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## Faculty Working Papers

SEQUENTIAL AND CYCLICAL NATURE OF INFORMATION  
PROCESSING MODELS IN REPETITIVE CHOICE BEHAVIOR

Jagdish N. Sheth and P. S. Raju

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College of Commerce and Business Administration  
University of Illinois at Urbana-Champaign



FACULTY WORKING PAPERS

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December 31, 1973

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CHOICE BEHAVIOR

Jagdish N. Sheth and P. S. Raju<sup>1</sup>  
University of Illinois

There is considerable controversy in consumer and social psychology about the role of attitudes as causal predictors of choice behavior (Cohen, 1964; Bem, 1970; Insko, 1967; Crespi, 1971). The controversy can be classified into three distinct areas of concern. First, are attitudes either necessary or even relevant to the understanding of choice behavior processes? This has been the heart of heated disagreement between the behaviorists and the cognitivists in psychology (Hilgard and Bower, 1966; McGuire, 1969). It is even more vividly manifested in the recent interest in behavior modification as a substitute for cognitively based attitude modification in numerous areas of societal problems such as alcoholism, emotional disturbance and drug abuse. In consumer psychology, Bass has recently revived this concern by suggesting that stochastic models of choice behavior may be superior to attitude models of choice behavior because of better and more reliable prediction (Bass, 1973). This is analogous to earlier works of Kuehn, Frank, Massy and their associates (Frank, Kuehn and Massy, 1962; Massy, Montgomery and Morrison, 1970) in which almost a decade of research concentrated on the examination of the usefulness of stochastic models such as Bernoulli, Markov chains and linear learning models of brand choice behavior.

Second, are attitudes the cause and choice behavior the effect or vice versa? This concern about the directionality of attitude-behavior relationship is still very strong in social psychology (Triandis, 1971) almost a decade after Festinger raised it as part of the dissonance theory inferences in the area of cognitive consistency (Festinger, 1969). Fortunately, in consumer psychology, we seem to have a consensus that the attitudes and choice behavior are mutually interdependent over time (Howard and Sheth, 1969) due to the repetitive and dynamic nature of consumer choice behavior. However, the concern is still raised as to whether attitude change precedes behavior change.

Third, what specific model of attitude structure is most useful as a predictor of choice behavior? While there are numerous models of attitudes as contenders (Fishbein, 1967; Rokeach, 1970; Rosenberg, 1956; Triandis, 1971; Sheth, 1970, 1973), there is virtually no agreement as to their relevance or appropriateness in specific situations. This is further complicated by the recent interest in forms of attitude structures other than the linear additive models (Einhorn, 1970; Wright, 1972; Calder and Lutz, 1972; Bettman, 1970, 1971).

Our objective in this paper is to present a theoretical framework of attitude behavior relationship which hopefully will provide resolutions for some of the concerns raised above. Based on the dynamics of repetitive choice behavior in consumer psychology, we have developed a sequential typology of different information-processing models which indicates how



different choice situations are based on different models. In addition, the theory brings out in bold relief several other determinants of choice behavior in addition to attitudes.

### Description of Four Choice Mechanisms

Attitudes are not the sole determinants of all choice behaviors in consumer psychology. Indeed, there are several systematic and biased choice behaviors manifested by the consumer without a concomitant presence of attitudes. However, we also do not believe that all choice behaviors are determined by factors other than attitudes. We believe that systematic choice behavior in consumer psychology is determined by any one of the following four choice mechanisms. Before we discuss each choice mechanism, several things should be pointed out. First, some choice mechanisms are fully in the control of the consumer while others are controlled by his environment including the marketing activities of companies. Second, at a point in time, a specific choice mechanism dominates the consumer's choice behavior. However, due to individual differences, it is necessary to build a linear additive model of these choice mechanisms as determinants of consumers' choice behavior. Third, the four choice mechanisms hypothesized in this paper are sequentially dependent on one another over time. The sequential nature of their relationships over a period of time will be discussed later.

The first mechanism is called Situation Controlled Choice Mechanism (SCCM). It implies that the consumer makes a biased choice among alternatives such as products or brands solely due to the motivational impact of the situational stimuli and without any comparisons of the cognitive belief structures of the alternatives. It is, however, possible that the motivational impact of the situational stimuli may also heighten emotive tendencies such as affect, fear, love, anxiety and the like. Finally, the SCCM entails only binary choices such as buy or no buy responses toward a product class or brand.

