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## Faculty Working Papers

A PROPOSED MODEL OF CONSUMER BEHAVIOR FOR STUDY OF  
ENERGY CONSUMPTION AND OTHER NON-REPETITIVE PURCHASE  
DECISIONS

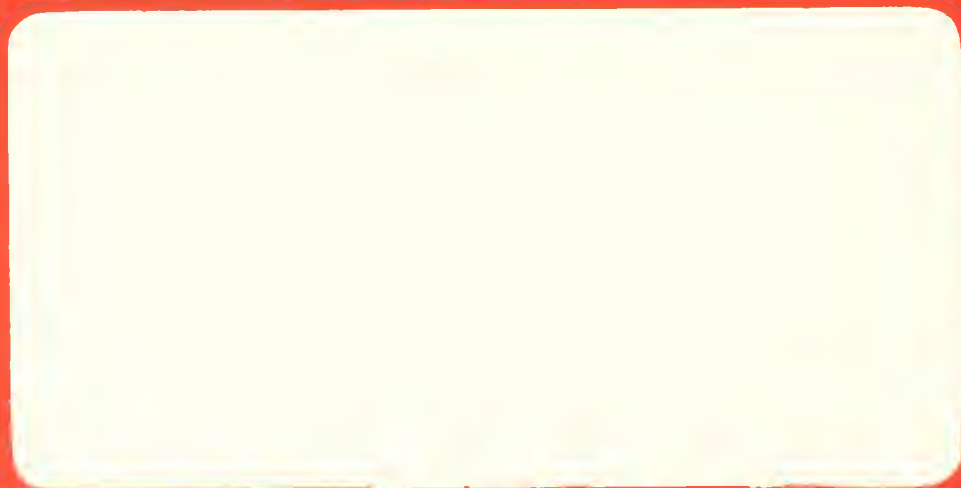
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#650

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March 6, 1980

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Summary:

This paper proposes a model of consumer behavior appropriate to the study of energy consumption, durables and other non-repetitive purchase decisions. The need for such a model arises out of the need to organize and interpret the many diverse studies focusing on specific parts of the non-repetitive purchase process, especially the consumers role in "solving" the energy problem. In addition, existing models of consumer behavior are not well-suited to the study of these non-repetitive purchase decisions. The rationale for such a model is presented, a model is proposed and procedures for testing the model are advanced. Of particular interest in the model are those "intervention" points where consumers are more likely to acquire information or to be subject to influence.

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From the very start of the "energy crises" triggered by the 1973 oil embargo, the consumer has been studied from a variety of perspectives. Since the consumer is such an important part of both the problem and the solution to the "energy crises," this attention is not surprising. What is surprising, however, is that we have not learned very much about the consumer and the consumer's role in solving the "energy crises." As this paper will point out, this lack of knowledge has two sources. The first is the most obvious. There simply has not been enough research. And for the most part, with the exception of several small scale programs sponsored by the Department of Energy, and programs sponsored by several Canadian federal agencies, there is no semblance of a research plan. Therefore, what research does exist, often does not build on existing research, but rather is fragmented. So, we have bits and pieces. Furthermore, the research is largely descriptive and very broad in its focus. The second reason for the lack of knowledge is less obvious. Research on consumer behavior should be guided by some model of behavior if it is to be useful in providing understanding. Existing energy research on consumers is either based on micro theories or on an implicit attitude-behavior relationship model. It is the premise of this paper, that a model of consumer behavior appropriate to major energy decisions by consumers is important to guide research and understanding. However, existing models of consumer behavior are not well suited for this purpose. Therefore, the rationale for a more well suited model is presented, a model is proposed and procedures for testing the model are advanced.

There appear to be at least two aspects of consumer behavior of interest. The first is the prediction, understanding and use of



repetitive brand choice behavior as it relates to the consumption of energy either directly or indirectly. For instance, advertising can be used to encourage the inclusion of an energy saving brand in the consumers evoked set of brands.\* Much is known about the marketing techniques relating to repetitive brand choice behavior. In general, products in this category are those advertised on television including food, beverages, cigarettes, household supplies, drug and beauty, and other products purchased repetitively by the average household or consumer.

The second aspect of consumer behavior is the purchase of large-ticket items (high-cost durables, leisure activities, vacations, transportation) whose purchase or use may impact on the larger societal system. This second aspect also includes activities and practices. However, unlike the former, the focus is not on brands, but on non-repetitive purchase behavior with its emphasis on product choice and evaluation behavior. Like the concern with repetitive brand choice behavior, we are here concerned with prediction and understanding, but also in influencing behavior. However, this behavior is hypothesized to require a different model of consumer behavior than generally used in the study of repetitive brand choice behavior.

It is with the second aspect of consumer behavior that this paper deals. It is the intention of this paper to propose a model of consumer behavior that is specifically adapted to the purchase of large-

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\*An evoked set is defined as the set of alternatives that the buyer would actually consider making the purchase choice from (43, p. 26).

ticket items, activities and practices. Within this category of products activities and practices are to be found high energy consuming appliances, travel patterns and life style behaviors directly related to energy consumption. Once such a model is proposed and the relationship of its elements examined, then a valuable tool will be available to those concerned with energy issues. Not only will understanding and prediction be improved, but methods of influencing behavior should be more efficient and effective. Many purchases in this category and adoption of basic life style activities and practices will either be a "one-time" purchase or decision or be temporarily separated sufficiently to require a new or updated "choice strategy with only limited room for learning and adaptive behavior over time (92, p. 251)."

The prime distinction to be used will be the difference between repetitive and non-repetitive purchase models.\* The procedure for building this model closely follows that suggested by Zaltman (94, p. 49-79). The approach taken in the development of this model has been pragmatic. A "black box" approach has been used to model relationships. Fortunately, we were able to use literature to suggest which variables are most likely to be associated. In addition, conscious attempts have been made to make this model complementary to the Howard (41,42,43) and Engel, Blackwell, Kollat (24) models. While both of these models have their origins in the study of repetitive

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\*In general, a non-repetitive purchase model deals with goods characterized as shopping and specialty goods (53). Likewise, a non-repetitive purchase model deals with consuming practices and activities that reflect major life style options.

brand choice decisions, they are so widely used, it is important that linkages be made which should eventually lead to a model of consumer behavior that can effectively deal with both repetitive and nonrepetitive consumer decisions.

