

AN INVESTIGATION OF THE EFFECT OF  
ECOLOGICAL INFORMATION AND SOCIAL CLASS  
ON IMPORTANCE RATING, RANK ORDERING AND BRAND CHOICE

A Dissertation  
Presented to the Faculty of  
The College of Business Administration  
University of Houston

In Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Philosophy

By  
Patrick Edward Murphy  
December 1975

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## ABSTRACT

Information is a necessary ingredient in consumer decision making and it appears that marketers are currently experiencing pressure by public policy makers and consumers to make available more functional information. This study addressed one information type rarely presented to consumers--information concerning the ecological harm caused by consumer products.

The theoretical foundation for this research had multiple underpinnings. Psychological and consumer behavior literature on information processing model building, information overload and new information provided the background for ecological information processing. A typology of ecological problems relevant to this study, was developed as well as consumer products' relationship to them. Prior research on consumers' reaction to ecological information represented the final theoretical area.

In the research methodology chapter, eight major hypotheses were stated and operationally defined. The three products selected for analysis were paper towels, soft drink containers and laundry detergents because they have a relationship to the ecological problem typology. Data were collected using a randomized block design with ecological information being the treatment and social class the blocking variable. Three hundred and nine (309) Houston area women from three social classes determined by Hollingshead's two factor "Index of Social Position" served as the test units.

Independent variables were no, moderate and high levels of ecological information. Moderate level ecological information was made up of four

statements reflecting the products' present level of environmental harm while the high level treatment included the moderate information and four more statements about the environmental consequences of continued product usage. Dependent variables consisted of the environmental concern index importance rating score of two product features, the rank ordering of the same features and the choice of the "environmentally correct" brand form four alternatives. Methods of statistical analyses encompassed the analysis of variance, Duncan's multiple range test, Kruskal-Wallis test and the chi-square test.

Findings were that level of ecological information affected paper towels' environmental concern index rating, soft drinks' harm to the environment rank ordering and the choice of paper towels and laundry detergents. Social class was found to influence the rank orderings of laundry detergents' harm to the environment and phosphate content, paper towels' made from recycled paper, soft drinks' returnability of container. Environmentally correct choices of all three products were also social class related. Upper social class women were always more concerned with the ecology issue and it was concluded that social class is more closely associated with importance rating, rank ordering and choice than ecological information.

Consumer information processing theory interpretations, as well as marketing and public policy implications were discussed in the final chapter. Consistency of consumer response across the dependent measures and products indicated that information processing models could be applied to women's processing of ecological information. The effect of "new" ecological information seemed to level off after the moderate information treatment. Implications for marketing managers were that firms would

likely not make this type of information available, but the upper class women may represent a potentially profitable segment for ecologically benign products. For public policy makers implications were that ecological information could be provided as an affirmative disclosure program but the cost and pitfalls of providing such information must be recognized. Finally, possible programs recommended for public policy consideration were mandatory environmental labeling and environmental education.

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## CHAPTER 1

### INTRODUCTION

Information is a necessary ingredient in consumer decision making. There is currently much speculation on the amount and content of information consumers desire and how they use the information provided by marketers. As the absolute number of consumer products and the procedures for disseminating information in recent years have increased, individuals have been forced to adjust their information handling to cope with these occurrences. At the same time public policy makers are becoming increasingly active in their scrutiny of marketer's methods of providing information and the types of information made available to buyers. Therefore, the study of how consumers process (i.e., react to) information provided about products has far reaching implications.

Formal analysis of information processing in the field of consumer behavior is in the early stages of development. Popular texts in consumer behavior are just beginning to include it in their presentation. Although Hansen (23) examines the choice process and information's role in it, he makes no explicit reference to information processing. Howard and Sheth (24) feel that information processing represents a useful framework for grouping concepts. "Furthermore, by setting attitude formation and changes as well as research on information seeking into the framework of concept formation and information processing we believe that a number of phenomena that seemed unrelated now fit snugly together" (29, p. 397).