The SCCM is analogous to the S-R relationships hypothesized and heavily researched in psychology. It is irrelevant to include the learning or the conditioning aspects here. Also, individual differences are presumed but not as widespread as in other choice mechanisms. We can, in general, identify four different types of stimuli. These are Personal Stimuli, Social Stimuli, Significant Stimuli and Symbolic Stimuli. The latter three have been identified by Howard and Sheth (1969). Personal Stimuli are stimuli which are internal to the consumer such as hunger, thirst, etc. Social Stimuli are those that emanate from other people, such as friends and relatives of the buyer either through words or action. Significant Stimuli refers to stimuli that emerge from the physical object itself and Symbolic Stimuli refers to stimuli that emanate from symbols of the actual object such as words, writing or pictures.

There are several types of systematic choice behaviors in consumer psychology which can be explained by the SCCM. These include all the unplanned but biased choices the consumer makes due to time and place stimuli which arouse and heighten either the specific motives or the non specific motivational level. For example, many stimuli can arouse





anxiety or fear in the consumer (Wheatly and Oshikawa, 1970; McGuire, 1963) and also housewives tend to impulsively buy many ready to eat items in the supermarket when they shop during lunch or dinner time. Many studies (Kollat and Willet, 1967; Stern, 1962; West, 1951) point to the importance of impulse buying where a biased brand choice of unplanned products often arises due to the display or communication at the time and place of shopping.

The second mechanism is called Belief-Controlled Choice Mechanism (BCCM). It implies that the consumer makes a systematic choice among several alternatives after performing a mental utility analysis by cognitively structuring his beliefs about their potential to satisfy a set of needs, wants or desires. It is presumed that the consumer minimizes the impact of the environmental stimuli except as they become relevant to his choice process.

The BCCM represents the rational decision-making process which consumers manifest in some of their buyer behavior activities and which the society normatively considers as the ideal way for the individual to behave. The cognitive psychologist is the prime believer in this choice mechanism and various models of cognitive consistency are efforts to discover the underlying processes by which the Belief-Controlled choice mechanism works. This is, therefore, the heart of information-processing modeling effort and we will provide a detailed sequential typology later in the paper.

The BCCM is generally presumed to be the dominant mechanism in those consumer choice situations which are important to him, have higher perceived risk or he is involved. While there is some controversy, most researchers believe that all the initial choice behaviors for major consumption areas are dominated by the BCCM.

The third mechanism is called the Habit-Controlled Choice Mechanism (HCCM). It implies that the consumer makes a biased choice based on past rewarded experiences, and that the choice is reduced to a binary choice between the habituated alternative and any other alternative. While he may have a belief structure related to the habituated alternative, it is not consciously or actively taken into account in his actual choice. Instead, we presume that he somehow has converted his belief structure into either a strong affective or conative tendency which is the sole criterion he utilizes at the time of choice behavior. It should also be noted that strong affective or conative tendencies may also arise without any belief structure.

The habitual choice behavior in consumer psychology is widespread, especially for frequently purchased products and services. The instrumental conditioning seems to be the direct basis for habitual choice behavior and, therefore, the role of learning theory is very critical in this choice mechanism (Kuehn, 1962).

The last mechanism is called the Curiosity-Controlled Choice Mechanism (CCCM). It implies that the consumer makes a systematic choice based on a nonspecific motivation and, therefore, the intrinsic utility of the alternatives is irrelevant to his choice behavior. The nonspecific motivation implied as the impelling force in CCCM is what Berlyne (1960, 1963, 1964, 1966) has labelled as novelty, curiosity or exploratory behavior. While we will discuss the nature of CCCM, it is sufficient to





note that the systematic choice behavior determined by the CCCM is more common in consumer behavior than suspected. Furthermore, similar to the SCCM and the HCCM, the choice is reduced to a binary proposition.