Thus, the model will be a generic model rather than a model which focuses on particular brands. It will focus on decisions that involve durable consumables such as: appliances, housing, transportation, leisure activities in addition to activities and practices. The model will indicate decision points where the consumer may be influenced to change behavior and/or consumption patterns that will result in lower levels of energy consumption.

That most current models of consumer behavior have a repetitive brand choice bias is not surprising. From its earliest days, the field of consumer behavior has had an interest in Markov chains, brand loyalty and learning models. This is a reflection of the fact that most consumer decisions are largely related to choices between brands-- not to decisions about completely new products nor choices regarding purchases of housing, major appliances, vacations or even possibly automobiles or other transportation decisions. Even though these latter types of decisions all involve brands, they are usually made infrequently and therefore are not repetitive except for rather small segments of the population.

#### CURRENT MODELS OF CONSUMER BEHAVIOR

Human behavior of any form is enormously diverse. There is no single or completely acceptable theory of human behavior. However, there is a range of theories from various disciplines which are

insightful and capable of improving our ability to predict and understand behavior. Consumer behavior is the study of human behavior in the consumer role. It is primarily a branch of social science drawing heavily from such behavioral disciplines as psychology, sociology, and anthropology. In fact, it is emerging as a multidisciplinary field of study in its own right. For example, a family's purchase of a vacation may be the outcome of a complex set of psychological, sociological and sociocultural factors. The decision may have been influenced by many factors including culture, social class, the attitudes and opinions of each family member, the group interaction patterns of the family and the economy.

In the past decade, there have been several notable attempts to set forth a theory or model of consumer behavior.

The most widely quoted models of consumer behavior are the Howard (41,42,43) and the Engel, Blackwell and Kollat (24) models. In addition the earlier work of Andreasen (5) and Nicosia (68) and the recent work of Bettman (10) are major contributions to modeling consumer behavior. A review of these models, however, confirms the need for a complementary approach for non-repetitive decisions. (See Appendix A)

While the Howard and Engel, Blackwell and Kollat models recognize decisions about infrequently purchased products, only the 1977 work of Howard develops the decision process for these products in any detail (9, pp. 87-128). Earlier writings by Howard (10,11) and even the newly revised Engel, Blackwell and Kollat model (6) leave to the reader the task of recognizing differences and similarities in the respective decision process. While Howard does indicate differences

in the repetitive and non-repetitive process, the emphasis is on repetitive brand choice (9, pp. 87-128).

That there are differences can be easily overlooked in our pursuit of knowledge about repetitive decisions. But, most will agree that differences probably do exist between repetitive and non-repetitive consumer decisions. Both Howard (9) and Bettman (3, p. 154) indicate differences may exist on at least the dimensions of choice criteria and recall versus recognition.

#### THE RELEVANT LITERATURE

Before proposing a model, there appear to be at least three relevant areas of the literature that need to be reviewed. These fall into the general categories of:

- a. Energy specific consumer studies
- b. Purchase and consumption of durables
- c. Variables associated with the non-repetitive purchase process.

With the exception of the first category, the literature is voluminous. Therefore, no attempt will be made to be exhaustive. However, a very serious effort was made to insure that all potentially relevant variables and studies were reviewed.

#### The Consumer and Energy Consumption

With very few exceptions, this literature is post 1973. However, two extensive reviews and annotations of the energy specific consumer studies are available (30, 3). It is apparent from these almost exhaustive reviews, plus a review of the European literature (50), that the majority of the available studies are descriptive.

Typical are those that report consumers belief in the existence or non-existence of energy problems (73) and those that explore consumer's behavioral intentions. An example of the latter type is the data reported by Cunningham and Joseph (18). They report that consumers are likely to conserve energy in the face of significant price increases. Likewise, they report that consumers are not willing to wait for long pay-back periods in the purchase of energy saving equipment. In a similar study, Anderson and Lipsey investigated the relationship of general attitudes toward technology to conservation attitudes and behavior (4).

A series of studies sponsored by the United States Department of Energy is an attempt to build a useful base of information. These studies are organized into two programs (46). The first, "Feedback: A Motivation and Information Program" explores the use of a feedback device so consumers can determine their electrical consumption. The second program, "Energy Cost of Ownership: A Communications Program" is designed to test ways to accelerate the acceptance of energy saving products. As part of this second program, the United States Department of Energy launched an advertising campaign in six cities in the fall of 1978 and the spring of 1979. This campaign was an attempt to demonstrate that well designed promotions can stimulate demand for energy-saving products (35). Milstein provides background thinking for these two programs as well as insights into research dealing with energy related attitudes and behaviors (62,63).

A few studies are available that try to determine explanatory variables. Verhallen and van Raaij used regression analysis to



determine if attitude or non-attitude variables are more important in explaining energy usage (85). As would be expected, non-attitude variables such as home characteristics, household behavior and special circumstances are more important than attitudes about energy usage. However, from their data, they make suggestions on encouraging consumers to change practices and products.

Hardly any experimental studies are published. Hopefully others will follow Craig and McCann whose experimental design used the variables of communication source effect and the effect of repetition as they effect the consumption of electricity (16). While a high credibility source treatment resulted in a significantly higher level of request for energy saving information, the results of their study are less clear for actual energy consumption as measured by meter readings.

Another experimental study is offered by McNeill and Wilke. Subjects were asked to evaluate refrigerators with information labels containing energy usage data. Results indicated that the labels did communicate information, but, by themselves, did not produce significant behavioral change (61).

Much of what we know about human behavior in general and consumer behavior specifically undoubtedly applies to understanding consumer behavior with respect to energy consumption. Certainly the famous findings of the "Yale" group (39,40) on attitudes and communication is appropriate as well as dissonance theory, perception, reference groups and balance theory. But exactly which finding and in which context is difficult to determine.

Still missing is a conceptual scheme of the consumer as he or she deals with purchases that have energy implications. Consequently, we are largely unable to develop a research agenda and to effectively interpret our rather fragmented findings. Also, we are largely unable to determine, with any degree of confidence, what existing knowledge is useful. This ultimately severely hinders the development of meaningful hypotheses for investigation.

#### The Purchase of Durables

The literature dealing with the purchase of durables is extensive. Two, rather extensive, reviews of this literature are available.

One of the most thorough reviews of the literature on purchase and use of durable goods is by Dickson and Wilkie (22). Their review covers the literature since 1950. They advance a model of the durable goods acquisition process and outline six key propositions that represent their understanding of the literature. Briefly, they suggest:

- a) Search behavior is deliberate, highly involved and triggered by an unexpected event or anticipated need.
- b) Much information is acquired casually before the triggering event or need.
- c) Search for purchase outlet often precedes brand search.
- d) Store personnel may be a significant factor.
- e) If search is abandoned, it will affect acquisition priorities for other products.
- f) Cultural and economic factors are important influences on the decision process.