A more extensive discussion of consumer information processing within a textbook is found in Engel, Kollat, and Blackwell's recent revision (16).

They define information processing as a four phase concept--(1) exposure, (2) attention, (3) comprehension, (4) retention. In the exposure phase they include both physical and social stimuli of all types. Attention which is highly selective for most consumers is the stage where the actual processing begins. Comprehension consists not only of understanding, but also distortion of the stimuli to fit the individual's past experience and value structure. Finally, processing of information is completed if it is stored in the person's conscious memory. This four phase conceptualization of information processing provides a good working definition.

Literature on consumer information processing has been expanded with the recent publication by Hughes and Ray (30) of the papers presented at the 1972 Association for Consumer Research workshop. Their formulation of consumer information processing is divided into three phases--(1) information search, (2) initial processing, and (3) central processing leading to choice. They provide ample support in the articles for the three stage process, and it offers an alternative definition to Engel, Kollat, and Blackwell's four step model.

As a preview, the study is briefly outlined. In the balance of this chapter the formal problem statement as well as significance and limitations of this project are included. The second chapter consists of the theoretical foundation of this research. Research methodology is the subject of the third chapter which discusses the major hypotheses, operational definitions, and all aspects of the research design. The findings are analyzed in the fourth chapter. Finally, interpretations for information processing theory and implications for marketing managers and public policy makers are given.

### Problem Statement

The problem that this research addresses, pertains to the usefulness of a specific information type in consumer decision making. Many traditional types of information such as price, brand name, net quantity of contents are available for all products. However, there appears to be a demand for more functional information by consumers. Information about the nutritional content of food products, the price per unit of measure and the percentage of liquids in certain goods is already being provided by some consumer products marketers at this time. Another type of information which is rarely presented to consumers refers to the ecological harm caused by consumer products. Since the quality of the ecological environment (i.e., air, water and availability of natural resources) ultimately limits all activities, this information would seem to have a high long term priority for consumers and marketers alike. Thus, the problem that this research is designed to examine is stated as follows: What is the effect of differing amounts of ecological information on women's importance rating and rank ordering of selected choice criteria and brand intentions?

### Significance

Findings from this project seem to be significant in several ways. First, reactions of the women to the ecological information treatments may determine the saliency of environmental issues across several products to their decision making. Second, the findings should show whether there is ecologically-conscious segment to which marketing managers may appeal by altering their marketing mix variables. Third, this study offers public policy makers empirical evidence on which to base their judgments whether to provide themselves or to require marketers to provide ecological

information about consumer products. Fourth, this research extends published efforts in the marketing literature on ecological problems by using a larger number of products and several dependent measures. Fifth, the theory of information processing is applied in a new context. Finally, since ecology issues are no longer in the forefront of public concern, it is important to ascertain if they have any bearing on consumer decision making.

### Limitations

This study has several limitations which must be recognized because they constrain its generalizability. Only one type of information (i.e., ecological) is presented to the women. Ideally, a comparison between this type and other forms of socially useful information such as nutritional, unit price or safety information might show the relative importance of ecological concern. A second limitation is that the information treatments were only given in sentence form on a sheet of paper. This method of presentation is somewhat unnatural and other possibilities like presenting it in advertising copy context or as package information would have been more realistic. Although the study was carried out in the community, the data were not gathered in a field experimental setting. Thus, the women may have reacted differently because they were removed from the actual purchase situation. A fourth limitation refers to the timing of the project. It may be that the current status of the economy had such an overriding impact upon the women that they completely dismissed the ecological information.

The fifth limitation concerns the types of measurement techniques utilized in the study. Although more elaborate measurement devices than



importance rating and ranking scales are available to monitor information processing, the women had difficulty with the ones chosen. A related problem is that although the women were randomly assigned to each information treatment, they undoubtedly had differing levels of knowledge and commitment to ecological problems. Thus, a preliminary measure of ecological awareness would have been useful.

