy may differ from one environment to another. For example, a strategy that is more accurate in one environment may be less accurate in another, or different information presentation formats may make certain strategies more or less effortful to implement (for a classic example of such format effects, see Russo [1977]).

Finally, given the array of possible approaches and their relative advantages and disadvantages for a given situation, we assume that the consumer selects the approach that best meets his or her goals for that situation. Thus, consumers may select different approaches in different situations as their goals, the constraints of the situation, and/or their knowledge change (for a discussion of the potential infinite regress problem of "deciding how to decide how to decide . . ." see Payne et al. [1993], pp. 107–108). In summary, we propose:

*Proposition 1.4:* Individuals have a repertoire of different strategies for solving decision problems. This repertoire will vary across individuals depending on their experience and training.

*Proposition 1.5:* Different strategies vary in their advantages and disadvantages with respect to accomplishing different goals in a given situation. These relative advantages and disadvantages may be a function of consumers' skills and knowledge and will vary from one choice environment to another.

*Proposition 1.6:* Consumers select the strategy that best meets their goals for a particular situation given the array of possible strategies and their advantages/disadvantages with respect to these goals.

This general outline of our choice goals approach shows how constructive processing may occur. However, to better understand the approach, we examine how it can be made more specific. In particular, first we examine situations where maximizing accuracy and minimizing effort are the two major focal goals and show how our approach can explain such decisions. Then we consider situations where the goal of minimizing negative emotion is also relevant. Finally, we examine a particularly interesting case where both perceptual factors and the goal of ease of justification are relevant.

### Analyzing Situations Where Accuracy and Effort Goals Predominate

For many consumer choices, there is little emotional involvement or need to justify. In such situations, we and others argue that two preeminent goals for a decision are maximizing the accuracy of the decision and minimizing the cognitive effort involved in reaching that decision (e.g., Beach and Mitchell 1978; Hogarth 1987; Payne, Bettman, and Johnson 1993; Shugan 1980).

*Assessing Cognitive Effort and Accuracy.* The choice goals framework is most useful if we have conceptually appropriate and easily calculable measures of the various goals and the extent to which different strategies accomplish these goals in different task environments. For example, we have proposed measures of cognitive effort and accuracy. With respect to cognitive effort, any decision strategy can be decomposed into more elementary information processes (EIPs), such as reading an item of information, comparing two items of information, multiplying or adding items of information, eliminating items of information, and so on (see Chase [1978] for a general discussion of using EIPs to analyze information processing). A lexicographic strategy, for example, could be conceptualized as reading the value for each attribute weight, comparing the weight just read with the largest weight found previously until the most important attribute has been found, and then reading the values for the options on that attribute and comparing them until the largest value is found. A weighted adding strategy could be thought of as reading weights and values, multiplying the two, mov-

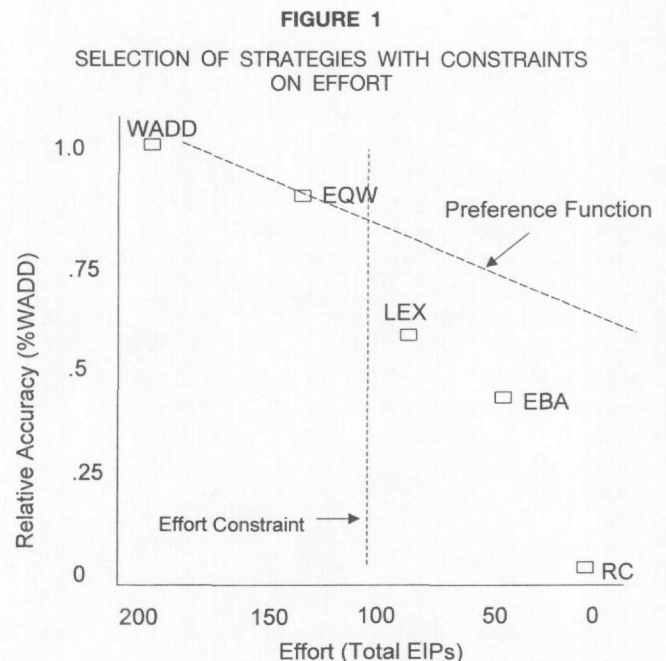


ing on to the next weight and value and multiplying them, adding the products, and so on. Thus, for any given strategy, a representation in terms of EIPs can be developed. When the given strategy is applied to make a selection in a given situation, how many EIPs of each type were required to make that selection can be determined. The number of EIPs used will be a function of the specific rule, the size and other characteristics of the problem, and the specific values of the data (see Payne et al. [1993], chap. 3, for detailed examples). Cognitive effort can then be defined as a function of the number and types of EIPs needed to complete a task (i.e., some EIPs require more effort than others). This approach to measuring cognitive effort has been validated by showing that the time to make a decision using a specified strategy and individuals' self-reports of the effort required are modeled quite well by weighted counts of the EIPs characterizing that strategy (Bettman, Johnson, and Payne 1990).

The accuracy of a decision strategy can be defined by using the weighted adding model, which is a normative model in that it specifies how individuals can best reflect their preferences if certain assumptions about those preferences are met (Keeney and Raiffa 1976). A decision process that selects the same option as the weighted adding rule is therefore an accurate process. Accuracy can also be defined by avoidance of choice patterns such as intransitivities or selection of dominated options. Finally, accuracy can be defined by examining properties of the decision process. Choice processes such as weighted adding that are both compensatory and extensive, utilizing all relevant information, are typically considered more normative (Frisch and Clemen 1994); see Hammond (1996) for a discussion of alternative conceptions of choice accuracy. Given these measures of cognitive effort and accuracy, we can characterize the accuracy and effort of various strategies in particular environments by running a computer simulation of each strategy in each environment and keeping track of the number of EIPs used for each choice and the option chosen (Johnson and Payne 1985).

Although a good deal of progress has been made in assessing the accuracy and cognitive effort of alternative strategies, several unresolved issues remain. For example, some strategies have not been specified at a process level in terms of EIPs. An important example of this is Tversky and Simonson's (1993) componential context model and its potential variants discussed above. In general, relational heuristics that might arise in choice problems that are more perceptual in nature have not been formulated in process terms. One goal for future research, therefore, is to develop process versions of such heuristics in terms of EIPs (e.g., the componential context model would involve reads, difference operations, comparisons, additions, and so on). Then the effort and accuracy required for such heuristics could be simulated.

Also, work to date has not adequately taken the difficulty of implementing strategies into account. For in-



NOTE.—WADD = weighted adding; LEX = lexicographic; EBA = elimination-by-aspects; EQW = equal weight; RC = random choice; EIPs = elementary information processes.

stance, computational errors are more likely for strategies like weighted adding than for the lexicographic heuristic; errors in keeping one's place in the process may be more likely for strategies such as EBA, where the consumer must keep track of exactly which options have already been eliminated. Such computational errors and memory or "bookkeeping" operations have generally not been included in the models to date. In addition, computational difficulties due to the complexity of the ratings for the options (e.g., ratings that involve unwieldy fractions) have not been modeled, although there is evidence that such complexity can influence processing (Johnson, Payne, and Bettman 1988). Finally, implementation difficulty also depends on the individual's processing skills, which will vary as a function of such factors as socioeconomic status (Capon and Burke 1980), age (e.g., children [Capon and Kuhn 1980; Gregan-Paxton and John 1995; Roedder 1981] or the elderly [Cole and Balasubramanian 1993]), and expertise (Alba and Hutchinson 1987). Therefore, modeling implementation difficulty is another major area for research in specifying the accuracy and effort of strategies more precisely.

*Using Effort and Accuracy Values to Make Predictions.* To show how such values might then be used, consider the hypothetical example shown in Figure 1. This figure shows the average accuracy (measured in terms of the percentage attained of the optimal weighted adding value) and average effort (in total EIPs) for five strategies: weighted adding, lexicographic, EBA, equal weight, and

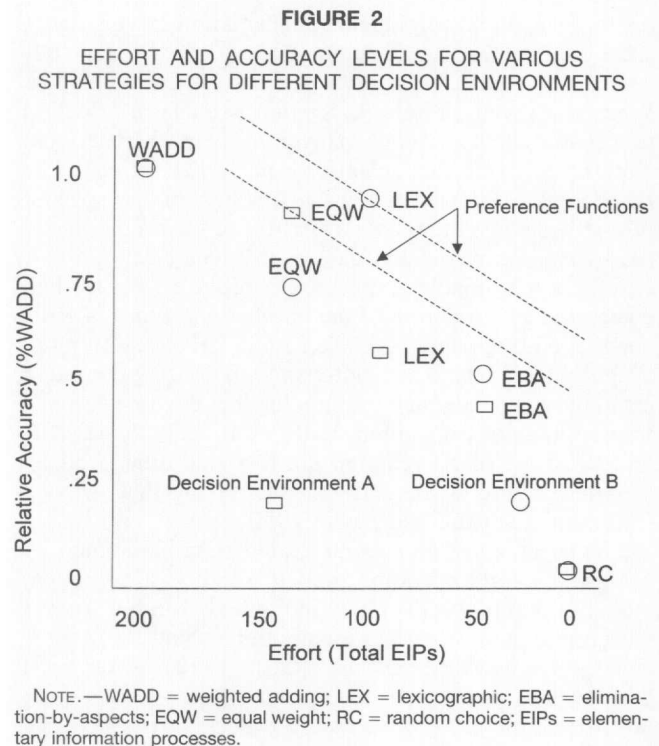
random choice. A preference function (reflecting the decision maker's relative emphasis on the goals of accuracy and effort) has also been shown; although it has been depicted as linear for the sake of simplicity, a nonlinear monotonic function could be used as well. Finally, we have also indicated an effort constraint.