In a review by Huang, the focus is on purchasing behavior in housing, automobiles and other durables. Huang concentrates on studies that use a microanalytic modeling approach (44). The review deals mainly with studies cross-sectional and/or panel data that analyze demand as contrasted to ownership. He concludes: "stock adjustment models have been the workhorse in durables demand analysis. There appears to be no stronger alternative framework for studying investment in durables.....Looking beyond stock adjustment approaches, purchase-incidence models would be a catalyst for more effort toward joining economic theory and marketing research. Whether information search, nature of warranty, intrahousehold roles in decision making, etc., have causal relevance in such stochastic processes as waiting time between two purchases probably should be explored (44, p. 180)."

Since the publication of these two reviews, three articles of particular interest have appeared. Kasulis, Lusch and Stafford report that there is an "underlying common order of acquisition for a large set of heterogeneous durables." (51, p. 56) Their data also suggest that patterns of acquisition differ for home owners, house renters and apartment/duplex renters. The patterns of information search and usage were explored by Westbrook and Fornell. Using retail, neutral and personal sources, they identified four different patterns and observed tradeoffs in the usage of and reliance on different information sources (87).

The recent work of Pessemier and Wilton is useful in understanding durable goods purchasing behavior. This proposed and tested a method

for estimating market share of an innovation that is not currently on the market. Using the electric car as their stimulus object, they report that either a logit or probit statistical model can be used (72).

### Changes in Life Style

The literature dealing with changes in basic life style practices and activities is vast. Unfortunately, while many political scientists and sociologists have devoted considerable effort to this area, not much appears particularly relevant to the concerns and emphasis of this proposed model.

It appears that changes take place in at least three primary ways. The first is deflection. "Deflection processes can be expected to occur when certain nonconsumption institutions no longer interpret and translate a particular cultural value into activity-specific norms. (69, p. 443) Existing studies appear to be so macro or too descriptive to be of use in this particular project. The second is diffusion of innovation. The works of Rogers (75) and Robertson (74) are well known. While the work of Rogers gave direction to the entire field, Robertson has attempted to review and integrate the literature specifically to the fields of communication and marketing. Many useful insights can be gained from a review of this field. However, it is in the third area that we know little and results in the need for conceptualization and research of the kind proposed in this paper. That is the conscious "selling" or "marketing" of a change in basic life style not related to an innovation or deflection.

In addition to the literature reviewed here, Appendix B contains a review of the literature more directly associated with the proposed model.

#### AN APPROACH TO A NON-REPETITIVE MODEL

Most models of consumer behavior have tried implicitly to explain decisions by explanatory equations. These explanatory equations generally assume linear relationships. That there are limitations to the assumption of linear relationships for the study of consumer behavior is obvious. But, because of the limitations of statistical techniques, theoretical models of consumer behavior generally must make the assumption of linearity if they are to be verified.

The approach taken in the model proposed in this paper, however, differs considerably from most other consumer behavior models. Most models are process models that try to incorporate all relevant influences, determinants, processes and outcomes. Therefore, most will include the influence of culture, social class and environmental constraints in addition to a precise explanation of attitude formation and change. The proposed model is a very pragmatic model that is theory based, but only includes those elements and relationships that can be used to explain non-repetitive consumer behavior. It is definitely not a process model.

A legitimate question, however, arises as to the need for such a model, particularly in its rather simplified, pragmatic form. In addition to the arguments for a non-repetitive model presented earlier, it is hypothesized that the non-repetitive decision is different enough from the largely routinized decision to require different analysis of presently used constructs and the possible addition of others.

Some Propositions

The non-repetitive decision probably differs on at least the following dimensions.

- 1) The probability of choice between product class\* alternatives is high.

This implies that there is often an initial decision between dissimilar product classes (12). For instance, an initial decision may be between taking an extended vacation, a new car, or remodeling part of the house. Imbedded in this initial decision would be the elements of taking a shorter vacation if the car or remodeling is chosen and the postponement of the car or remodeling if the extended vacation were chosen. Once the initial decision results in the selection of a product class, then further decisions will be necessary within the product class and ultimately between brands or specific offerings. But note--that even the decision within product class may be non-repetitive.

- 2) The probability of the decision being moderately important or very important to the consumer is high (45,58).

This implies both the consumer's need to make a decision consistent with his view of himself and the need to anticipate longer term consequences.

- 3) The probability of joint decision making is high.

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\*Product class as used in this paper includes services, entertainment and all categories of individual or family expenditure in addition to traditional product categories.

This implies that either more than one person will be instrumental in making the decision or that an attempt will be made to accommodate the preferences of others. This should be especially true for decisions involving expenditures for housing, transportation, vacations and other family related expenditures (19,80,89).

- 4) The probability of overt information seeking is high.

This implies that the store of the consumer's information will most likely need to be updated and supplemented before each purchase. Choice criteria will need to be verified against current offerings and constraints (24, p. 238-240; 67).

- 5) The probability of a conscious use of decision rules is high.

While this proposition is not directly addressed in the literature, a review of literature dealing with the purchase of durables and joint decision making for durables seems to indicate the strong possibility of such a relationship.

- 6) The probability of effective communications containing high levels of information versus persuasion is high (2, p. 127-129).

This implies that the role of communication is less reminder and what Krugman describes as "learning without involvement" (55). Rather, it is more informative.

#### THE TENTATIVE MODEL

As discussed in the previous section most models of consumer behavior have a strong emphasis on cognitive structure concepts. However, the orientation for this research places its primary emphasis on decision points to influence consumer consumption patterns. Consequently,

a more pragmatic result is hoped for than has been achieved by past models.

Additionally, this model will consider information processing and information flows throughout all major stages of the model. Past models have tended to isolate or delegate these processes and flows to only initial stages of their structure. One result is that more emphasis will be placed on the consumer's perceived situation.

More emphasis will be placed on incorporating choice strategies used by consumers than have past models. Choice strategies (e.g., lexicographic, conjunctive, disjunctive, etc.) may allow for different choices to be made by consumers even when they have the same information at hand. This emphasis is congruent with the pragmatic focus of the model.