## CHAPTER 2

### THEORETICAL FOUNDATION

#### Introduction

The nature of this study dictates that one draw from a number of theoretical areas. First, in order to examine consumers' processing of information one must look initially at the theories developed by psychologists on human information processing. Second, the literature of consumer behavior researchers on several aspects of information processing also is examined. Since this study deals with the problem of environmental deterioration, a typology of ecological problems and consumer products' marketing relation to them are discussed. Finally, the research that directly relates to consumers' processing of ecological information is summarized and the gaps in the existing literature enumerated.

#### Human Information Processing Models

Analysis of human information processing has been the subject of widespread study in clinical psychology. The body of theory on information processing emanates from the research conducted by these psychologists. Their efforts at theory building fall into three general categories. The first deals with attempts to develop computer simulation models of individual behavior. The works of Hunt (31), Reitman (54), and Newell, Shaw and Simon (47, 48, 49) fall into this category. The second focuses upon the amount of information that a person is capable of processing. Miller (45), Schroder, Driver and Steufort (59) are leading researchers in this area of information load. The concept of "new" information discussed by

Newcomb, Turner and Converse (46) is the third. Although these writers and the three categories comprise only a small portion of the total research conducted by clinical psychologists on information theory, their efforts provide the necessary background for consumer behavior theorists.

Expanding on earlier work undertaken with Hovland (32), Hunt (31) developed an information processing theory of concept learning. Through the use of sequential decision trees, he constructed a computer simulation model of concept learning. His three phases of concept learning are perception, definition of positive instances (use of a class of objects to determine common characteristics, i.e., dog from not dog) and answer development by the "decision tree" technique. Although no empirical validation of his theory is included or has since been conducted, Hunt believes that "a useful model of concept learning can be built by programming a procedure for constructing a decision tree" (31, p. 241).

Reitman (54) takes a more cautious view of the value of information processing models in psychological theory. He concludes that information processing theories are not comparable to other psychological theories in their sophistication. He thinks that any information processing system, whether it be human or computer, "must be able to take in information, recognize significant objects, organize and store information about them, retrieve that information as it becomes relevant to ongoing activity, and update and eliminate obsolete information with the passage of time" (53, p. 22). According to Reitman, information processing theorists must begin with key concepts such as the organizing and evaluative skills of individuals and work to develop programs that will explain human behavior in general situations. He contends that information processing research has shown that the psychological systems being studied are more complex

than they originally were thought to be. His conclusion is that these theories must be evaluated by a set of ground rules not yet developed.

Another group of researchers attempted to build a computer simulation model of information processing. In 1958 Newell, Shaw, and Simon (47) posited their theory of human problem solving. It was a theory of the control system which consisted of (1) memories (2) information processes which operated on the memories, and (3) a perfectly definite set of rules for combining these processes into decision rules. Their study primarily analyzed how a computer could be programmed to prove theorems in logic. Although this article is widely referenced in the information processing literature, a later article by Newell and Simon (48) discusses the application of the computer program to human information processing.

In their 1961 article, Newell and Simon developed a program solving protocol which took the form of a computer program called General Problem Solver (GPS). A group of students were asked to solve problems in formal logic by applying prescribed decision rules. The student was instructed to "think aloud" and his thought processes were recorded. According to the authors,

... the research problem, then, is to construct a theory of the processes causing the subjects behavior as he works on the problem, and to test the theory's explanation by comparing the behavior it predicts with the actual behavior of the subject. (48, p. 2012)

After testing their theory, Newell and Simon conclude that the GPS is a computer program capable of simulating human behavior over a narrow but significant problem domain. Since similar programs exist for writing music, playing chess and designing electric motors, etc., they feel that these programs add credence to the approach taken by GPS in constructing a theory of human thinking.