For the moment, ignore the effort constraint. With the given preference function, a consumer would select the equal weight strategy for this environment. We can model the effect of changes in the decision maker's relative emphasis on accuracy versus effort by changing the slope of the preference function. For example, as the preference function became less steep (reflecting a greater relative desire for accuracy), the consumer would eventually select weighted adding; if it were made more steep (reflecting a greater relative concern for effort), the consumer could eventually select EBA or even random choice. Research supports such predictions; decision makers instructed to maximize decision accuracy shift to more extensive, less selective, and more alternative-based processing when compared to decision makers instructed to minimize effort (Creyer, Bettman, and Payne 1990; Payne, Bettman, and Luce 1996).

Now consider the original preference function and the effort constraint. For that constraint, only the lexicographic, EBA, and random choice strategies are feasible, and the lexicographic strategy would be selected. Thus, this simple example shows how variables such as time pressure might influence strategy selection by imposing an effort constraint.

Finally, we consider how choice strategies might shift depending on characteristics of the decision environment. In Figure 2 we plot a second set of accuracy and effort values for the decision strategies in a second decision environment. This pattern of values emphasizes that the accuracy and effort characterizing a given strategy can be highly dependent on the situation. In this case the lexicographic strategy has become more accurate and the equal weight strategy less accurate in environment B. Such changes might occur if the variance across the weights characterizing the attributes for the options was high in environment B and low in environment A. Thus, the heuristic best meeting the consumer's accuracy and effort goals can vary across environments. For the example in Figure 2, equal weight would be selected for environment A, but the lexicographic strategy would be used for environment B. Note that although we focus on specific strategies in this discussion, the results also provide some insights into the kinds of processing to be expected (e.g., the prevalence of attribute-based or alternative-based processing, selectivity, and extent of processing) if consumers selected strategies according to this framework.

We have carried out the approach outlined above to examine the effects of several different features of decision environments (e.g., time pressure [Payne et al. 1988, 1996], interattribute correlation [Bettman et al. 1993],



and relative weights on accuracy and effort goals [Creyer et al. 1990]). In each case the processing results were in line with the predictions derived by using accuracy and effort goals to predict strategy usage. We will examine in more detail how this approach may apply to specific consumer decision-making situations when we review the findings on constructive consumer choice. Next, however, we examine consumer choice situations where negative emotion may be evoked and consider the implications of adding the goal of minimizing negative emotion to those for accuracy and effort.

### Analyzing Situations Where Minimizing Negative Emotion Is Relevant

Consumers sometimes face emotion-laden choices. Such choices arise when there are choice conflicts between goals that are very important to the individual (e.g., one cannot attain all goals given the set of available options and must give up something on one important goal to attain more of another important goal). In such cases, trade-offs are required that the individual does not want to make, since trade-offs in such situations involve giving up attainment of some goal on which the individual does not wish to accept a loss. Examples of such emotion-laden consumer choices include trading off the safety of an automobile against environmental concerns (if larger vehicles fare better in crashes but worse in gas mileage) or trading off health risks due to the presence of insects

in one's house versus health risks from having chemicals sprayed in one's yard. Such choices can easily lead to negative emotion, since the trade-offs required represent threats to the attainment of important or valued goals (Lazarus 1991). The degree of emotion often depends on the values of the options (e.g., the degree of conflict and which specific attributes are involved in the conflict). Note that the nature of emotion-laden choices is such that the ensuing negative emotion is associated with the decision itself and not with some unrelated ambient affect such as negative mood attributable to background noise at the site where the decision must be made (see Isen [1997] for a discussion of affect and decision making).

We believe that individuals may cope with emotion-laden decisions by altering processing to escape negative emotion. Choice processes under negative emotion may therefore be affected by accuracy and effort concerns as modified by emotion minimization concerns. In particular, two general coping strategies may apply in emotion-laden situations: problem-focused coping (direct actions aimed at improving the person-environment relationship eliciting the emotion) and emotion-focused coping (indirect actions aimed at minimizing emotion through changes in the amount or content of thought about the situation; Folkman and Lazarus 1988). These two forms of coping are typically used simultaneously (Folkman and Lazarus 1988; Terry 1994).

Problem-focused coping involves direct efforts to solve the problem at hand. In decision making, we argue that problem-focused coping will involve attempting to identify the most accurate decision alternative. This motivation to perform accurately should be particularly associated with extensive processing. Such extensive processing is the most readily available (to oneself) and observable (to others) indicator of one's motivation to be accurate. When asked to list factors associated with accurate decisions, individuals most often list consideration of all relevant information (Payne et al. 1988, p. 551, n. 4). Hence, we expect that increased negative emotion due to the choice situation will lead to more extensive processing.

Emotion-focused coping often involves avoidant behaviors. Thus, one way in which emotion-focused coping may be brought to bear on emotion-laden choices is avoidance of those aspects of the decision that are particularly emotion provoking. The aspect of emotion-laden choices that is most taxing is making the difficult trade-offs required, because trade-offs call attention to losses. Many researchers have argued that trade-offs are uncomfortable and are avoided when possible (Hogarth 1987; Tetlock 1992; Tversky and Shafir 1992), and we believe this tendency is exacerbated when choices are emotion laden. Therefore, individuals may cope with emotion-laden decisions by avoiding explicit trade-offs; such avoidance can be accomplished by using noncompensatory strategies (Hogarth 1987), particularly those noncompensatory strategies in which processing is attribute based. Attribute-based processing minimizes confronting

the possibility that one attribute must be sacrificed to gain on another, but alternative-based processing highlights such trade-offs.

Our choice goals approach argues that in negatively emotion-laden choices, consumers will simultaneously process more extensively (reflecting the goal of accuracy) and in a more attribute-based fashion (reflecting a goal of coping with negative emotion), a pattern that in fact has been supported (Luce, Bettman, and Payne 1997). The conceptual analyses above and these results support the notion that examining how other important goals, such as minimizing negative emotion, interact with goals for maximizing accuracy and minimizing effort can lead to insights into consumer decision making (Garbarino and Edell [1997] demonstrate another way in which such goals may interact, arguing that expending cognitive effort on evaluating options can lead to negative affect and influence choice).

Note that one difference between our analysis of decisions involving emotion and our analysis of the effects of accuracy and effort is that we have to date no easy measure for the amount of emotion characterizing a decision. Unlike the case of measuring cognitive effort addressed above, the amount of emotion generated in making a decision is not likely to be primarily a function of the processes involved in a strategy. Rather the degree of emotion will depend in a complex fashion on the content of the decision (i.e., the specific attributes involved and their properties), characteristics of the consumer (since what is emotion laden for one person may not be for another), properties of the decision task such as the amount of conflict, and the type of processing carried out. Thus, measuring the extent of emotion on-line (i.e., during a decision process) and modeling the determinants of the emotional difficulty of a choice task are important topics for future research on the choice goals framework (see Richins [1997] for work on measuring the emotions characterizing consumption experiences). In the next section we add a fourth major goal, maximizing ease of justification, to our consideration of constructive consumer choice.

### Analyzing Situations Where Maximizing Ease of Justification Is Relevant

Consumer decisions are often evaluated, either by others to whom one is accountable or by oneself. Hence, consumers often must be able to justify or provide reasons for a decision (Shafir, Simonson, and Tversky 1993). Accountability and the need to justify decisions to others can have important effects on consumer decisions. Tetlock (1992) has proposed a contingency approach that allows for both effort-minimizing and accuracy-maximizing responses to increased accountability. In particular, Tetlock argues that people will cope with accountability in some situations by simply deferring to the preferences of the person(s) to whom they are accountable, an effort-

TABLE 3

## AN EXAMPLE OF AN ASYMMETRIC DOMINANCE TASK

Brand	Ride quality	Miles per gallon
A	83	24
B	73	33
C	70	33

SOURCE.—This problem was taken from Simonson (1989, p. 164).

minimizing strategy. However, people's inferences about the preferences of others may not be very accurate. For example, Hoch (1988) has shown that consumers have low accuracy when predicting the interests and opinions of the typical American consumer. If the preferences of those to whom one is accountable are not known, Tetlock proposes that individuals may process more thoroughly. Even in this case, more thorough processing may lead to poor results if the extra effort is not devoted to diagnostic information.

We believe that the effects of a goal of maximizing ease of justification cannot be fully accounted for by accuracy and effort considerations, however. In particular, the need to consider other factors beyond accuracy and effort is especially likely to be true for choice problems that are more perceptual in nature (i.e., small numbers of alternatives and attributes depicted either graphically or using simple tables of numerical ratings). Consider, for example, the choice problem among cars shown in Table 3 (Simonson 1989). This choice problem is an example of a problem involving asymmetric dominance (i.e., brand C is dominated by brand B but not by brand A), and it is very easy to detect these relationships among the options at a glance. In problems of this sort, adding brand C to a choice set originally consisting of brand A and brand B increases the choice share of the dominating alternative, brand B (Huber et al. 1982). If consumers are asked to justify their choices, the strength of this effect increases (Simonson 1989). As noted by Tversky (1996, p. 17), such violations of context independence indicate that "people do not maximize a precomputed preference order, but construct their choices in the light of available options." How can this result be explained by our choice goals approach?

We believe that Simonson's (1989) original insight is correct: that increased accountability leads consumers to weight ease of justification more heavily, that this goal leads to a search for good reasons to use as justifications, and that the asymmetric dominance relationship provides a good reason (anyone can easily see B is better than C). We now analyze further how such choice based on reasons (Shafir et al. 1993) fits within our framework. This analysis is more speculative than those above, since most research in this area has not been based on a choice goals approach.