Because of the heavy pragmatic orientation a "black box" approach will be used to model relationships. Theory where it exists will be used to suggest which variables are most likely to be associated. Consequently, at each stage of the model the basic question that will be answered is: "What inputs are most statistically likely to be associated with these specific outputs?" For the purposes of our model it is not necessary to take a "process tracing strategy" where a complete understanding of the processes relating inputs to outputs is necessary.

This model will also incorporate the preferences of more than one member of the household. Past models have largely ignored consideration of this aspect of decision making.



To the extent possible, this model is based on existing literature. An extensive review of consumer behavior literature was combined with reviews of literature from economics, political science, sociology, social psychology and the decision sciences. Each of these disciplines has a body of literature focused on the how and why of individual choice.\*

Appendix B contains observations that will be useful in understanding the statistical relationship that will be the product of the exploratory phase of the research in support of this model. Appendix B also contains references to some of the literature reviewed in the development of the model and the propositions on which it rests. This is not an exhaustive listing.

### Model Structure

The basic model structure is given in Figure 1.

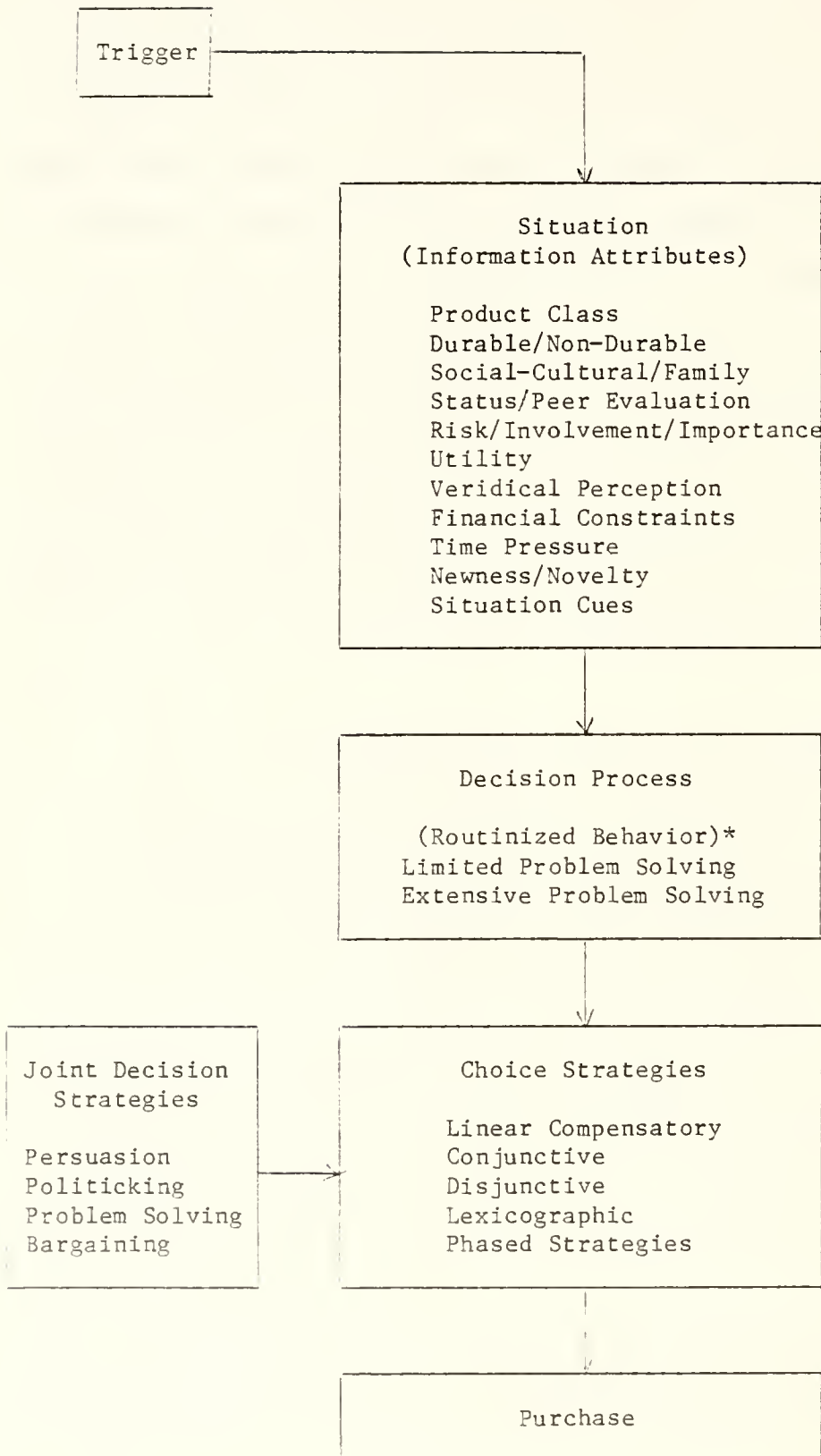
A "trigger" initiates the process of consumer selection and finally a purchase response. The trigger is some mechanism which establishes a felt need by the consumer which can be satisfied through purchase of a durable good.

This trigger is probably similar to problem recognition as defined by Engel, Blackwell and Kollat. They define it as "a perceived difference between the ideal state of affairs and the actual situation sufficient to arouse and activate the decision process." (24, p. 215).

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\*While not an exhaustive literature review, the reader will find Selected Aspects of Consumer Behavior (29) useful in understanding the contribution from these disciplines.

Figure 1



\*An element of minor importance to the model.

Given the activation of the decision process the consumer perceives the situation at hand in terms of a multidimensional framework of attributes. Some of the situational attributes he may consider include: status, peer evaluation, risk/involvement, time pressure, newness/novelty, cost/utility, and veridical perception.

These situational attributes will influence the primary decision process and subsequent information search that will be used by the consumer. Three major types of decision processes have been identified in the literature: (1) routinized behavior--associated with little additional information search, (2) limited problem solving behavior--associated with some additional information search, and (3) extensive problem solving behavior--associated with much additional information search. In turn, the consumer's information search may make an adjustment in his initial assessment of the situational attributes.

Certain situational attributes will be identified by the consumer as being crucial to his decision. Since he may have to "process" several dimensions in order to eventually make a purchase response he relies on some sort of individual choice strategy. Some examples of individual choice strategies are: lexicographic, conjunctive, disjunctive, and compensatory.