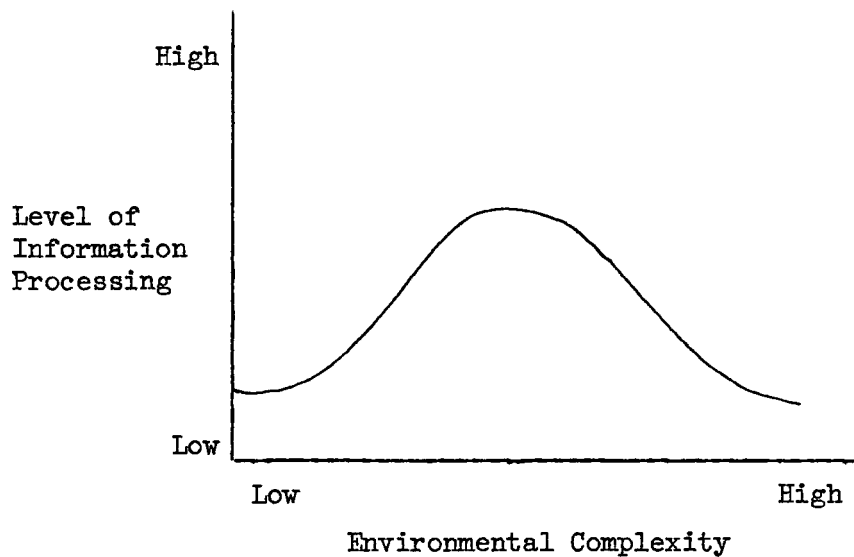
In their latest and most comprehensive work Newell and Simon (49) refined their theory and now label it Information Processing Systems (IPS). They believe that man's thinking and problem solving can be modeled by a computer program and their theory is applied to the problems of cryptoarithmetic, logic and chess. Although IPS is a much more sophisticated version in terms of the number of variables and situations taken into account, the authors feel that this effort only represents a progress report and not a culmination of their research on human information processing.

Other researchers have approached the study of information processing model building from different perspectives. A brief mention of a few gives an indication of the varied nature of theoretical research on information processing. Cyert and March (12) formulated a decision process framework based on empirical studies of decision making in the firm as a basis for their theory of managerial information processing. Clarkson (8) developed a model of buyer choice behavior depicting the rules used by a trust investment officer to select stock portfolios. He found that this individual's behavior could be modeled as a sequential choice procedure, called a discrimination net. Cravens (10) instructed staff engineers and scientists at the Aerospace Research Applications Center to keep a diary of sources of information useful for decision making. Through the use of canonical correlation he discerned what information was most important in their decision making. Fleck (18) developed a model of how media planners process information by assigning weights to various media based on interviews with experienced advertising executives. The computer program that resulted had a high probability of success within a narrow range of alternatives. Thus, these articles represent other related theoretical efforts within the information processing field.

The current status of information processing modeling is that human mental processes can be simulated using computer programs (31, 47, 48). However, the sophistication necessary to adequately model human thinking and ultimately behavior for anything but simple tasks still is lacking (54). Continuation and extension of human information processing model building efforts by some researchers offers encouragement for the development of more comprehensive theories (49).

The second general theoretical area in the clinical psychology literature pertaining to information processing deals with the concept of information load. Miller's comprehensive article (45) reviewed previous research conducted on how individuals process various amounts of information. In examining published studies on the ability of individuals to judge differences among levels of unidimensional stimuli (i.e., tones, loudness, taste intensity), Miller concluded that individuals possess finite capacities to make judgments between them. This capacity also varies little from one sensory attribute to another. For multidimensional stimuli the judgmental ability is higher than for unidimensional, but the law of diminishing returns quickly sets in. In addition, he examined the span of immediate memory and the ability of individuals to recode or rephrase information. Miller summarized by saying, "... the span of absolute judgment and the span of immediate memory, impose severe limitations of the information that we are able to receive, process, and remember" (45, p. 952).