What are the similarities and differences among the four choice mechanisms? First, the Situation-Controlled and the Curiosity-Controlled choice mechanisms are least controlled by the individual. On the other hand, the Belief-Controlled and the Habit-Controlled choice mechanisms are most controlled by the individual. Second, only the Belief-Controlled choice mechanism entails systematic analysis and choice from among several alternatives. In the case of all the other three choice mechanisms, the choice is reduced to a binary proposition. Third, attitudes models are relevant only where the Belief-Controlled choice mechanism operates while attitude measurement may correlate in other choice situations determined by the other three choice mechanisms, it is less fruitful as a model for future predictions.

Thus, we propose that neither one of the extreme beliefs (i.e. attitudes are not useful predictors or attitudes are the only predictors of choice behavior) is relevant or correct in consumer psychology. There is enough empirical evidence to believe in the presence of all the four choice mechanisms in consumer behavior. What remains to be done is to identify types of consumer behavior in which each choice mechanism predominates. We, therefore, propose the following model of choice behavior in consumer psychology:

$$\text{Choice Behavior} = B_1 (\text{SCCM}) + B_2 (\text{BCCM}) + B_3 (\text{HCCM}) + B_4 (\text{CCCM}) + \text{error}$$

We must first isolate random choice behavior from total choice behavior, which is then determined by any combination of the four choice mechanisms. It should lead to an empirical determination of the following questions: (a) Which choice mechanism is more important in consumer behavior? (b) Is the hypothesized linear additive relationship among the choice mechanisms true in the real world or are there any interactions among the choice mechanisms? (c) If there are interactions, what is the complexity of interaction among the four choice mechanisms? (d) Are there any specific consumer choice situations in which any one choice mechanism predominates?

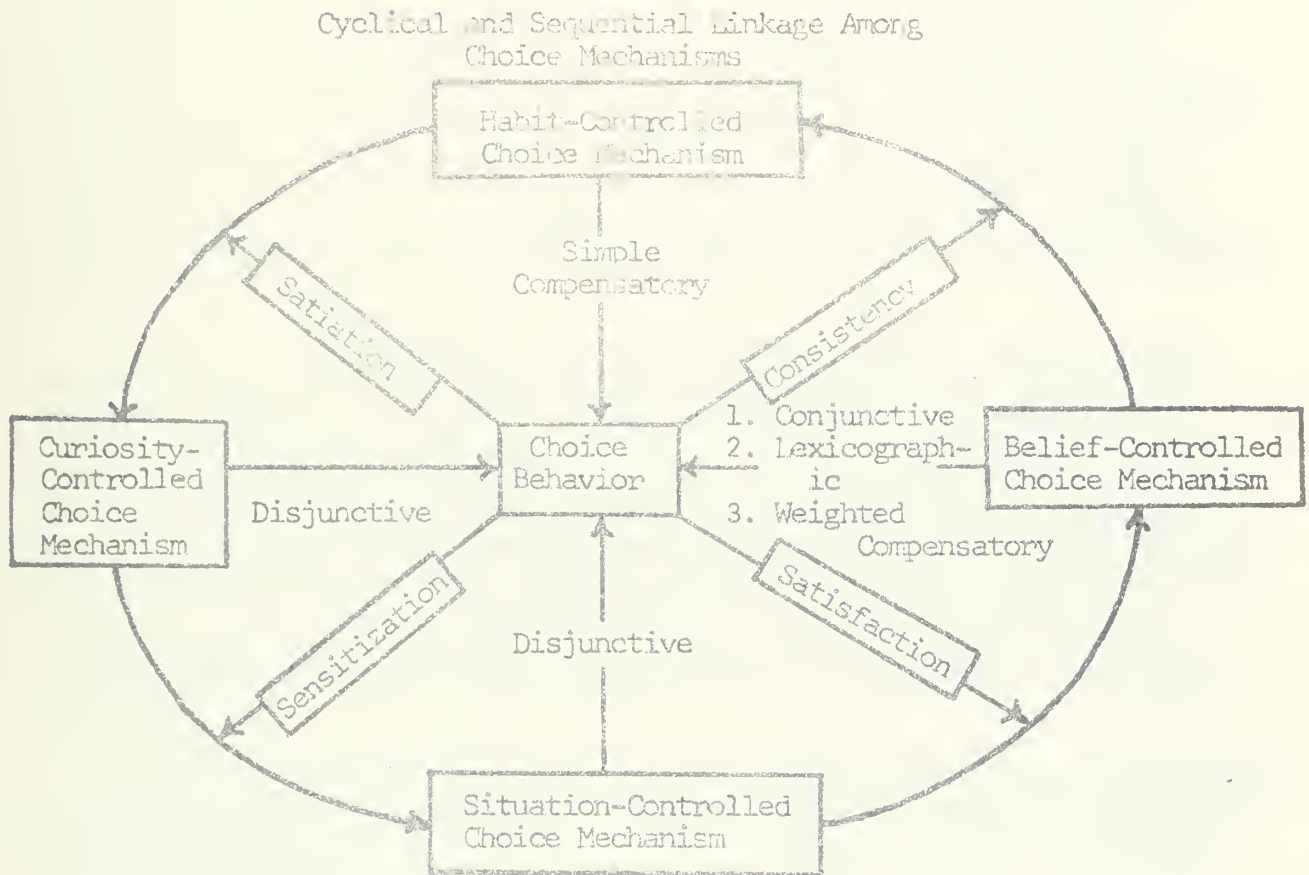
#### Dynamics of Choice Mechanisms and The Underlying Information Processing Models