We assert that for simple, more perceptual problems,

relational heuristics (such as the componential context model or its variants) are both easy to apply and provide good reasons. The fact that option B dominates option C is a good reason for choosing option B at an *outcome* level of explanation (it is clearly a better outcome than C). There is no need to refer to a *process*-level explanation (e.g., I chose B over A because of the trade-offs I prefer between ride quality and miles per gallon). Outcomes are likely to be more salient than process in the wake of a decision, so arguments based on outcomes may provide better reasons. In fact, serious concerns often arise in decision analysis and managerial decision making because of this focus on outcomes and avoidance of process explanations (e.g., Baron and Hershey 1988).

Thus, relational heuristics appear to perform well both with respect to ease of justification and effort goals. Even though information on the relationships between options must be generated, such relationship information is very easy to assess and process for simple problems. Using such relationship information as a reason allows the consumer to avoid making trade-offs, leading to the prediction that asymmetric dominance effects might increase as trade-offs become more emotionally difficult (since using the asymmetric dominance relationship to avoid trade-offs would be even more appealing). Luce (1998) reports some empirical support for this prediction. Thus, relational notions may also help minimize negative emotions in some cases.

For this case of asymmetric dominance, therefore, a complex interaction of multiple goals may explain the effects observed. Noting relationships among the options and using these relationships as a basis for choice accomplishes some combination of minimizing effort, minimizing negative emotion, and maximizing ease of justification. It is less clear how using such relationships affects accuracy; this probably depends on the exact structure of the choice sets, suggesting that manipulating choice-set structure so that the relationship information either is consistent or inconsistent with accuracy goals is a promising research direction. We suspect that such a complex interplay of goals will be the norm for choices involving justification issues.

The above arguments depend heavily on the notion that asymmetric dominance relationships are generally quite simple and perceptual in nature and that the dominance relations are very easy to assess. We also argue that the very salience of such relations is part of what makes them good reasons. However, for problems of any complexity, such relationships may be more difficult to assess. For example, as the number of attributes increases, the number of required pairwise attribute comparisons increases, and the consumer may not be able to make the comparisons in a simple, perceptual fashion (i.e., it may not be easy to take in the options "at a glance"). In these more complex situations, the amount of effort expended or the goodness of the outcome may be the easiest aspects of the choice for the individual or observer to assess, unlike the obviousness and salience of relational properties in simpler situations.

Thus, we hypothesize that relational reasons will be used less as problems become more complex and/or those relations are made more difficult and less transparent. Further research on how problem complexity affects the use of relational notions as reasons is needed.

The search for reasons may not always lead to effort savings, however. The arguments for effort savings above focused on the use of relational properties. Developing justifications may actually require more effort in other situations. For example, Luce (1998) shows that consumers choosing the status quo option, which has been argued to lead to better justifications, actually took more time to make a choice than consumers who did not select the status quo. Thus, more research is needed on measuring the justifiability of different strategies across situations and the effort those strategies require.

We have now presented the basic ideas underlying our choice goals approach. Although some aspects have been the subject of a good deal of research (e.g., accuracy and effort goals), the role of negative emotion has seen more limited research, and the role of ease of justification is admittedly more speculative. We now review the evidence for constructive consumer choice and address how those results can be accounted for within our integrated framework. We organize the review as we did the discussion of the framework, first considering research on situations where accuracy and effort goals appear to predominate, then choices where negative emotions play a major role, and finally addressing choices involving justification issues. In each subsection we summarize the major findings as propositions; these propositions are summarized in Appendix B.

### **EVIDENCE FOR CONSTRUCTIVE CONSUMER CHOICE: CHOICE TASKS WHERE ACCURACY AND EFFORT GOALS PREDOMINATE**

Many findings in research on consumer decision making can be accounted for in terms of accuracy and effort goals. For instance, one natural focus, given an emphasis on accuracy and effort goals, has been on factors influencing problem difficulty and how consumers cope with such difficulty. In addition to effects of problem difficulty, researchers have also examined one other important aspect of the decision task itself: the type of response required of consumers (response mode). Recall that rational choice theory assumes that preferences will not vary across strategically equivalent methods of eliciting preferences. Finally, there has been research addressing how the knowledge individual consumers bring to decision tasks affects decision making.

#### **Consumer Choice Research on Problem Difficulty**

We consider six main subtopics under research on problem difficulty: problem size, time pressure, attribute

correlation, completeness of information, information format, and comparable versus noncomparable choice. In general, decisions become more difficult as the amount of information increases, as the time resources available for processing the available information decrease, as the degree of conflict among attributes increases, as the amount of missing information increases, as the information display format becomes less organized or more complex, and as the number of shared attributes describing the options is smaller. For each topic we first consider the basic findings and then address how our framework accounts for these findings.

*Problem Size.* Studies of the effects of problem size show that increases in the number of alternatives facing the consumer lead to greater use of noncompensatory strategies that eliminate alternatives (e.g., Johnson and Meyer 1984; Payne 1976). Compensatory strategies, however, are more common for small numbers of options. Changes in the number of attributes do not appear to lead to strategy changes as readily but may increase selectivity (Olshavsky 1979; Payne 1976). Gregan-Paxton and John (1997b) have recently extended this line of research to examine decision processing by children; they find that older (ages 10–11) children adapt by searching less exhaustively for larger problems, but younger (ages 7–8) children adapt to larger problems only when search costs are explicitly made salient. Finally, Otnes, Lowrey, and Shrum (1997), using in-depth interviews, found that brides-to-be often (but not always) respond to the complexities of planning a wedding by simplification.

Our framework accounts for these findings by examining the way changes in the number of alternatives and attributes affect the accuracy and effort for various strategies. Payne et al. (1993, pp. 133–137) report simulation results showing that the relative accuracy of heuristics is fairly robust over changes in the number of alternatives, that the relative accuracy of heuristics other than weighted adding is sensitive to the number of attributes, and that the effort required to implement other heuristics increases much less rapidly with problem size than the effort required for weighted adding. Thus, heuristics other than weighted adding will appear relatively more efficient as the number of alternatives increases; in addition, selective, attribute-based heuristics such as lexicographic and EBA also appear relatively attractive under these conditions (Payne et al. 1993). These simulation results are consistent with the empirical results reported above.

A critical issue related to problem size is whether consumers can be given too much information. The issue of possible information overload has been of continued interest in consumer research, with major information provision implications for both marketers and policy makers. For example, if providing more information could lead to harmful effects, then policies requiring new information might have impacts opposite to those intended.

Initial research on information load (Jacoby, Speller, and Kohn 1974a, 1974b) claimed that consumers could be overloaded and that consumers made poorer decisions with more information. Several researchers rapidly debated this conclusion and argued that consumers in those studies in fact made more accurate decisions if the amount of information per alternative was increased (Russo 1974; Summers 1974; Wilkie 1974); accuracy only suffered when more alternatives were added. Others have subsequently found decreases in accuracy as the amount of information per alternative was increased as well (Keller and Staelin 1987; Malhotra 1982), but controversy still surrounds the interpretation of these results (Keller and Staelin 1989; Meyer and Johnson 1989). A major problem is identifying a good decision. Most studies use subjects' attribute importance ratings to ascertain the "best" alternative; however, these ratings are subject to error, and this error often covaries with the amount of information (Meyer and Johnson 1989).

Given these problems in defining accurate choices, we suggest a reorientation of research on information load. Rather than focus on accuracy directly, we believe that the essence of consumer response to information load is selectivity. The critical issue, then, is *how* consumers become selective as load increases. That is, how do problem size and other factors (e.g., expertise, information format, perceptual factors) interact to influence consumers' decisions about which information to select for examination? If consumers become selective in ways that reflect their values, then overload may not be too harmful. However, if selectivity is based on surface features of the decision task such as perceptual salience or format, and these surface features are not reflective of consumers' underlying values, then substantial decreases in accuracy are possible. In summary:

*Proposition 2.1:* Increases in the number of alternatives lead to a greater use of noncompensatory choice strategies. Increases in the number of attributes generally leads to increased selectivity, but not strategy changes.

*Proposition 2.2:* Information load will not be harmful to accuracy if consumers select a subset of the information that reflects their values; if selectivity is based on problem features that do not reflect consumers' underlying values, information load can decrease accuracy.

**Time Pressure.** As the pace of life accelerates, consumers may feel that they are subject to increased time pressure. Time pressure has clear effects on choice processes. Payne et al. (1988) found that individuals engaged in a hierarchy of responses when faced with increased time pressure. Under moderate time pressure, individuals processed each item of information more rapidly (acceleration) and became somewhat selective. Under more severe time pressure, people accelerated their processing, became more selective, and changed their decision strategies. In particular, they switched to more attribute-based processing, which characterizes such strategies as lexico-

graphic or EBA; when time pressure is severe, it appears that quickly examining at least some information on each option is more effective than examining a limited set of options in depth. Similar findings are reported by Payne et al. (1996) when time stress was manipulated by varying the opportunity cost of delaying decisions; by Pieters, Warlop, and Hartog (1997) for visual scans of brand displays; and by Eisenhardt (1989) for firms processing alternatives in high-velocity environments. Some fascinating research supporting such breadth-rather-than-depth strategies is provided by Jacoby et al. (1994). Jacoby and his colleagues allowed consumers to access information about birth control options and measured consumers' degree of certainty regarding their choice of birth control method after each item of information was acquired. In one condition, Jacoby et al. controlled the format of acquisition to be either alternative based or attribute based. Consumers' feelings of uncertainty were reduced more during within-attribute searches; when search was constrained to be within-alternative, uncertainty remained high until almost all options were examined. Since all options cannot be examined in depth in many instances of time pressure, these results provide corroborating evidence for consumers' preferences for within-attribute search under time pressure.

Such shifts to attribute-based processing can be predicted based on accuracy and effort concerns. Effort is essentially fixed under time pressure. Payne et al. (1988) also show that accuracy decreases markedly for weighted adding under severe time pressure because there is not enough time to complete processing, yet the accuracy of attribute-based heuristics such as lexicographic and EBA is much more robust under time pressure.