Schroder, Driver and Streufort (59) built a theory of human information processing which revolves around what they call the "U curve" hypothesis. They postulate that the relationship between the level of information processing and environmental complexity approximated an inverted U shape like the following:



Environmental complexity consists of information load, noxity (severity of adverse consequences of behavior in any situation) and eucity (amount of reward of promise given by the environment). They tested the U curve hypothesis through the use of an inter-nation simulation game where students control the destiny of a country in a fictitious world. Economic, political and military decision parameters control the complexity of the game. On the basis of this test the writers believe that their hypothesis (theory) is supported. However, the game operates in a completely controlled environment. Both Miller and Schroder, Streufort, and Driver provide theoretical foundation for the idea that the capacity of humans to process information is limited.

The third area of information processing theory within psychology that has relevance to this research problem is the concept of new information. Since the information provided in the study is unfamiliar to most respondents, it can be classified as new. The literature presents little in the way of theoretical development. However, one group of writers discussed new information in the context of attitude change. Newcomb, Turner and Converse

believe that "attitude change depends very generally on the receipt of new information that in some way or another is relevant to the attitude object from the point of view of the attitude holder" (46, p. 82).

According to these writers the probability of attitude change is highest when individuals are exposed to small amounts of new information. This probability declines as the amount of new information increases but never back to the level where no information was given. Examples used by the writers to support their theory were attitudes toward new information about political candidates and whites receiving new information about blacks. The manner in which individuals process new information completes the theoretical background emanating from psychology.

#### Consumer Information Processing Theories

Literature in the field of consumer behavior has extended the information processing theory building efforts of psychologists in several ways. First, the use of protocols (i.e., tape recordings of consumers articulating their thoughts while shopping) to develop models of consumer information processing has been investigated by several researchers. Second, analysis of information load in consumer decision making also relates to the work of the psychologists. Third, although it is not traditionally associated with information processing, studies conducted on the types of information used by consumers is relevant to theoretical development. Types of information refers to the choice or evaluation criteria of the product. This writer believes that the individual choice criteria can be thought of as bits of information available to the consumer. Fourth, research conducted on how consumers react to new information about products also builds upon the work undertaken by psychologists. These areas--information processing



models, the amount of information, the type of information, and new information--are pertinent to information processing theory development in consumer behavior.

Donald Cox (9) was the first researcher to conduct a detailed analysis of information processing in the context of purchasing behavior. He was

... concerned with how consumers 'process' information, that is, how they sort, assess and evaluate information they have acquired (either recently or in the past), and how they reach some conclusion about the information, i.e., decide which information cues they will utilize. (9, p. 317)

According to Cox, products should be thought of as an array of cues (information bits). Consumers assign "information value" to these cues through what he calls the sorting rule model. Within the model, information value is how accurately the information predicts the attributes being evaluated and confidence value is how confident the consumer is about the predictive value she assigned to the cue. He tested the model with 414 low to middle class Boston housewives, by asking them to evaluate two brands of nylon stockings. As the following passage points out, the findings were that given confidence value is constant and has achieved a minimum level, predictive value is used as the determinant of behavior.

The consumer seems highly selective in her use of information, and highly economical in the use of the information she selects. She does not use all of the information available to her, prefers only those cues with the highest information value, and seems quite willing to base much of her evaluation of a product on one or a very few cues. In short, she makes a little high value information go a long way. (9, p. 360)