To examine more carefully the interrelationships among the four choice mechanisms we propose a cyclical sequential linkage among the four choice mechanisms. This cyclical sequential linkage is a direct function of the learning entailed in repetitive choice behaviors and it is based on the cycle of psychology of complication and simplification proposed by Howard and Sheth (1969). The full cycle is summarized in Figure 1. The left half of the figure, where the flow is from HCCM to SCCM, represents the psychology of complication and the right half where the flow is from SCCM to HCCM represents the psychology of simplification.

Before we discuss the elements and rationale of the cycle of choice mechanisms there are several points which should be explicitly stated.



Figure 1



First, it is very difficult, if not impossible to suggest how the cycle is activated in consumer behavior due to product differences and consumer differences. However, since buying behavior is an ongoing process, we presume that for most well-established products and services, the cycle is at the Habit-Controlled choice mechanism. In other words, most consumers for well-established products and services manifest habitual choice behavior. Accordingly, we will discuss the cycle starting with the HCCM even though this may not be the starting point for some consumers and for new products.

Second, while the four choice mechanisms and the antecedent and subsequent psychological processes (Satiation, Sensitization, Satisfaction and Consistency) are sequentially related we presume that the consumer can and often does, short-circuit the total cycle. Therefore, he may skip or bypass the sequential steps in some situations. This is especially relevant to the purchase of durable versus non durable goods since the HCCM stage is predominant only in the case of frequent and less important purchases.

Third, we believe that different types of information-processing models underlie each of the four choice mechanisms. Therefore, there is a sequential hierarchy among the different information-processing models. We will limit our analysis in this paper to the following five information-processing models even though we believe there are several other possible models in the consumer choice process: (a) conjunctive model (Coomb's, 1964;





Einhorn, 1970) in which that alternative is chosen which meets the minimum levels of utility on a vector of choice criteria; (b) disjunctive model (Coombs, 1964; Einhorn, 1970) in which that alternative is chosen which provides the maximum level of utility on any one element of a vector of choice criteria; (c) lexicographic model (Coombs, 1964) in which that alternative is chosen which conditionally provides the maximum level of utility on a criterion after satisfying the maximum levels of more salient choice criteria; (d) weighted compensatory model in which that alternative is chosen which has the highest utility derived from an optimum linear combination of a vector of choice criteria which are weighted by their importances; and (e) simple compensatory model in which that alternative is chosen which provides the maximum utility derived from an optimum linear combination of a vector of choice criteria.

Finally, the information-processing models vary with respect to two aspects both of which are relevant to the consumer (Wright, 1973). They vary with respect to the effort (search, deliberation and evaluation) required on the part of the consumer to base his choice behavior upon them. For example, the conjunctive and the lexicographic models are more effortful than the disjunctive or simple compensatory models. Secondly, the models also vary with respect to the unique choice they enable the consumer to make based on those choice criteria. Some models provide so much restriction that only a few alternatives can meet their requirements, whereas, other models are less restrictive so that the consumer still has a choice problem among several alternatives all of which meet the model requirements.