However, the consumer's purchase response may also be influenced by other consumers if the purchase is to satisfy the felt need of more than one individual. Thus, joint decision strategies may be used to directly influence the purchase response by determining which individual choice strategies may be used by the purchaser. Some examples

of joint decision strategies are bargaining, problem solving, politicking, and persuasion. The joint decision strategy used will be determined primarily by the perceived situational attributes of those members influencing the primary purchaser.

The above relationships are summarized in the following equations. At this time the functions are yet unspecified.

$$\text{Purchase Response} = f(\text{Individual Choice Strategy})$$

$$\text{Individual Choice} = f(\text{Decision Process [ \& Information Search ], Strategy Joint Decision Strategies})$$

$$\text{Decision Process} = f(\text{Situational Attributes})$$

$$\text{Joint Decision Process} = f(\text{Situational Attributes})$$

It is hypothesized that information is either sought by the consumer or the consumer is receptive to information at each stage in the model. Therefore, we can anticipate that information can influence not only the trigger, but perception of the multidimensional array of attributes in the situation as well as the use of particular choice strategies. Of course, whether the problem is perceived as one of "limited problem solving" or "extensive problem solving," will dictate how much information is sought and the respective formation and use of choice criteria. The exact nature of the influence of joint decision making on information search and receptivity must remain unspecified because of limited research evidence at this time. Actual purchase strategies, including brand, store, and price have been demonstrated as being sensitive to information directed at consumers. Less certain, however, is the exact nature of this influence and consumers actual search for information for non-repetitive purchases.

### Limitations of the Tentative Model

The primary limitations of this model stem from the pragmatic demands placed on it. Since primarily the black box approach is used to model relationships:

- 1) A complete understanding of the relationship is not sought. Only relationships will be developed which give good predictive results, even though it may not be the true relationship.
- 2) The model will only look for major relationships which account for most of the variance in behavior. It will not include variables which are theoretically justified but do little to predict the behavior investigated.
- 3) Because of the input-output nature of the model there is a possibility of capitalizing on chance variations by the statistical methods used. However this will be minimized by modelling relationships which seem theoretically and intuitively justified (as well as empirically shown to exist by past research).

### EXPLORING RELATIONSHIPS

In terms of testing the model we are at the early stages of scientific method. At this stage of model development the model is not specifically being tested. Instead, the primary concern is the exploration and establishment of relationships (associations) between the different variables which will be incorporated into the model. Later these relationships will be tested using additional data not used in the initial parameter estimation.

### Establishing Relationships

Both noncorrelational or correlational techniques can be used to establish relationships. One technique that should be used is Automatic Interaction Detection (AID). It is a noncorrelational method which can be used in its own right for prediction or be used as a preliminary step to indicate interaction effects to be modelled using a correlational technique. However, AID has two main disadvantages: (1) the sample size should be large--approximately 750-1000 subjects and (2) it has limited "look ahead" capabilities to enable it to capture higher order relationships.

Two related correlational techniques which can be used to model relationships are regression analysis and discriminant analysis. Each are multivariate techniques which try to fit a model to account for the variation in the behavior modelled. Discriminant analysis is used when the behavior modelled (criterion or dependent variable) is nominally scaled. Regression analysis is used where the behavior can be measured on an interval scale. Both correlational techniques may use a step-wise procedure in determining the best fit.

### Establishment of Parsimony

With the number of situational attributes being so large it seems desirable to reduce this set to a manageable subset. One approach is to drop certain attributes which are very closely related to other attributes (since essentially they measure the same aspect of the situation). Another approach is to develop an index composed of several variables to represent a certain attribute of the situation.

One statistical technique that has been developed to do this is principal components (factor analysis). Thus this technique will be used early in the modelling process to reduce the number of situational attributes into a more parsimonious set.

Establishing Dimensions of Choice

When an individual choice strategy is used to determine a purchase response, the consumable is judged on the basis of certain dimensions salient to the consumer. In order to model this process these salient dimensions need to be determined. Focus groups may be used to directly try to determine salient dimensions or this information can be used as input for scaling procedures. Two scaling procedures which can be used for this purpose are nonmetric multidimensional scaling and conjoint measurement. Data collections differ in those methods but both generally consist of giving preference judgments on comparisons of different product offerings.

Data Collection

Data collection will be done by self administered questionnaires. Bipolar semantic differential scales will be used to have the respondents indicate their perceived values of the situational attributes. For example, to obtain a measure of importance a question may be asked such as:

How important is this [purchase decision] to you?

not important

extremely important

1

2

3

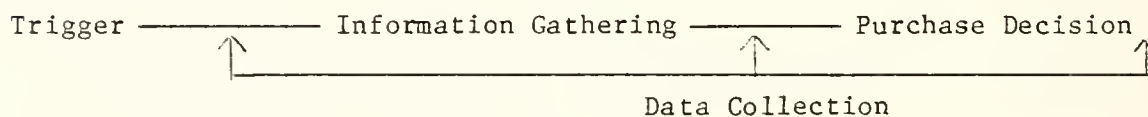
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The initial data collection would occur before the respondents have had a chance to gather more information about the purchase decision. The followup data collection would occur after the data collection process has occurred. Also data collection (i.e., at least information on the actual purchase response) will be done after the purchase response is made. In essence, the sample is a panel of consumers each facing a similar durable good purchase decision.



### Criteria

As an example of the use of the proposed model and the testing of its relationships, imagine the following situation.

At the dinner table, a discussion evolved that eventually centered on this year's vacation plans. In addition to the usual expression of preferences by family members about favorite places to visit, some question was raised about taking a shorter vacation this year. The money saved would be used to buy a swimming pool or to remodel the basement so larger parties could be given. Some discussion also centered on mom's need for a new, economical car.

Given this situation or simpler decisions to purchase a new refrigerator or even more complex decisions about alternative modes of transportation, several questions should be answered by this model.

- 1) Can we identify what triggered the response.



- 2) Can we identify what situational attributes are salient to this buying situation?
- 3) Can any situational attributes be related to the primary decision process used?
- 4) Can we identify the primary sources where information was sought? (to reduce the decision maker's uncertainty).
- 5) Can we identify what situational attributes and/or primary decision processes are related to the primary individual choice strategy used for this buying situation?
- 6) Can any situational variable be related to whether a joint decision will be made rather than an individual decision?
- 7) Can any situational attribute be related to what kind of joint decision strategy will be used?
- 8) Can the individual choice strategy used be related to whether a joint decision is made rather than an individual decision?