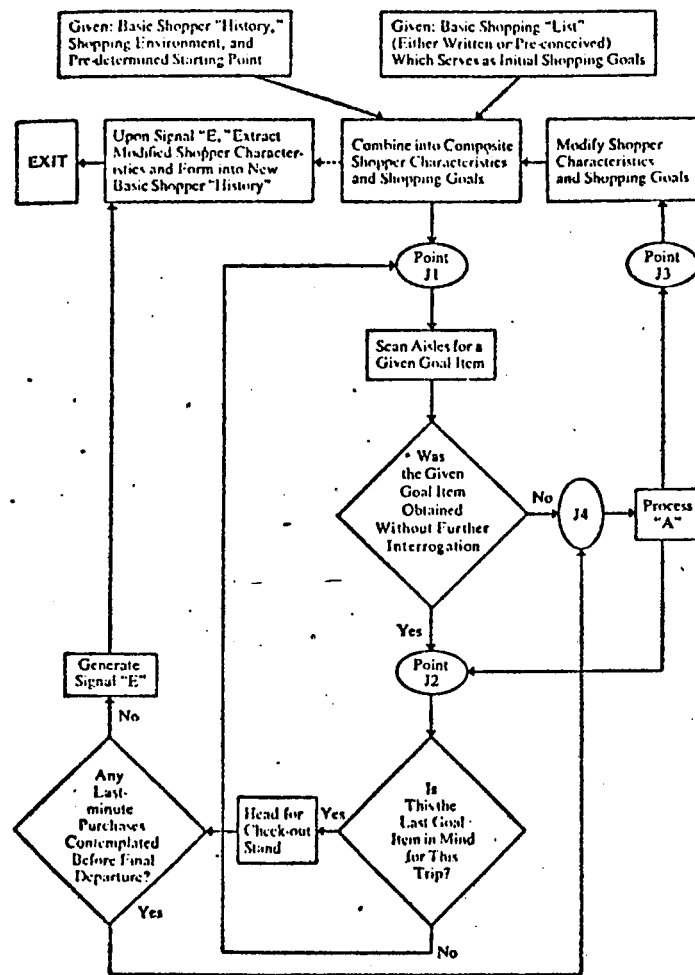
Drawing heavily from the works of Hunt and Newell, Shaw and Simon, King (37) built a model simulating the cognitive processes of a supermarket shopper. The model was formulated from a number of tape recorded protocols obtained from actual shopping experiences of four housewives.

Figure 1 shows the general model and more detailed decision tree for "process A" which were converted into a computer program. King concluded that this type of model has many limitations, but it warrants further research.

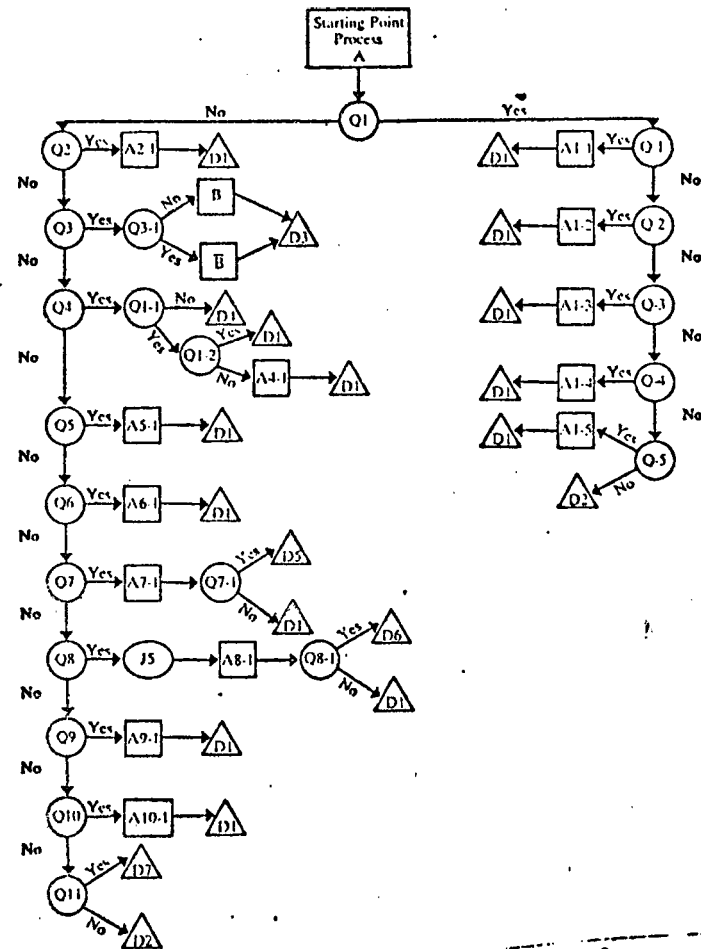
Before any simulation model could hope to predict with accuracy, the decision this shopper will make in this complex, although bounded, environment, the model would have to have been programmed to know the subject's decision rules for every conceivable item classification that lay before him. It would have to know the illogical as well as the logical processes of these rules and apply them on the same basis as its human counterpart. It would also have to know the sum total of all factors surrounding the daily living experiences of the subject...