We believe that the consumer's need to differentiate among alternatives varies significantly as he passes through the various stages of psychology of simplification and complication. Accordingly, he is likely to choose only those models at a specific stage of the cycle which are optimal in terms of the effort needed to make the differentiated choice.

We will now describe the cycle of choice mechanisms starting with the Habit-Controlled Choice Mechanism (HCCM). As stated before, the HCCM can exist without any underlying cognitive structure consisting of a vector of choice criteria especially if the consumer has short circuited his learning process by bypassing the Belief-Controlled Choice Mechanism (BOCM) stage.

When there is no underlying cognitive structure in the HCCM, we believe that none of the information-processing models is useful as a predictor of choice behavior. At best, some emotive tendencies such as affect, fear, compliance, etc. or some conative tendencies such as prior history of choices, plans and intentions are likely to be useful predictors of choice behavior. Thus, naive models based on pattern of the past choice behaviors may be sufficient in this situation.

On the other hand, the HCCM may be based on some cognitive structure learned in the past. We believe, however, that the dimensionality of the choice criteria is narrowed down to one or at best two criteria. In other words, it is a highly simplified cognitive structure which underlies the HCCM. At the same time, the consumer is not interested in exerting effort in his choice behavior nor is he seeking any high degree of differentiability among the alternatives. This may be partly due to the fact that





the learning has vastly increased his ability to discriminate among alternatives even though the simple information-processing model used does not indicate substantial differences among alternatives. In fact, he has reduced his choice process to a binary level of choosing between the habituated response and any alternative response. We, therefore, believe that the most appropriate information-processing model is the simple compensatory model where the choice is on a single dimension.

From the habitual behavior, the consumer passes into the stage of exploratory behavior due to the satiation, boredom or monotony in consumption. The consumer is now in search for new criteria and new alternatives. The exploratory behavior is therefore strongly controlled by the nonspecific and unrelated motives such as curiosity, novelty and the like. The novelty or curiosity itself may be with respect to any one particular aspect of the product e.g. its packaging, name, display, etc. Further novelty, curiosity, surprisingness, complexity, etc. are the different dimensions of the exploratory behavior and as long as a brand or product is maximum on any one of these dimensions it could be chosen. In this sense a disjunctive model is used and the consumer does not care as much about the utility of the brand or product on the actual choice criteria (which he may or may not know). We should, therefore, expect considerable choice switching by the consumer despite his prior experience.

The choice criteria dominated by CCCM results in greater sensitization of the environmental stimuli with respect to new alternatives on the part of the consumer. This heightened sensitization to informational stimuli enables the situational variables to dominate the choice behavior. He passes now to the stage of choice behavior where SCCM operates most effectively.

Again, in the SCCM, the consumer may or may not have a set of choice criteria based on the extent of his previous experience. This is more so in the case of a new product or the first purchase of an existing product. Using the Howard and Sheth (1969) terminology the buyer may be in the extensive problem solving stage or the limited problem solving stage. In SCCM the purchase behavior is impulsive as compared with exploratory behavior in the case of CCCM. The logical information-processing model in this stage would be the disjunctive model due to the following reasons: (1) The consumer usually does not spend much time in evaluating alternatives in impulse purchase. (2) The lack of a well ordered, set of choice criteria. (3) The strategy with established minimum levels at this point in time would be more oriented toward creating a subset of acceptable alternatives rather than determining one best choice.

Accordingly, we hypothesize that the disjunctive model is the most appropriate choice model. However, unlike the CCCM, the disjunctive model is not limited to any predefined choice criterion such as novelty or curiosity but is open to as many choice criteria as the environmental stimuli suggest to the consumer. Thus, any competitive effort by the industry will be effective in precipitating a choice behavior.

The consequences of choice behavior determined by the SCCM are evaluated in terms of consumer satisfaction. The consumer learns more about the alternatives from several trial and error choices. He learns about the choice criteria which are relevant to his needs. He also learns about the



payoffs each alternative provides to him. Also with increased learning the need to gather more information about the alternatives decreases (Swan, 1969). Further, positive reinforcement rather than mere experience seems to be the key factor in the learning (Bennett and Mandell, 1969).