#### CONCLUSION

This tentative model is based on the hypothesis that the non-repetitive consumer decision is different than the repetitive brand choice decision. Much consumer behavior of interest to those studying the consumer's role in the "energy crises" is most likely to be non-repetitive in nature. Therefore, the need for such a model.

The approach taken here is not elegant--in fact it is simplistic. But one step in the scientific method is to start identifying what varies with changes in specified variables. Because of the lack of empirical evidence, this approach seems reasonable, especially if significant differences exist between repetitive and non-repetitive decision making. Modifying existing models seems difficult because of their largely repetitive brand choice bias. In non-repetitive models, we are concerned with inter product choices. As this model

is tested, it will not only yield valuable information to managers, policy makers and others interested in energy related consumer behavior, but will provide the information needed to develop a better explanatory model of non-repetitive consumer behavior. And then, the logical incorporation of both repetitive and non-repetitive behavior into a single model.

In the meantime, we see this as a valuable tool. It does not minimize existing models or the efforts to evaluate them. Rather, we see important contributions to those studying the process of consumer allocation, the purchase of housing, travel, social marketing and the energy problem.

This tool, however, can only be useful as it is tested, developed and revised. We hope this proposed model will encourage just that activity.

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## APPENDIX A

### Andreasen's Decision Model

Andreasen (5) proposed a descriptive model of consumer choice behavior built upon several specific conceptions about attitude formation and change drawn from social psychology. Based on the work of Krech, Crutchfield and Ballachey (54) about attitude and attitude dynamics, Andreasen made observations on the major components of consumer attitudes (belief, feelings, and dispositions), and the individual's disposition toward each product or service. This disposition component is the central intervening variable for his choice model which focuses on information processing as the most salient feature of consumer decision making.

The entire process of the model, from stimulus to outcome comprises an information processing cycle. The seven major elements of the cycle are:

1. Input stimuli
2. Perception and filtration
3. Disposition changes
4. Outcome
5. The selection decision
6. The search decision
7. The no-action decision.

While not directly addressed, it is reasonable to assume that the concept of habit formation permits the model to accommodate repetitive decision behavior.

Since individual's attitude is the major component of the choice model, the behavioral outcome of an attitude subsystem is action with respect to the attitude object. By taking action, the consumer presumes some conscious or unconscious decision to act.

However, the point of decision is difficult to discover empirically. Andreasen theoretically defines the decision point as the point at which the disposition component of the attitude subsystem has maximum positive valence, i.e., +1. Therefore, the attainment of this maximum positive valence (the decision to act) is an attitude change.

In a comparison with other models, Andreasen's model does not include other psychological constructs and individual characteristics. It is not as elaborate and descriptive as other models developed within this period. Also much emphasis is placed on the attitude components.

#### Nicosia's Theory of the Consumer Decision Process

Nicosia looks at buying behavior as involving several inputs which result in actions by the consumer (outputs) (68). Major input factors outlined by Nicosia include:

1. attitude
2. motivation
3. experience.

His emphasis on consumer decision-making as an ongoing process was an important and useful contribution.

Nicosia's work used the technique of computer flow charting to designate elements and relationships. This model is basically a computer program that describes an invariant structure of consumer behavior. The framework of the model is composed of four building blocks

or fields and their functional relationships. Each field is treated as a subprogram of the overall computer program (model). Also, the various psychological constructs (cognition, perception, selective exposure, etc.) are represented by subroutines which can be called up by any field (subprogram).

The basic subfields are:

1. Field one: from the source of a message to the consumer attitude.
2. Field two: search for and evaluation of means-ends relationships.
3. Field three: transformation of the motivation into an act of purchase
4. Field four: storage and consumption that lead to experience with the brand.

Even though Nicosia has incorporated a wealth of research findings from many sources into his model, there are certain difficulties in the model's practical application. The limitations in the evidence underlying the model were not revealed sufficiently. Additionally, the linkage of elements are not clear. Therefore, it is difficult to apply this conceptual model to the study of consumer problems.

#### The Engel, Blackwell and Kollat Model

This model (24) originated from the black box model in that it conceives of a human being as a system with output (behavior) in response to inputs. They expand from this simple idea to discuss what happens when inputs are received (the comparison process) and the type of output which results (the buyer decision making process). Thus, they rename the black box as the central control unit (CCU) which in fact is the individual's psychological makeup. The incoming stimuli

pass through the filter within the CCU and are processed in four different phases. (1) Exposure. (2) Attention. (3) Comprehension. (4) Retention. In the decision process stage, it begins with problem recognition and proceeds through four more steps: (1) internal search and alternative evaluation, (2) external search and alternative evaluation, (3) purchasing process, and (4) outcomes--past purchase evaluation and further behavior.

Additionally there are the influences of external constraining forces that affect the extent of decision making:

- (1) situational variables
- (2) product characteristics
- (3) consumer characteristics
- (4) environmental factors.

The 1978 version of the model, includes 16 equations which permit direct comparison with the Howard model. The special feature of the new version is the inclusion of 16 equations and variable definitions which permits further empirical testing or even operationalization of the model. However, an operationalization of the model has yet to be done.

#### Bettman's Information Processing Model

Bettman's model (10) is based on cognitive theory. He believed that the decision is not purely the end result of stimulus-response but rather that the individual's cognitive structures are involved in information acquisition and processing. Bettman argues that persons

often perceive the external world in terms of cue patterns and configurations, rather than in terms of separate ones. This is an important concept because the consumer is not exposed to a product stimulus but rather to a configuration of product stimuli.

This model follows the mathematical decision network format and adopts Simon's (82) work on an information processing theory of human problem solving. It consists of:

1. a memory consisting of an array of cues
2. a number of simple processes that operate on the cue and develop mediating constructs and a network or discrimination net, which represents rules for combining the cues
3. and input/output mechanisms.

Thus a decision process is viewed as a net through which an array of cues passes. Alternatives are taken at the choice points in the discrimination net depending upon the value of the cue which that choice point processes.

The basic elements of Bettman's theory are, "the concepts of processing capacity; motivation; attention and perception; information acquisition and evaluation; use of memory; decision rules and processes; and consumption and learning." (82, p. 16)

Bettman's work presents the results of his attempt to computerize the actual decision process and develops a general decision and choice model. Both the Bettman and Nicosia models are similar to each other in their general approach. They both use the cognitive theory approach on consumer behavior and are capable of employing computer simulation in order to derive decision criteria. While Bettman's model incorporates specific decision elements, it is difficult, at this stage of

model development, to use it for determining points at which information is acquired and used.