Time pressure has other effects on shifting the focus of attention. For example, Wright (1974) reports that consumers place greater emphasis on negative information about options under time pressure. This shift in focus of attention could be due to both goal-driven (e.g., avoiding bad options) or involuntary (e.g., threats being very salient) factors. The major results for time pressure can be summarized as:

*Proposition 2.3:* Under moderate time pressure, consumers process more rapidly and become more selective. Under more severe time pressure, individuals switch to more attribute-based heuristics.

*Proposition 2.4:* Consumers weight negative information more heavily under time pressure.

**Attribute Correlation.** Interattribute correlation is related to notions of dominance; when the number of attributes is small, removing dominated options leads to more negative interattribute correlation for the remaining options (Curry and Faulds 1986). Interattribute correlation is also related to the concept of conflict among the attribute criteria: the more negative the correlations, the more one has to give up something on one attribute in order to get more of another attribute.

Bettman et al. (1993) show that many simplifying heuristics become less accurate, compared to the weighted adding model, when interattribute correlations become more negative. Thus, if accuracy concerns are salient, our framework predicts that consumers may shift to more extensive, less selective, and more alternative-based processing under negative correlation.

Bettman et al. (1993) found this hypothesized shift toward more normative processing under negative correlation, but replication in a consumer context is needed. Widing and Talarzyk (1993) provide suggestive evidence supportive of the hypothesized relationship between use of the weighted adding strategy and correlation. They showed that a decision aid that provided weighted average scores using importance weights provided by the user was highly favorably evaluated by users and resulted in the best decision accuracy in a negative correlation environment (better than a decision aid based on cutoffs and an unaided format). In contrast, Johnson, Meyer, and Ghose (1989) found that their subjects did not appear to shift strategies; however, they also manipulated the number of options, and subjects may have focused on that manipulation and may have failed to perceive correlation accurately (Huber and Klein 1991; Klein and Yadav 1989).

Although there is some evidence that negative correlation may be associated with more alternative-based processing, this relationship may not hold for all types of decision tasks. Luce, et al. (1997, experiment 3) showed that processing became more attribute based as correlations became more negative when the decisions were more emotion laden. We speculate that negative correlation leads to more alternative-based processing for less emotional decision tasks but to more attribute-based processing for more emotion-laden decisions, because alternative-based processing is likely to elicit negative emotion by highlighting difficult trade-offs in the latter case. To summarize:

*Proposition 2.5:* Consumers engage in processing more like weighted adding (more extensive, less selective, and more alternative based) under negative interattribute correlation in less emotional decision tasks.

*Completeness of Information.* Consumers may wish to have a complete set of information about the brands and attributes they choose to consider. However, this is often not the case. What happens when one or more options are partially described (i.e., there is missing information)? Decision makers might respond in a variety of ways to such a circumstance. The consumer might try to infer the missing value based on other available information. Two such types of available information for inferring a missing attribute value for a given option are other values for that attribute in the set of options (other-brand information) and values for other attributes of the given option (same-brand information). Early work (e.g., Huber and McCann 1982; Meyer 1981) argued that con-

sumers used other-brand information, namely, the average value of the attribute for the other options, discounted to take account of the fact that there was uncertainty. Johnson and Levin (1985) argued that same-brand information was used, and Ford and Smith (1987) also found that consumers were influenced more by information about other attributes of the same brand than by other-brand information.

Other research, however, has taken a contingency viewpoint, arguing that whether other-brand or same-brand information is used is a function of properties of the choice task. Several researchers have invoked the Feldman and Lynch (1988) accessibility-diagnostics framework as the basis for their contingency approaches. Dick, Chakravarti, and Biehal (1990), for example, argue that consumers for whom attribute information is more accessible are more likely to make inferences using interattribute correlation (same-brand information). Ross and Creyer (1992) propose that consumers use other-brand information when it is diagnostic, perhaps because it is less effortful, only examining same-brand information if other-brand information is not diagnostic. However, some researchers have sounded cautionary notes; Simmons and Lynch (1991), for example, note that the discounting effects noted above may not be mediated by inferencing. Broniarczyk and Alba (1994) point out that consumers' intuitive beliefs about likely attribute relationships may be dominant in inferencing, even when they conflict with the available same-brand or other-brand information.

The application of the choice goals framework to these results is relatively straightforward. Consumers have heuristics for making inferences about missing information (e.g., same-brand or other-brand). The use of such heuristics appears to be governed by accessibility-diagnostics trade-offs. Feldman and Lynch (1988) define the diagnosticity of an input in terms of the degree to which the decision implied by that input would accomplish the individual's goals for the choice in question (e.g., maximize accuracy, maximize ease of justification). Effort is also a major component of their approach, both with respect to accessibility and the termination of search by a diagnosticity threshold. Since accuracy has been a salient goal in many accessibility-diagnostics studies, accessibility-diagnostics trade-offs may be essentially effort-accuracy trade-offs in those situations. However, in other situations accessibility-diagnostics concerns can also refer to a balance among the broader set of choice goals we have proposed. Finally, the Broniarczyk and Alba (1994) results are explainable by noting that generalizing from intuitive beliefs is even less effortful than using same-brand or other-brand information.

*Proposition 2.6:* Consumers may infer values for a missing attribute using heuristics based on other-brand information (other values for that attribute in the set of options) or same-brand information (values for other attributes of the same brand with the missing value). Which type of



heuristic is used depends on the relative accessibility and diagnosticity of each type of information.

*Information Format.* The organization of information displays can have a major impact on consumer choices. Russo (1977) provides a classic illustration; he argued that normal unit price displays, with separate tags for each item, were difficult to process when attempting to make price comparisons. He argued that making such comparisons easier by providing unit price information in the form of a sorted list, with brands ranked in order of increasing unit price, would increase consumers' usage of unit prices. In a field experiment, he showed that consumers saved about 2 percent, on average, with the list display. Thus, consumer decision making was affected by making some information easier to process. Simply making information easier to process is not always sufficient, however. Russo et al. (1986) found no effects from listing positive nutrients (e.g., vitamins), but did find effects if negative nutrients (e.g., sugar) were listed. To use the lists consumers must be motivated, even if they are easily processable; consumers apparently did not feel they needed to worry about positive nutrients (they could take a vitamin pill) but were motivated to avoid negative ones. Finally, Bettman, Payne, and Staelin (1986) outline principles for providing warning information in less effortful formats that encourage processing of such warnings.

A related display effect concerns the impact of display format on information acquisition. Slovic (1972) suggested a "concreteness" principle: decision makers will tend to use only that information that is explicitly displayed and will use it in the form it is displayed, without transforming it. Such behavior reduces the cognitive effort required to process the information. A related concept is the so-called focusing phenomenon in mental models, in which thoughts are restricted to what is explicitly represented in the mental model (Legrenzi, Girotto, and Johnson-Laird 1993). In addition, when individuals construct mental models of a situation, they often make as little information as possible explicit in order to minimize cognitive load.

The concreteness principle is supported by Bettman and Kakkar's (1977) finding that individuals indeed acquired information in a manner consistent with the form of the display (by attribute or by brand), and Jarvenpaa (1989) extended these results to the case of graphical displays. A similar finding is that sequential presentation of information leads to more significant pioneering effects (e.g., more learning about the pioneer and greater likelihood of including the pioneer in the consideration set; Kardes and Kalyanaram 1992; Kardes et al. 1993).

Several authors show that the concreteness effect does not always hold, however. Concreteness is likely to hold when the costs of following the given format (both the acquisition costs and opportunity costs due to losses in accuracy) are low. If those costs are more pronounced, consumers may depart from the given format. Coupey

(1994), for example, shows that consumers will restructure information if it enables them to facilitate choice. Restructuring is more likely when information is poorly structured and hard to process in its original form. The specific form of restructuring depends on the sources of difficulty (e.g., consumers may rescale information if it is presented in different units). Thus, the form in which consumers represent the choice problem is a function of accuracy and effort considerations.

The consumers' task goals may also affect where the concreteness principle holds. Sethuraman, Cole, and Jain (1994) show that concreteness holds if the consumer's task is to screen a set of options to see which are acceptable, since this task can be done without regard to order of presentation of information. However, if the task is to choose the first acceptable option (satisficing), then information is processed by brand regardless of the format. Thus, accuracy considerations can override the potential effort savings. Finally, Biehal and Chakravarti (1982) show that memory organization can interact with format; prior brand-based memory organization, for example, weakens the effects of attribute-based formats.

These results can be readily explained within our framework by noting that different information formats make some forms of processing easier and less effortful and hence more likely. The concreteness principle and governance of the processing of information by the form of the display are also explainable by cognitive effort considerations when the other acquisition costs and potential accuracy losses are low. However, if processing is difficult in the original format or there are potential accuracy losses, consumers may process in ways that depart from the format. Summarizing these results, we propose

*Proposition 2.7:* Different information formats can make some forms of processing easier and less effortful than others. The processing encouraged by the format will be more likely; however, potential accuracy losses due to the encouraged form of processing will lessen the effect of format.

*Comparable versus Noncomparable Choices.* For many years consumer choice researchers focused on decision processes in choice sets where the alternatives were members of the same product class, such as selecting among brands of automobiles or microwaves. Johnson (1984, 1986) pioneered work on choice among noncomparable options. For example, a consumer might try to decide whether to spend some extra money on a vacation, a new stereo, or some new cooking equipment. Such options are called noncomparable because the attributes that describe them differ across the options. Ratneshwar, Pechmann, and Shocker (1996) examined conditions that might lead to such noncomparable choice sets and found that consumers developed consideration sets with alternatives from different product categories when there was goal conflict (one category could not satisfy all of the

consumer's goals) or goal ambiguity (no clear, salient goals).