With sufficient experiences and past decision evaluations of the choices, the consumer relies less on the situational stimuli and more on his own cognitive world. He has a belief system about each alternative and he wishes to utilize it in his choice behavior. At this stage the BCCM predominates the choice behavior.

It is in the BCCM stage that the attitude models become most useful and relevant in our effort to build models of buyer behavior. This is also the stage which the public policy considers most useful in the determination of rational consumers in the society.

We believe that there are at least three sequential strategies the consumer follows while he makes his choices based on the BCCM. The first strategy is the use of the conjunctive model in which he specifies the minimum acceptable levels of a vector of choice criteria. He is striving to achieve a very rational decision making process and wishes to maximize his joint utility of a number of benefits in a single choice behavior.

However, the conjunctive model is more effortful even though it might lead to a smaller choice set than other information processing strategies. The logical step is for the consumer to switch to lexicographic model in which he orders the choice criteria. Since the lexicographic model entails the ordering of choice criteria, the consumer has to compare the alternatives on only one criterion at a time. Also at each step, the number of alternatives to compare will reduce substantially. This results in an enormous simplification of the task which is consistent with the simplification strategy adopted by the consumer. The first step in the ordering of the choice criteria could be the selection of a subset of the choice criteria by giving a 1-0 weight to each criterion (Bettman, 1973). The consumer may then order in a more refined manner, the criteria which are in the subset.

Though the lexicographic model enables the consumer to evaluate alternatives on one criterion at a time it is still a multidimensional model in the sense that the consumer has to keep in mind the rating of each alternative on every choice criteria. The next logical step in the simplification process would then be to create a summary measure for each alternative based on its rating on each criterion and just use this summary measure for evaluation purposes. The comparison is now on a single dimension. The summary measure is the weighted linear compensatory model. The weights are the direct result of the conversion of the ordinal scale used in the lexicographic model to a higher order (interval or ratio) scale to form the summary measure.

The rationale behind the use of the weighted linear compensatory model during the BCCM versus the simple linear compensatory model during the HCCM is as follows:

With increased learning the consumer reduces down the choice criteria to just a few, that really make the difference. These few choice criteria



are all likely to be the most important ones for the consumer, and accordingly there is not much necessity to weight these criteria.

All throughout the HCCM stage, the consumer continuously restructures his cognitive world based on cognitive consistency theories. We believe that this restructuring is in part responsible for the shift from the conjunctive to the lexicographic to the weighted compensatory strategies of choice behavior. We also believe that this restructuring also enables the consumer to simplify his choice behavior such that he is able to reduce the number of choice criteria to a minimum number essential to his needs and his desires.

This simplification of the consumer's decision-making process enables the consumer to move to the next phase of the cycle in which the HCCM dominates his choice behavior. The cycle is then repeated again but for a higher level of needs, wants and desires.

### Summary & Discussion

The four major types of purchase behaviors, namely the Habitual, Exploratory, Impulsive and Belief based behaviors have often been researched individually in the buyer behavior area. This paper ties in all these four behaviors into the larger framework of the total purchase behavior of the consumer. The paper describes four types of mechanisms, namely the Habit-Controlled Choice Mechanism (HCCM), Curiosity-Controlled Choice Mechanism (CCCM), Situation-Controlled Choice Mechanism (SCCM) and the Belief-Controlled Choice Mechanism (BCCM) which are linked sequentially in the purchase process. At any point in time one of these mechanisms is presumed to be dominant in the choice behavior. The total choice behavior is thus a weighted linear combination of the four mechanisms with the weights changing over time. The paper also indicates in which stage of the choice behavior and the information processing models that might be used by the buyer in each stage of the process.

Finally, the author raises some questions regarding the impact of individual differences and product differences on the position of an individual in the purchase cycle. For example, do some individuals tend to stay much longer in the HCCM stage? Do some individuals do some particular products warrant more than one cycle? Do some individuals go through the cycle, e.g. Are there some products which are bought only by impulse or by habit. Perhaps some researchers could be encouraged to help answer these questions.

### Footnote

1. Jagdish N. Sheth is Professor of Business and Research Professor and P. S. Raju is a doctoral candidate at the University of Illinois.







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