### The Howard Model

The Howard model of buyer behavior (41,42,43) has its theoretical roots in the Hull and Spence S-R learning theory. Howard and Sheth (43) proposed that much of buying behavior is more or less a repetitive brand choice decision. In the face of these repetitive brand choice decisions, the consumer simplifies his decision process by storing relevant information and routinizing his decision process.

The buying process starts when the buyer has been motivated to buy a product and is faced with a brand choice decision. The elements of his decision are:

1. a set of motives
2. several courses of action
3. decision mediators by which the motives are matched with the alternatives.

After the purchase, if the brand proves satisfactory, the potential of that brand to satisfy the consumer's motives is increased. The result is that the probability of buying that brand is likewise increased. Thus with repeated satisfactory purchases of one or more brands, the buyer is likely to manifest a routinized decision process whereby the sequential steps in buying are well structured so that some event which triggers the process may actually complete the choice decision. With a routinized purchase, it implies that the consumer's decision mediators are well established and that the buyer has strong brand preference.

So in addition to adaptive behavior, the Howard-Sheth model focuses upon the role of repetitive brand-choice decisions, and with the ways in which consumers store information and routinize their decision processes.

The Howard model of consumer behavior consists of four sets of constructs:

1. input variables
2. output variables
3. hypothesized constructs
4. exogenous variables.

The input variables are essentially the stimuli from the buyer's environment (social or commercial). The output variables are (1) attention, (2) brand comprehension, (3) attitude, (4) intention, (5) purchase. Even though some of the output variables are given the same names as the hypothetical constructs, they are less inclusive in meaning and less rich in speculation than the hypothetical constructs. The hypothetical constructs of the model are more abstract, and not operationally well defined. They are further grouped into two types of constructs: perceptual and learning. The perceptual constructs are (1) attention, (2) stimulus ambiguity, (3) search. The learning constructs are (1) motives, (2) brand comprehension, (3) choice criteria, (4) attitude, (5) intention, (6) confidence, and (7) satisfaction.

In our opinion the Howard-Sheth model does not differ greatly from the Andreasen model. It is a reductive-functional and stimulus-response model. The mediating and important causes of behavior are to



be found within the perceptual and learning constructs. The triggering stimuli are to be found among the input variables.

The deficiency of the Howard and Sheth model is its inability to specify how independent variables interact with dependent ones and what the nature of the interaction process is. It is also weak in pointing out the interactive, interdependent nature of almost all variables related to human behavior.

This model underwent revision in 1974 (25). Twelve functional relationships were specified. While the model continues to be treated and revised, it is clear that this model is most useful for the study of repetitive brand choice decisions and still suffers from the inability to allow identification of points where information is sought and used.

## APPENDIX B

### Observations from the Literature

#### 1. PRODUCT CLASS

- a. Product class is a group of brands all judged by the same choice criteria and with the same weight given to each criterion.
- b. Extensive Problem Solving results in:
  - i. change in consumer's tastes,
  - ii. redefinition of the utility function, or,
  - iii. concept formation (41).

Therefore: The product class concept depends on the aspirations, needs, and values of the consumers and the innovativeness and the technological advancement of the society at large.

#### 2. DURABLE/NON-DURABLE PRODUCTS

- a. The purchase of durable products is discretionary and postponable. The decision to purchase depends on the ability, need, and willingness to buy.
- b. The operational hypothesis of durable purchases includes: disposable income; normal or expected income; transitory income; income change; liquid assets and debts; initial stock; installment credit; home ownership and movement; marital status; age; size of household; sex of household head, region and location; attitudes, intention and expectation (27, 44).

Therefore: A consumer durable purchase model should include all the variable listed above.

#### 3. SOCIAL-CULTURAL/STATUS/PEER EVALUATION

- a. Social stratification produces different perceptions of the world--and of consuming by social class. Consuming is one of the ways in which people implement their values based on these perceptions.
- b. Six social classes have been identified which show distinct product and branch preferences in such areas as clothing, home furnishing, leisure activity and automobiles.
- c. Culture is the most fundamental determinant of individual wants and behavior. Whereas the behavior of lower creatures is largely governed by instinct, human behavior is largely

learned. Each culture contains smaller groups or subcultures and each of these provides more specific identification and socialization for its members.

- d. The major social factors which influenced the behavior of consumers are: reference groups, family, social roles and statuses. Reference groups are those groups that influence a person's attitudes, opinions and values. Some of them are primary groups, and others are secondary groups and aspirational groups.
- e. A role consists of a set of activities that the individual is supposed to perform according to the definition and expectations of the persons around him/her. Each role has a status attached to it, which reflects the general esteem accorded to that role in society or in the eyes of the immediate group. Consumer purchase patterns are the reflection of his/her role and status in the society (47, 59, 60).

Therefore: Buying decisions are typically influenced by other participants in the society as well as the characteristics of the buyer himself. His/her spending and saving behavior are the reflection of his/her status, imagery and symbol as well as economic values of the product.

#### 4. FAMILY

- a. Roles of consumption vary by life cycle.
- b. The qualitative level at which families satisfy basic consumption needs varies between stages of the family life cycle (15, 86).

Therefore: Asset accumulation (durable goods) and consumption patterns are affected by the family life cycle.

#### 5. RISK

- a. Consumer behavior involves risk in the sense that any action of a consumer will produce consequences which cannot be anticipated with anything approximating certainty.
- b. There are five types of risk: i) financial, ii) performance, iii) physical, iv) psychological, and v) social (48).
- c. Consumers characteristically develop decision strategies and ways of reducing risk that enable them to act with relative confidence and ease in situations where their information is inadequate and the consequences of their actions are in some meaningful sense incalculable (14).

Therefore: Knowledge about the nature and amount of risk perceived by the consumer will be helpful for the understanding and prediction of consumer information acquisition, transmission and processing.

## 6. INVOLVEMENT/IMPORTANCE

- a. Freedman (1964) proposed a definition as i) involvement is an interest in, concern about, or commitment to a particular position or issue, ii) involvement is a general level of interest in or concern about an issue without reference to a specific position (31).
- b. A low involvement product class is one which most consumers perceive little linkage to their important values and is a product class where there is little consumer commitment to the brands.
- c. In purchasing low involvement product classes, buyers are assumed to be passive, re-active instead of active problem solving.
- d. In purchasing high involvement product classes, buyers are assumed to be engaged in active decision making ( ).