Processing can differ between comparable and non-comparable choices. Johnson (1984) showed that as options become more noncomparable, consumers represent attributes at more abstract levels (e.g., enjoyment or necessity) in order to allow comparisons. At some point, however, consumers switch to developing overall evaluations of each option and comparing those evaluations. Bettman and Sujan (1987) argued that a fundamental distinction between comparable and noncomparable choice situations is that criteria are more readily available for the comparable choice. When a criterion (e.g., reliability) was primed for the noncomparable situations, decision processes resembled those for the case of comparable options. In related work, Huffman and Houston (1993) showed that the presence of goals helps to structure and focus the acquisition of information, even in unfamiliar situations, and West, Brown, and Hoch (1996) found that providing consumers with a consumption vocabulary led to better-defined preferences.

These results can be explained by invoking effort and accuracy notions. In fact, Johnson (1986) developed models for the effort and accuracy of the within-attribute abstraction and across-attribute overall evaluation strategies and derived conditions under which each strategy was likely to be used based on accuracy-effort trade-offs. The Bettman and Sujan (1987) results can be explained by noting that their priming task makes a particular criterion more accessible, hence enabling consumers to choose based on that concrete criterion as opposed to making more effortful inferences about more abstract attributes.

*Proposition 2.8:* Processing can differ between comparable and noncomparable choices. Consumers can develop more abstract attributes or compare overall evaluations as choices become more noncomparable. Their use of these strategies is governed by accuracy-effort concerns. If a specific criterion is primed, however, noncomparable choice processes more closely resemble those for comparable options.

## Consumer Choice Research on Response Mode

A fundamental principle of rational decision theory is procedure invariance, that is, that preferences should not depend on the method used to assess them if the methods are strategically equivalent (Tversky et al. 1988). However, this principle does not seem to hold empirically; different methods can strongly influence expressed preferences. Mowen and Gentry (1980) show, for example, that preferences between two new product projects could be reversed depending on whether the decision maker was asked to choose one of the projects or designate a price for the rights to each project. Such preference reversals are common in many contexts (e.g., Tversky, Slovic, and

Kahneman 1990). A major contributing factor to preference reversals seems to be that some response modes, such as choice, evoke qualitative (e.g., comparative) reasoning, whereas other response modes, such as evaluation, evoke more quantitative (e.g., how much more will I pay) reasoning (Fischer and Hawkins 1993; Slovic, Griffin, and Tversky 1990). Nowlis and Simonson (1997) provide supporting evidence for the latter notion. They show that attributes on which consumers can easily make comparisons (comparable attributes) assume more weight in choice, whereas attributes that are difficult to compare but are meaningful and informative when evaluated on their own (enriched attributes) take on more weight in tasks where individual options are evaluated. This difference in emphasis across response modes leads to systematic preference reversals. Coupey, Irwin, and Payne (1998) have recently shown that an individual's familiarity with the stimuli used can affect the frequency of preference reversals; in particular, consumers make fewer choice-matching preference reversals for more familiar products. The biggest impact of familiarity in their study was on consumers' responses to the matching task.<sup>2</sup>

As the above discussion implies, judgment and choice are not equivalent. When making a judgment, consumers must provide an overall evaluation of each alternative; in choice, the consumer must simply pick the most preferred option. A judgment task thus encourages less selective, alternative-based processing, whereas a choice task allows more selectivity and can be attribute based, depending on the strategy used.

Such response mode effects are difficult to undo. In a classic set of studies, Grether and Plott (1979), for example, found that monetary incentives did not eliminate preference reversals. In general, incentives based on maximizing accuracy often have relatively little impact on decisions (Tversky and Kahneman 1988), perhaps because incentives appear to lead individuals to increase the *intensity* of their behavior (i.e., working harder) without necessarily changing the *direction* of that behavior (i.e., working smarter). However, providing incentives and feedback over repeated choices does appear to reduce preference reversals (Cox and Grether 1996).

The analysis of response mode effects within our framework is more speculative than the analyses presented above. We argue that response mode alters choice because it both changes the criterion used for task accuracy and the relative emphasis on accuracy and effort. The response mode determines the consumer's criterion for the task. That is, as noted above, choice requires determining which option is better, whereas other response modes such as matching and ratings require a quantitative estimate of how much better one option is over another or how much to give up on one attribute for more of

<sup>2</sup>In a matching response, an aspect of one option is adjusted so that this option matches another option in overall value.

another. We believe that this difference in focus means that there is more relative emphasis on accuracy when matching or rating and more relative emphasis on effort when making a choice. Since we have shown above that changes in the relative emphasis on accuracy versus effort can change strategy usage, it is perhaps not surprising that preference assessments might differ across response modes.<sup>3</sup>

We can speculate further, however. We hypothesize that there will be fewer preference reversals between choice and some quantitative task (e.g., rating or matching) to the degree that the use of heuristics emphasizing accuracy is encouraged in the choice task. There is suggestive evidence consistent with this hypothesis. Johnson et al. (1988) found that preference reversals were lower when processing of the probability information in their task was made easier by expressing the probabilities as simple decimals or simple fractions instead of as complex fractions. Coupey et al.'s (1998) results showing a decrease in preference reversals with familiarity also seem supportive. One corollary of our hypothesis is that if a matching task evokes a strategy with greater weight on one attribute, the results of matching may agree more with the choice task, since choice is more likely to be lexicographic in nature. Hence we hypothesize that there will be fewer choice-matching preference reversals if the match is carried out on the more important versus the less important attribute.

*Proposition 3.1:* Different response modes (e.g., choice vs. matching) can lead to different preferences and to preference reversals. Choice encourages more selective and attribute-based comparative processes, whereas rating or matching encourage less selective, more alternative-based, quantitative processing.

*Proposition 3.2:* Preference reversals can be reduced by making the more quantitative processing easier, by greater familiarity with the options, and by repeated experience with incentives and feedback on the task.

## Consumer Research on the Interactions between Consumer Knowledge and Decision Making

*Choice Process and Memory Interactions.* Biehal and Chakravarti (1982, 1983) carried out a classic series of studies examining the interactions between choice processes and memory. Biehal and Chakravarti (1982) had consumers either learn information and then choose or just choose; following the choice task, consumers were

asked to recall the information. Consumers who first learned the information tended to organize it in memory by brand and were more likely to process information in an alternative-based fashion when making choices. Consumers who chose first were more likely to process by attribute and to organize their memory in an attribute-based fashion. In addition, consumers had much better memory about the chosen alternative (see also Johnson and Russo 1984). In their 1983 paper, Biehal and Chakravarti again had consumers either learn information or make a choice. Then information on new alternatives and new attributes was provided and a second choice made. The added attribute information made one of the original options, which was not likely to be selected originally, more attractive. Consumers who made a choice first were less likely to reevaluate and choose that original option, perhaps because of their decreased memory for the non-chosen option, than the consumers who learned first. These studies provide convincing evidence that memory and choice processes interact in interesting and principled ways (see also Lynch and Srull 1982).

Other research has continued to examine memory and choice interactions. Lynch, Marmorstein, and Weigold (1988) showed that consumers will use information in memory to make a choice when some or all of the options had to be retrieved from memory if that information is both accessible and more diagnostic than other accessible information. In related work, Nedungadi (1990) showed that brand choice can be influenced by altering the memory accessibility of a brand, without changing the brand's evaluation. Hutchinson, Raman, and Mantrala (1994) model such brand name accessibility as a function of consumer and marketing mix variables (e.g., usage rate, advertising spending, market penetration, and product attributes).

We explain such choice-memory interactions by invoking effort considerations. For example, Biehal and Chakravarti's learning tasks encourage an alternative-based focus, and alternative-based processing would then be less effortful in choice. Choice, in contrast, tends to be more comparative and attribute based. Thus, consumers who chose first would find it more difficult to integrate the new and old information, because their choice processing was both more selective and more attribute based. For consumers that learned first, however, the information would be stored and processed more by alternative, so the added information would be easier to integrate with each option. Finally, work based on accessibility-diagnostics notions, as noted above, can be viewed in terms of balancing choice goals.

*Proposition 4.1:* Because choice processes are selective and comparative, choice processes influence both which items are stored in memory and the organization of such memories. Conversely, information in memory can affect the form of choice processes.

*Proposition 4.2:* Consumers will use information in memory to make a choice to the extent that it is more accessible and more diagnostic than alternative sources of information.

<sup>3</sup>Cognitive effort considerations continue to play a role in judgment, even though there may be more relative emphasis on accuracy. There is a great deal of evidence for compatibility effects in judgment, i.e., that the weight of an attribute in a decision is enhanced by its compatibility with the response scale or strategy used (Fischer and Hawkins 1993; Slovic et al. 1990).

*Categorization and Choice.* Fiske (1982; Fiske and Pavelchak 1986) has argued that individuals use two basic modes for evaluating stimuli. In one mode, piecemeal processing, a stimulus is evaluated by integrating the evaluations of the individual attributes of the stimulus. In contrast, category-based processing is characterized by attempting to categorize the stimulus into an existing category; if successful, that category's evaluation is associated with the stimulus. Fiske and Pavelchak propose a two-stage contingency approach: in the first stage, categorization is attempted and, if successful, then category-based evaluation is used. If categorization is not successful, piecemeal processing ensues. Sujan (1985) utilized this approach in a consumer context, providing evidence for category-based processing when the information in a print advertisement matched expectations and evidence for piecemeal processing when expectations were not met, with effects greater for experts than for novices (see Gregan-Paxton and John [1997a] for a modification and extension of this approach based on internal knowledge transfer mechanisms). Peracchio and Tybout (1996) also examined the effects of categorization on evaluations. They demonstrated that new products were evaluated more favorably when their attributes were moderately incongruent with a schema (see also Meyers-Levy and Tybout 1989) only when consumers had limited knowledge about the product category. When consumers had more extensive knowledge about the category, their evaluations were influenced by associations to specific attributes based on their schemas but not by the degree of congruity. Finally, John and Lakshmi-Ratan (1992) apply categorization notions to children's choice.

The categorization findings can be explained by considering the accuracy and effort characteristics of the two classes of strategies, categorization and piecemeal. Categorization is less effortful and relatively accurate when expectations are met and categorization is successful. Piecemeal processing is more effortful and generally accurate. Hence, if categorization can be successfully applied, it is both less effortful and relatively accurate, so it will be used. Sujan's (1985) finding that novices are more likely to use categorical processing regardless of whether expectations are met can also be explained. The cost of piecemeal processing is less for experts than for novices because of the experts' increased ability; hence, experts are more likely to use piecemeal processing when expectations are not met.

Gregan-Paxton and John (1997a) have argued that consumers make use of analogies. We also believe that analogies can be used as a choice heuristic. For example, Schkade and Payne (1994) have shown that consumers use analogies such as charitable giving when expressing their preferences for environmental goods. The use of analogies clearly involves accuracy and effort considerations; an analogy can provide a way of making a choice in an unfamiliar situation with little effort, with accuracy depending on the goodness of the analogy. Analogies

do not always lead to accuracy; for example, the use of analogies may lead to insensitivity to the quantity of a good (Baron and Greene 1996). Characterizing the properties of analogies in terms of effort, accuracy, experienced negative emotion, and ease of justification, and then examining the contingent use of analogies would be promising areas for future research.

*Proposition 4.3:* Categorical processing is more likely to be used when expectations are met, with more detailed (piecemeal) processing more likely when expectations are not met and the consumer has expertise in the category.

This concludes our review of research where accuracy and effort goals predominate. Next we consider research where the goal of minimizing negative emotion must be taken into account.

### **EVIDENCE FOR CONSTRUCTIVE CONSUMER CHOICE: CHOICE TASKS WHERE MINIMIZING NEGATIVE EMOTION IS RELEVANT**

As discussed above in presenting our framework, we believe that at times consumers face emotion-laden choices. We have examined the effects of such negative emotion on decision processing, choice, and avoidance of choice. Luce et al. (1997) showed that increased negative emotion due to more difficult trade-offs or more serious consequences led to more extensive, more selective, and more attribute-based processing (consistent with the notion that consumers try to avoid emotion-laden difficult trade-offs). Luce, Payne, and Bettman (1998) showed that consumers more often chose an option that was better on a quality attribute rather than an option better on price when that quality attribute was rated as inherently more emotion laden, involved lower attribute values, or involved losses rather than gains. These effects were in addition to any effects of the consumers' importance weights for quality relative to price. Luce (1998) showed that increases in negative emotion led to increased avoidance of choice; in particular, increased trade-off difficulty led to increased choice of a status quo option, increased choice of an asymmetrically dominating alternative, and a greater tendency to prolong search. In addition, she demonstrated that choosing an avoidant option resulted in less negative retrospective emotion. Finally, Kahn and Baron (1995) found that consumers were likely to use a noncompensatory, lexicographic rule when making their own high-stakes decisions, but that consumers wanted advisors to make decisions for them using compensatory rules.

Such results have been explained above in describing the part of our framework dealing with negative emotion. However, there are two important points still to be made. First, the results show that individuals process in a more extensive, more selective, and more attribute-based fashion

ion when choices are more emotion laden. Note that this pattern of more extensive and more attribute-based processing is *opposite* to that found in all of our studies of nonemotional choices, where more extensive processing is linked to more alternative-based processing. Recall also that negative correlation appears to have different effects on processing for less emotional than more emotion-laden decisions. Taken together, these differences in results between less and more emotion-laden decision tasks demonstrate that negative emotion due to the decision task cannot be treated as simply another type of effort cost. Emotional decision costs appear to have an additional motivational component that leads to avoidant behaviors.

Second, we have argued that trade-off difficulty plays a crucial role in the degree to which a choice is viewed as emotion laden and can affect processing and choice; however, we have not yet examined the nature of trade-off difficulty. The traditional view of trade-offs is that "a trade-off was a trade-off was a trade-off" (Tetlock, Peterson, and Lerner 1996, p. 36). This point of view assumes that people are willing and able to make trade-offs among any conflicting attributes and that the only relevant question is the exchange rate between the attributes. However, Tetlock and his colleagues, along with others like Baron (1986; Baron and Spranca 1997) and Beattie and Barlas (1993), have argued that the identity of the conflicting attributes is in fact very relevant and that people will find some trade-offs much more difficult than others. Tetlock (1992; Tetlock et al. 1996) gives examples of such difficult attributes to trade off using what he terms "sacred" values (e.g., life, justice, or liberty). People resist putting prices on life or justice, for example. Baron and Spranca (1997) discuss "protected" attributes, which are attributes that resist trade-offs with other attributes.

There is some limited evidence in the consumer behavior literature that certain attributes are treated differently than others. In particular, consumers generally seem to be more resistant to trading off some quality to get a better price than accepting a higher price to get better quality (Blattberg and Wisniewski 1989; Hardie, Johnson, and Fader 1993; Heath and Chatterjee 1995; Nowlis and Simonson 1997; Simonson and Tversky 1992). Dhar and Simonson (1997) also distinguish between situations involving trade-offs between two goals (e.g., pleasure and health) and those involving trade-offs between goals and resources (e.g., pleasure and money) and show that choices vary depending on the type of trade-off involved.

Although some research has been done on attribute properties, we believe that much more research is needed. We believe that attributes differ in fundamental ways with respect to trade-offs (e.g., some attributes are more sacred or more laden with potentially severe consequences) and that research characterizing attribute properties and the effects of those properties on trade-off difficulty, processing, and choice is extremely important.

*Proposition 5.1:* Emotion-laden choices are characterized by more extensive, more selective, and more attribute-based processing. In general, emotion-laden choices encourage avoidant behaviors.

## EVIDENCE FOR CONSTRUCTIVE CONSUMER CHOICE: CHOICE TASKS WHERE MAXIMIZING EASE OF JUSTIFICATION IS RELEVANT

As mentioned earlier, consumers are often not sure how to trade off one attribute relative to another or which attribute is more important when confronted with a decision. Shafir et al. (1993) have argued that people often construct reasons in order to resolve their conflict about trade-offs, justify a decision to themselves (i.e., increase their confidence in the decision), and/or justify (explain) their decision to others. Such a reasons-based view of choice is clearly consistent with the view of constructive preferences. In addition, the justification of decisions is one of the important choice goals in our framework.

Shafir et al. (1993) argue that relationships among options may be perceived to be more compelling reasons or arguments for choice than deriving overall values for each option and choosing the option with the best value. For example, Montgomery (1983) has argued that a dominance relationship between options is easy to justify as a reason for choice. He suggests that as a consequence decision makers may restructure problems (e.g., discount small attribute differences or drop attributes of lesser importance) in order to achieve a dominance relationship. Other relationships that may provide good reasons are the best value on the most important attribute or principles of rational choice such as transitivity.

Of particular interest to consumer research is the fact that changes in the set of options under consideration change the relationships among the options and therefore some of the potential reasons for choosing among the options. That is, changes in the decision context can alter the reasons that are salient and, consequently, the choice made. Research on asymmetric dominance is an excellent exemplar of such context-dependent preferences based on relationships among options.

One of the classic assumptions of models of choice is the independence of irrelevant alternatives assumption. The basic idea behind this assumption is that the ratio of the choice probabilities for any pair of options does not change if the composition of the choice set containing the two is changed. As noted by Meyer and Kahn (1991, p. 91), the "central implication is that if a new option is added to a choice set, the shares of the existing options will always decrease in direct proportion to the size of their original shares." A weaker condition than the independence of irrelevant alternatives (and hence one for which violations are a more serious problem) is regularity, the notion that adding a new alternative cannot increase

the probability of choosing a member of the original choice set.

It is clear that consumers' choices do not always obey such assumptions; the composition of a choice set (the context) does affect choice behavior. As noted above, for example, asymmetric dominance has the remarkable effect that adding an asymmetrically dominated option to the choice set actually increases the choice share of the dominating alternative, in violation of the principle of regularity necessary for most probabilistic choice models. Huber et al. (1982) originally demonstrated this effect, and Heath and Chatterjee (1995), Huber and Puto (1983), Mishra, Umesh, and Stem (1993), Simonson (1989), and Simonson and Tversky (1992) have provided additional demonstrations.

Several alternative explanations have been proposed for the asymmetric dominance effect, including agenda effects (Huber et al. 1982), choice simplification by searching for dominant options (Montgomery 1983), and the simplicity and artificiality of the stimuli (Ratneshwar, Shocker, and Stewart 1987; however, see Wedell [1991] for evidence contradicting this view). Prelec, Wernerfelt, and Zettelmeyer (1997; see also Wernerfelt 1995) argue that at least part of the effect is due to the fact that consumers develop inferences about the location of their ideal points based on the stimuli and their relationships to one another.

We believe that many causes contribute to asymmetric dominance effects. However, one explanation that has received strong support is that people use the relationships among the options as reasons for choice justification: one can justify the choice of the dominating option more easily by noting that it is clearly better than the asymmetrically dominated option (Simonson 1989; Wedell 1991). Recall that Simonson (1989) found that increased need for justification led to a greater asymmetric dominance effect.

As described above, Tversky and Simonson (1993; Simonson and Tversky 1992) developed a componential context model accounting for asymmetric dominance and related context effects with two components: a measure of the value of each alternative if considered separately and a measure of the relative advantage of each option compared to all of the other options in the choice set. This latter component explains effects such as asymmetric dominance, since the dominating option has a clear advantage over the asymmetrically dominated option, whereas the advantages of the nondominated alternative over the dominating and asymmetrically dominated option are not as clear.