Therefore: Consumer behavior and information search is likely to be quite different for low involvement product classes versus high involvement classes. Consumers are more likely to engage in extensive or limited search for high involvement product classes and routinized behavior for low involvement product classes.

## 7. UTILITY

- a. "Consumers are utility maximizers, that is, they will use their limited resources to acquire a bundle of goods that will put them on the highest utility curve" (53, p. 135).
- b. "The stock of utilities in the consumer's assortment represented by durable goods varies much more widely than do other stocks, such as food products. Since he has to buy a large stock of utility at one time, he is gambling at the time of purchase that he will not have a greater need for something else before this stock is exhausted. He is also taking a greater risk with regard to future prices and the possibility that the item he has bought will be rendered obsolete by improved models" (1, p. 264).
- c. The analysis of utilities must include motives and psychological factors (52).

Therefore: Consumers explicitly or implicitly, compare the expected utility to be gained from purchase or use of a product or service to their existing inventory of products and their view of themselves.

#### 8. VERIDICAL PERCEPTION

- a. Consumers compare information from others, the media and sales people with their existing cognitive structure and assign meaning based on past experiences.
- b. "Veridical perception, consists of the coding of stimulus inputs in appropriate categories such that one may go from cue to categorical identification, and thence to the correct inference or prediction of other properties of the object so categorized" (11, p. 133).
- c. Consumers learn sets of probabilities of what goes with what (11, 33).

Therefore: Consumers tend to perceive and react to purchasing situations based on their established probabilities of expectation.

#### 9. INCOME/FINANCIAL CONSTRAINT

The following models must be considered:

- a. Permanent income
- b. Life cycle
- c. Expected income
- d. Discretionary income
- e. Conspicuous consumption
- f. Disposable income (32).

Therefore: The consumption pattern of the consumer depends on his income (real and expected) and the life cycle of the family or individual.

#### 10. TIME PRESSURE/TIME BUDGET

- a. Urgency in the consumer's perception of having only a short time remaining before he must satisfy his need.
- b. Time relates to consumer decision making as searching time, consumption time, and purchasing time.
- c. Consumers under severe time pressure will tend to place greater weight on negative product information (49, 66, 78).

Therefore: Time has cause and effect properties. Time devoted to the purchase can affect perceived risk, product complexity, post purchase satisfaction and commitment.

#### 11. NEWNESS/NOVELTY

##### a. Factors that motivate search:

- i. the quantity and quality of existing information,
- ii. ability to recall information,
- iii. perceived risk (financial and physical),
- iv. confidence in decision-making ability.

b. Search is much less likely when a product has been bought repeatedly over time.

c. A newly encountered product requires extra effort from the consumer (information seeking; stress in decision making) (66, 76).

Therefore: Novelty (not purchase products) and product class choice create stress in the decision making process of the consumer which can lead to an extensive and long problem solving process.

#### 12. SITUATION/SITUATIONAL CUES

Belk's situational analysis includes five characteristics:

- i. physical surroundings--geographical, sound, etc.,
- ii. time frame, duration,
- iii. interpersonal surrounding, role, interpersonal interaction,
- iv. mood, anxiety, pleasantness, hostility, etc.,
- v. goal direction, task (7).

Therefore: Situational cues have drastic influence on individual psychological make-up. The choice behavior reflects significant influence from the cues and the final decision is often cue-related.

#### 13. DECISION PROCESS

a. The consumer decision process may be viewed in three stages: Extensive problem solving, limited problem solving and routinized response behavior.

b. These three stages have similar constructs in consumer behavior, psychology and economics.

	1	2	3
Consumer Behavior	Extensive Problem Solving	Limited Problem Solving	Routinized Response Behavior
Psychology	Concept formation	Concept attainment	Concept utilization
Economics	Changing utility function	Constant utility function Changing consumer technology	Constant utility function Constant consumer technology

- c. The selection of a decision process by a consumer is a function of the combination of one or more of the following: novelty, risk, involvement, clarity, availability of product, ambiguity, task complexity, importance, type of product, rationality, appearance, traditionality, social conscious, values, brand concept, evoked set, information available and information exposed (34, 41, 84).
- d. The particular decision process has associated with it a generalized set of behaviors dealing with information search and usage.

Therefore: The decision process and/or sequences used by the consumer is determined by the complex interaction of many variables. The particular process used determines how information will be sought and used.

#### 14. EXTENSIVE PROBLEM SOLVING

- a. This stage of learning to buy is generally used when the consumer is confronted by a new situation or feels that his/her existing choice criteria is not appropriate (41).
- b. This stage is equivalent to a change in consumers' tastes, a redefinition of the utility function, or new concept formation within the consumer.
- c. It is characterized by an extensive search for information and relatively long decision time which could cause cognitive strain in information pressuring.

Therefore: Extensive problem solving describes the search for, and clarification of alternatives which is similar to identifying the problem. It is a process for forming a new product space and creating choice criteria.

## 15. JOINT DECISION MAKING

- a. Joint decision making behavior within households, may not be found in every purchase decision of the household members.
- b. Joint decision making for purchase decision is a function of one or more variables: durable product, frequency of purchase, product class, disposable income, age, size of household, sex of head of household, family life cycle, education, cultural role expectation, comparative resources, relative investment, working wife, money management, prime user, gift product, peer evaluation, occupation status, length of marriage, and authority structure of household (21,28,44).
- c. A high degree of joint decision making exists in the purchase of homes, cars, home furnishings and appliances.
- c. Husband-wife involvement varies widely:
  - i. by product category
  - ii. within product category
  - iii. between families
  - iv. by decision makers strategy; consensus versus accommodation.

Therefore: Joint decision making is commonly found in purchase of durable goods. The degree of involvement varies among family members and product categories.

## 16. INDIVIDUAL CHOICE STRATEGY

- a. Several types of decision rules that consumers could use as their choice strategies have been identified. In general they fall into the categories of:
  1. Lexicographic
  2. Conjunctive
  3. Disjunctive
  4. Compensatory
  5. Phased strategy.
- b. These choice strategies are a function of the combination of one or several of the following variables: time pressure, task complexity, ambiguity, involvement, importance, knowledge, perceived attributes, product cues, information available, values, distractions, environment structure, risk taking behavior, cue utilization, level of aspiration and individual cognitive style (6, 13, 23, 55, 70, 83, 93).

Therefore: The formulation of a particular choice strategy is a function of individual differences as well as situation variables, the decision process being used and the influence of joint decision making.









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