Simonson and Tversky (1992), in a tour de force paper, demonstrate that the principles of trade-off contrast and extremeness aversion can be used in their model to explain such context phenomena as local and background contrast and attraction, compromise, and polarization effects. Trade-off contrast refers to the fact that a given trade-off can appear more or less favorable depending on other implied trade-offs in the choice set, and extremeness

aversion reflects that intermediate options tend to be favored because disadvantages loom larger than advantages and intermediate options have relatively smaller disadvantages than extreme options.

We have attempted to explain such results above when presenting our framework. Our basic argument is that for simple choice problems the relations among the choice options are both easy to ascertain perceptually and are likely to be viewed as plausible reasons or justifications for choice. Indeed, we might push the argument a step further and assert that situations with simple options where the relationships among the options are easy to ascertain are more likely to evoke ease of justification as a relevant choice goal. Because they can be perceived with little effort, relationships among options may be used to make choices in situations with simple options even if they do not provide good justifications (e.g., for compromise effects, see Simonson [1989]).

As noted above, we believe that relationships among options will be more difficult to assess if the set of choice options is large or displayed in such a way that these relationships are less transparent. We also believe that the value component of the componential context model is more relevant to attaining accuracy goals and that the relative advantage component is more relevant for achieving effort and justification goals. Recall that  $\theta$  is the parameter in the componential context model that is the weight given to the relative advantage component; that is,  $\theta$  may capture the degree to which the focus is on local relationships in a choice set rather than absolute criteria. Based on the discussion above, we hypothesize that  $\theta$  will be a function of the relative strength of goals (with  $\theta$  higher if less weight is placed on accuracy and more weight is placed on effort and justification), task size (with  $\theta$  lower the greater the number of options and attributes),<sup>4</sup> and transparency of the relationships (with  $\theta$  higher the more transparent the relationships). We believe that research testing such predictions regarding the componential context model would be very important. In summary, we assert:

*Proposition 6.1:* Adding an asymmetrically dominated alternative to a choice set results in increased choice share for the dominating alternative. This effect is enhanced under increased need for justification.

*Proposition 6.2:* Many context effects can be accounted for by considering the value of each alternative considered separately and the relative advantage of each option compared to the other available options.

## DISCUSSION

We have now presented a framework for constructive consumer choice and have attempted to review the litera-

<sup>4</sup>Note the parallel to the results in noncomparable choice, where consumers switch to relying more on overall value as the options become more noncomparable.

ture on consumer decision making in light of that framework. However, there are several issues that still remain. First, there are some areas of research that we feel we cannot yet do a good job of explaining within our framework. Second, some broad generalizations about the literature have become apparent that point to large gaps in our knowledge. Third, we discuss the conditions under which constructive choices are likely to be adaptive (i.e., intelligent, if not optimal, responses to task demands). Finally, we consider the implications of a constructive view of consumer choice for measuring preferences, one of the most crucial applied problems in consumer research.

### Findings That Our Framework Cannot Fully Explain

Two areas of research pose problems for our framework, framing effects and preferences over time. It is clear that different ways of framing a problem can lead to different choices (Tversky and Kahneman 1988). For example, Levin and Gaeth (1988) show that labeling beef as 75 percent lean results in more favorable evaluations than referring to it as 25 percent fat, especially before tasting it. Mellers, Schwartz, and Cooke (1998) suggest that such framing manipulations influence the salience of the good and the bad features of outcomes. Different frames clearly can make gains or losses more salient, and differential reactions to gains and losses underlie many framing effects (e.g., Puto 1987; Shiv, Edell, and Payne 1997; Tversky and Kahneman 1981). Thus, frames may have an emotional component, and we have argued above that avoidance of losses may help satisfy the goal of minimizing negative emotion (Luce et al. 1998). More generally, framing effects suggest that "people choose, in effect, between descriptions of options rather than between the options themselves" (Tversky 1996, p. 7).

The framework presented in this article can make some inroads into explaining such effects, arguing that a frame makes certain aspects both more perceptually salient (involuntary attention) and less effortful to process. In addition, people may fail to transform problems into a single canonical representation that would avoid framing effects due to limits on intuitive computation, even in simple problems (Kahneman and Tversky 1984). People tend to accept the frame presented in a problem and evaluate options in terms of the reference point suggested by that frame, a concept clearly related to the concreteness principle mentioned earlier. The choice goals framework, however, is silent on why losses loom larger than equivalent gains (loss aversion).

A topic related to research on framing that our framework does not address in sufficient detail is the nature of problem representations. Our framework tends to consider problem representations as given by the structure of the task (see Coupey [1994], and Lynch, Chakravarti, and Mitra [1991] for exceptions). However, our framework

should be extended to address the principles governing how representations are formed. For example, individuals may construct representations that minimize cognitive load, perhaps by using relevant analogies. Depending on the goodness of the analogy, this can be an efficient solution, although individuals may not consider alternative representations once they have one that seems reasonable (Legrenzi et al. 1993). When no appropriate analogy exists, the consumer must construct a representation. We speculate that the representation formed will depend on what is most salient in the choice environment (due to both voluntary and involuntary attention), but very little is known about this process.

A second area of research that is problematic for our model focuses on choices that have consequences over time. Simonson (1990), for example, shows that whether one chooses items for future consumption on multiple occasions by making a combined choice all at one time or separately on each occasion has a systematic influence on choices. In particular, choices made all at one time increase the amount of variety in the choices. Read and Loewenstein (1995) provide a model and theoretical account of this phenomenon based on time contraction (consumers compress future time intervals when making combined choices and hence overestimate the effect of satiation) and choice bracketing (combined choices are framed together as a portfolio, whereas the separate choices are viewed more independently). As another example of choices over time, Wertenbroch (1998) argues that consumers exert self-control in consumption by rationing their purchase quantities (e.g., buying only a single pack of cigarettes at a time to help cut down on their smoking; see Hoch and Loewenstein [1991] for other work on self-control). Again, some aspects of these results can be understood in terms of our framework, particularly the Wertenbroch results. The consumer appears to be trading off increased acquisition effort for increased long-run accuracy. However, there are also trade-offs between long-run and short-run accuracy (i.e., the consumer wanting a cigarette now but knowing it is bad for him or her in the long run).

These two areas of research (framing and choice over time) reveal gaps that our framework still cannot fill. In both cases, perceptual principles seem involved to some extent (e.g., diminishing sensitivity to changes and loss aversion in framing and time contraction in the choices over time). Thus, research that attempts to buttress the perceptual aspects of the choice goals framework is needed.

### Some Generalizations from Reviewing Constructive Consumer Choice

In reviewing the literature on constructive consumer choice, we have drawn many generalizations about specific topic areas, expressed as the propositions summarized as Appendix B. However, two broader generaliza-



tions have also emerged: (1) task differences between research based on accuracy-effort ideas (e.g., task difficulty issues) and research based on perceptual notions (e.g., asymmetric dominance and other relationships among options), and (2) the lack of research on the dynamics of constructive choice.

First, striking task differences became apparent between research based on the accuracy-effort and perceptual approaches. Research based on accuracy-effort concerns generally considers larger, more complex problems and focuses more heavily on process than on outcome. Conversely, research from the perceptual perspective relies more on small, relatively simple problems and focuses on outcomes rather than process. These differences are very understandable; for example, to observe process one must have problems of some complexity. Otherwise there will be either no process to observe or the process will be so constrained that it will be trivial and invariant across conditions. Also, studies interested in observing process often restrict information gathering so that each piece of information examined can be observed (e.g., by using computerized information acquisition programs). At the other extreme, perceptual studies often make all information available simultaneously.

We believe that these differences in tasks across types of studies have major consequences. For example, the use of simple problems and simultaneous presentation in perceptual research makes relational aspects much more salient, hence making context effects and an ease of justification goal more prevalent. Thus, one large gap in the literature could be addressed by research that attempts to unconfound the conceptual approach from problem type. For example, research on context effects could be carried out with larger, more complex problems. Researchers using a perceptual framework could also attempt to enumerate the types of relational heuristics consumers might use and try to observe the processes involved in implementing such heuristics (this would also require more complex problems). Accuracy-effort researchers, in contrast, might attempt to analyze relational heuristic properties and how their usage varies depending on typical accuracy-effort variables such as time pressure, problem size, and so on.

A second broad generalization that is readily apparent is that there is very little work on choice dynamics. This is true at two levels. First, there is a need for work on how the focus of attention changes constructively over the course of a decision. Verbal protocols taken during choice processes reveal a complex dynamic course, with various aspects being noticed, which then cause shifts in processing, which then lead to different aspects being noticed, and so on (see, for example, Payne et al. 1993, pp. 175–176). However, we are not aware of any research in consumer choice that attempts to model the detailed, changing focus of attention over the course of a choice episode. To really understand

how choice is constructed “on the fly,” analysis at this level of detail seems necessary. Second, there is little research on sequences of choices over time. Without studying such sequences and the interactions among choices and their outcomes over time, it is difficult to observe how representations change or how learning occurs at the process level, for example. Third, people may have limited ability to predict to-be-experienced utility (Kahneman 1994). Consequently, people may seek to maximize the accuracy of a choice but instead experience later disappointment or regret due to a failure to consider how their tastes might change over time. Hence, a second broad gap in research is studying various facets of choice dynamics.

### When Will Constructive Choice Be Adaptive?

One issue we have not yet addressed is when constructive choices will be adaptive. Although being adaptive is hard to define, we generally mean making intelligent, if not necessarily optimal, choices. We believe that consumers are often adaptive in the above sense but that such adaptivity is not universal. There is some evidence, for example, that consumers’ responses to time pressure are adaptive. However, many factors can lead to failures in adaptivity, including lack of knowledge of appropriate strategies, difficulties in assessing properties of the choice task, overreliance on the most salient factors in the task environment, overgeneralization of heuristic strategies, and difficulties in implementing strategies. We also believe that certain kinds of failures are more likely than others. For example, overreliance on the most salient surface properties of the task can be particularly problematic if such properties capture consumers’ attention but are not related to consumers’ underlying values. In such a case, choices will likely not be adaptive. As a broad generalization, we believe lack of adaptivity is often more prevalent in studies based on perceptual notions, partly because such studies enhance perceptual salience and are often designed to specifically document biases in choice. It is clear, however, that much more research is needed on the extent and determinants of consumer adaptivity. One major problem in conducting such research will be to develop defensible measures for the goodness of a consumer’s choice.

### Assessment of Preferences in a Constructive World

In a constructive world, preferences differ depending on a wide variety of factors, as reviewed above. What does this imply for the assessment of preferences, which is a major focus of market research? We believe that the answer to this question depends on the goal of the analyst. One possible goal is that the analyst wishes to be able to predict the consumer’s preferences in order

to be able to predict market response. Context matching is the recommended approach for prediction purposes. In implementing context matching, the analyst attempts to determine the relevant factors that might influence preferences in the consumer's environment and then match the values of those factors in the measurement environment (Simmons, Bickart, and Lynch 1993; Wright and Kriewall 1980). For example, such factors as the number of options and attributes, the context provided by competing options, interattribute correlations, time pressure, response mode, and others can affect choices. The environment in which preferences are elicited should try to approximate the consumer's environment on all of these factors, particularly if the consumer has little familiarity with the decision. Context matching thus demands a thorough knowledge of the properties of consumer choice environments. In some cases, factors may differ systematically across environments (e.g., the set of available options may vary from store to store or from region to region). In that case, measurements may need to be taken for each of the major variants of the choice environment and then aggregated based on the relative frequency of these variants. Thus, context matching seems appropriate, even if potentially difficult, for prediction, which may be the goal in many market research applications.

However, in some situations we may wish to aid consumers as they construct their preferences (e.g., when measuring values for environmental goods or when helping a consumer select a college). For example, consumers are increasingly being asked to make choices among or provide values for environmental goods, such as cleaning up a lake, preventing deaths of animals, or decreasing levels of pollution. Environmental goods are often unfamiliar and often involve difficult trade-offs. In such situations we want to help consumers achieve a "defensible" expression of their preferences (Gregory et al. 1993) or help them develop preferences by considering the implications of those preferences and how to manage them (e.g., to reduce regret; Simonson 1992; Slovic 1995). Thus, an important area for future research is developing guidelines for a good preference construction process and doing empirical research to document that such guidelines are indeed effective. Such guidelines might include ensuring consideration of multiple viewpoints and options, using multiple response modes (Huber et al. 1993), and requiring explicit trade-offs. For an example of such guidelines, see Payne, Bettman, and Schkade (1998).

We have sought to convey the constructive nature of consumer choice in this article. We have also tried to communicate an integrated framework for understanding such behavior. Finally, throughout this article we have attempted to identify gaps requiring future research. These potential research areas are summarized in Appendix C. We are excited that a broad array of

intriguing research opportunities remains, and we believe that understanding consumer decision processes will continue to be a major focus of consumer behavior research and theory.

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## APPENDIX A

### Summary Propositions for the Integrated Conceptual Framework

*Proposition 1.1:* Consumers make choices in order to accomplish goals. Four of the most important goals for consumer decision making are (a) maximizing the accuracy of the choice, (b) minimizing the cognitive effort required to make the choice, (c) minimizing the experience of negative emotion when making the choice, and (d) maximizing the ease of justifying the decision.

*Proposition 1.2:* The relative weight placed on various goals will be influenced by a variety of problem characteristics, including the importance and irreversibility of the decision and the timeliness and ambiguity of the feedback available on performance relative to each goal.

*Proposition 1.3:* Two major influences on the selectivity of attention are current goals (voluntary attention) and surprising, novel, threatening, unexpected, or otherwise perceptually salient aspects of the choice environment (involuntary attention). Such factors can also affect the perceptual interpretation of focal aspects of the environment.

*Proposition 1.4:* Individuals have a repertoire of different strategies for solving decision problems. This repertoire will vary across individuals depending on their experience and training.

*Proposition 1.5:* Different strategies vary in their advantages and disadvantages with respect to accomplishing different goals in a given situation. These relative advantages and disadvantages may be a function of consumers' skills and knowledge and will vary from one choice environment to another.

*Proposition 1.6:* Consumers select the strategy that best meets their goals for a particular situation given the array of possible strategies and their advantages/disadvantages with respect to these goals.

## APPENDIX B

### PROPOSITIONS FOR CONSTRUCTIVE CONSUMER CHOICE

#### Choice Tasks Where Accuracy and Effort Goals Predominate

##### Problem Difficulty

###### *Problem Size*

*Proposition 2.1:* Increases in the number of alternatives lead to a greater use of noncompensatory choice strategies. Increases in the number of attributes generally lead to increased selectivity, but not to strategy changes.

*Proposition 2.2:* Information load will not be harmful to accuracy if consumers select a subset of the information that reflects their values; if selectivity is based on problem features that do not reflect consumers' underlying values, information load can decrease accuracy.

###### *Time Pressure*

*Proposition 2.3:* Under moderate time pressure, consumers process more rapidly and become more selective. Under more severe time pressure, individuals switch to more attribute-based heuristics.

*Proposition 2.4:* Consumers weight negative information more heavily under time pressure.

###### *Attribute Correlation*

*Proposition 2.5:* Consumers engage in processing more like weighted adding (more extensive, less selective, and more alternative based) under negative interattribute correlation in less emotional decision tasks.

###### *Completeness of Information*

*Proposition 2.6:* Consumers may infer values for a missing attribute using heuristics based on other-brand information (other values for that attribute in the set of options) or same-brand information (values for other attributes of the same brand with the missing value). Which type of heuristic is used depends on the relative accessibility and diagnosticity of each type of information.

###### *Information Format*

*Proposition 2.7:* Different information formats can make some forms of processing easier and less effortful than others. The processing encouraged by the format will be more likely; however, potential accuracy losses due to the encouraged form of processing will lessen the effect of format.

#### *Comparable versus Noncomparable Choice*

*Proposition 2.8:* Processing can differ between comparable and noncomparable choices. Consumers can develop more abstract attributes or compare overall evaluations as choices become more noncomparable. Their use of these strategies is governed by accuracy-effort concerns. If a specific criterion is primed, however, noncomparable choice processes more closely resemble those for comparable options.

##### Response Mode

*Proposition 3.1:* Different response modes (e.g., choice vs. matching) can lead to different preferences and to preference reversals. Choice encourages more selective and attribute-based comparative processes, whereas rating or matching encourage less selective, more alternative-based, quantitative processing.

*Proposition 3.2:* Preference reversals can be reduced by making the more quantitative processing easier, by greater familiarity with the options, and by repeated experience with incentives and feedback on the task.

#### Interactions between Consumer Knowledge and Decision Making

##### *Choice Process and Memory Interactions*

*Proposition 4.1:* Because choice processes are selective and comparative, choice processes influence both which items are stored in memory and the organization of such memories. Conversely, information in memory can affect the form of choice processes.

*Proposition 4.2:* Consumers will use information in memory to make a choice to the extent that it is more accessible and more diagnostic than alternative sources of information.

##### *Categorization and Choice*

*Proposition 4.3:* Categorical processing is more likely to be used when expectations are met, with more detailed (piecemeal) processing more likely when expectations are not met and the consumer has expertise in the category.

#### Choice Tasks Where Minimizing Negative Emotion Is Relevant

*Proposition 5.1:* Emotion-laden choices are characterized by more extensive, more selective, and more attribute-based processing. In general, emotion-laden choices encourage avoidant behaviors.

#### Choice Tasks Where Maximizing Ease of Justification Is Relevant

*Proposition 6.1:* Adding an asymmetrically dominated alternative to a choice set results in increased choice

share for the dominating alternative. This effect is enhanced under increased need for justification.

*Proposition 6.2:* Many context effects can be accounted for by considering the value of each alternative considered separately and the relative advantage of each option compared to the other available options.

## APPENDIX C

### Topics for Future Research on Constructive Consumer Choice

#### *Research on the Choice Goals Framework*

- Specifying factors that determine the relative salience of choice goals.
- Specifying relational heuristics at a process level and determining their effort-accuracy characteristics.
- Modeling the implementation difficulty of strategies.
- Measuring the degree of emotion during a decision.
- Specifying determinants of the emotional difficulty of a choice task.
- Examining how problem complexity affects the use of relationship information as reasons.
- Measuring the justifiability of various strategies.

#### *Research in Choice Tasks Where Accuracy and Effort Goals Predominate*

- Characterizing how consumers become selective as a function of information load and other factors.
- Examining how the frequency of preference reversals is related to the emphasis on accuracy in the choice task.
- Characterizing the properties of analogies in terms of choice goals and examining contingent analogy usage.

#### *Research in Choice Tasks Where Minimizing Negative Emotion Is Relevant*

- Characterizing attribute properties and their effects on trade-off difficulty, processing, and choice.

#### *Research in Choice Tasks Where Maximizing Ease of Justification Is Relevant*

- Examining the weight placed on the relative advantage component of the componential context model as a function of relative goal strength, task size, and transparency of relationships.

#### *Other Gaps in the Literature*

- Addressing the principles governing the formation of representations.
- Using more complex problems and process tracing in perceptual framework research.

- Examining the use of relational heuristics as a function of task complexity variables.
- Characterizing the determinants of focus of attention over the course of a decision.
- Studying choice processes over time.
- Examining the extent and determinants of consumer adaptivity.
- Developing guidelines for preference construction processes and empirically documenting their effectiveness.

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