For another think the sheer volume of statistical data collection concerning the shopping environment of the typical supermarket may make it both discouraging as well as impractical to specify the shopping environment in the details required to simulate precisely the experiences encountered in a real-life situation. One must consider that specification of this environment would have to include not only every classification of every item available but also every brand, price, quantity, size, location and many other factors too numerous to list at this point. But viewing this ultimate version of the simulation process should not discourage further study, not lead one to conclude that further study would be futile. These are ways in which this problem can be attacked, and its undertaking could prove quite fruitful for shedding light on subjects in the field of psychology as well as computer science. (37, pp. 65-66)

Another consumer information processing model was formulated by Alexis, Haines and Simon (1). They investigated the purchase behavior of 18 female students in buying six categories of women's clothing. The protocol (transcript of the verbalized thought and actions of a subject when the subject has been instructed to think of problem-solve aloud) method was used to construct decision trees of the process. Figure 2 depicts the overall shopping process model and Figure 3 shows the actual decision trees. The authors feel that their theory is an adequate representation of women's clothing purchasing behavior, but the predictive ability of it needs to



Part A: Simulation Model, Flow Diagram



Part B: Process "A" Decision Tree

Figure 1. KING'S MODEL OF CONSUMER INFORMATION PROCESSING

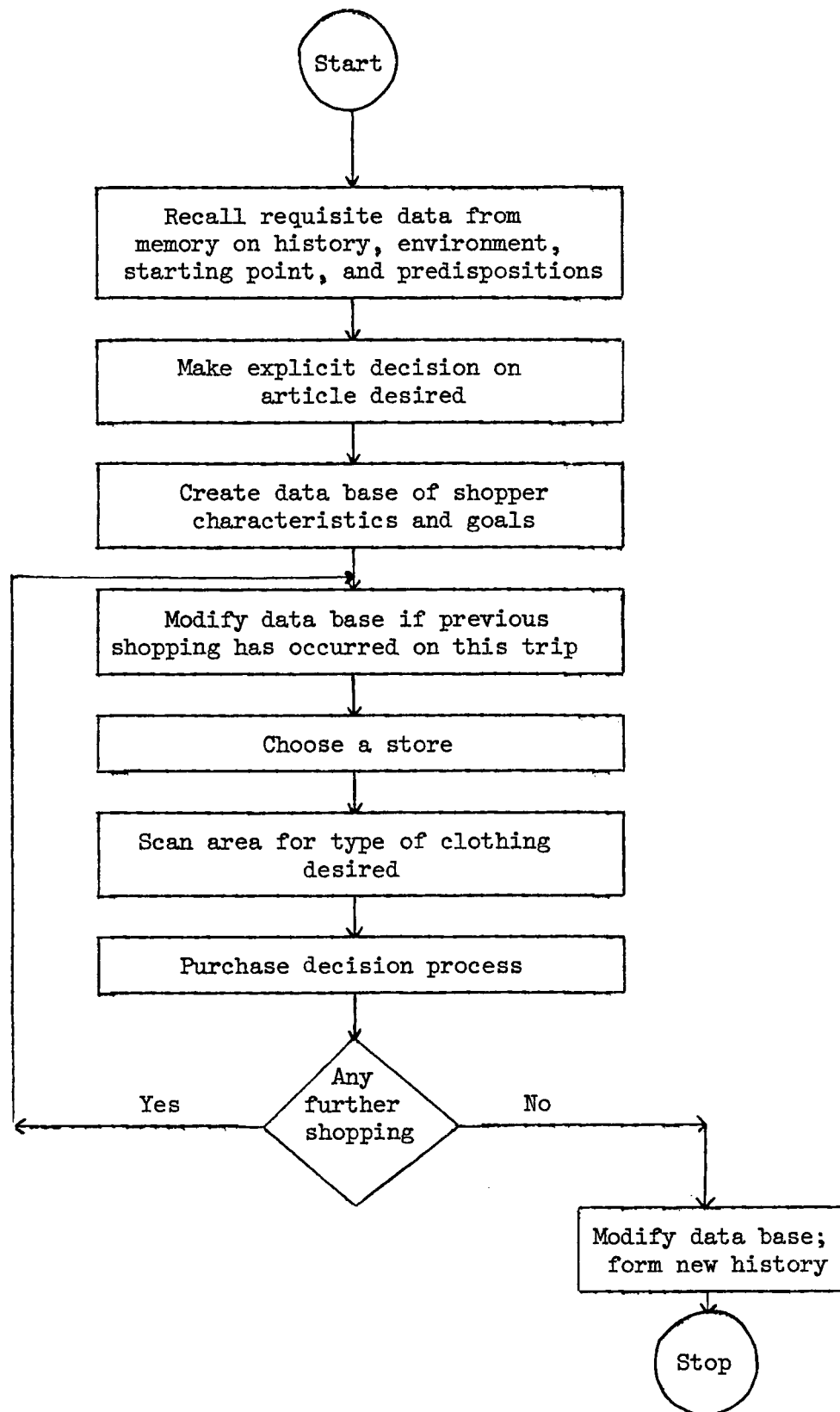
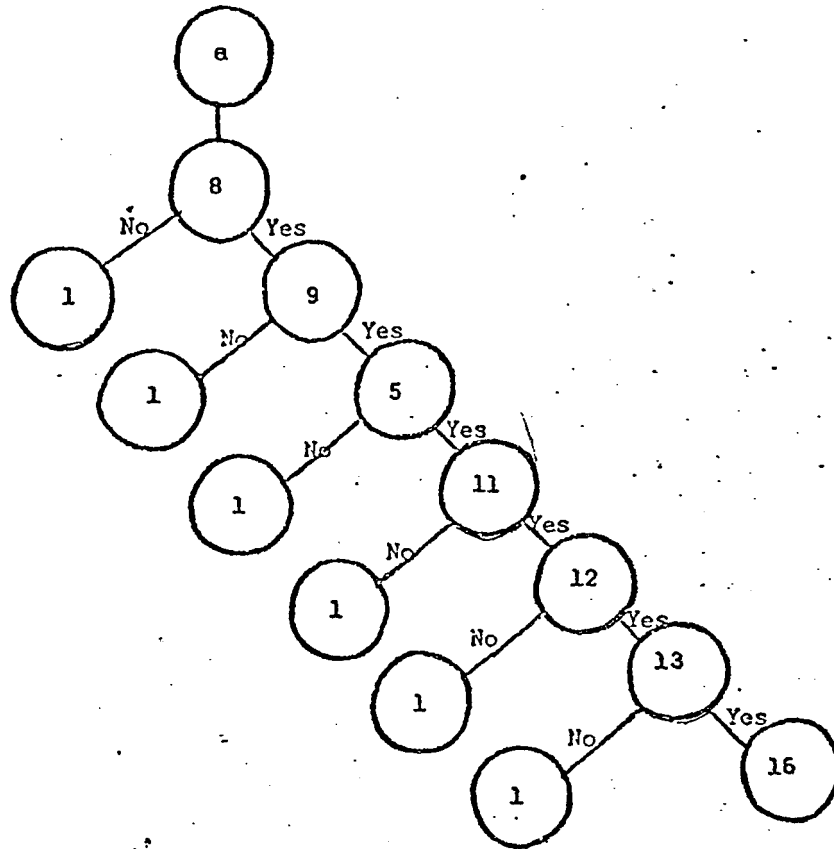


Figure 2, OVERVIEW OF SHOPPING PROCESS DECISION



#### QUESTIONS AND ANSWERS FOR DECISION TREES

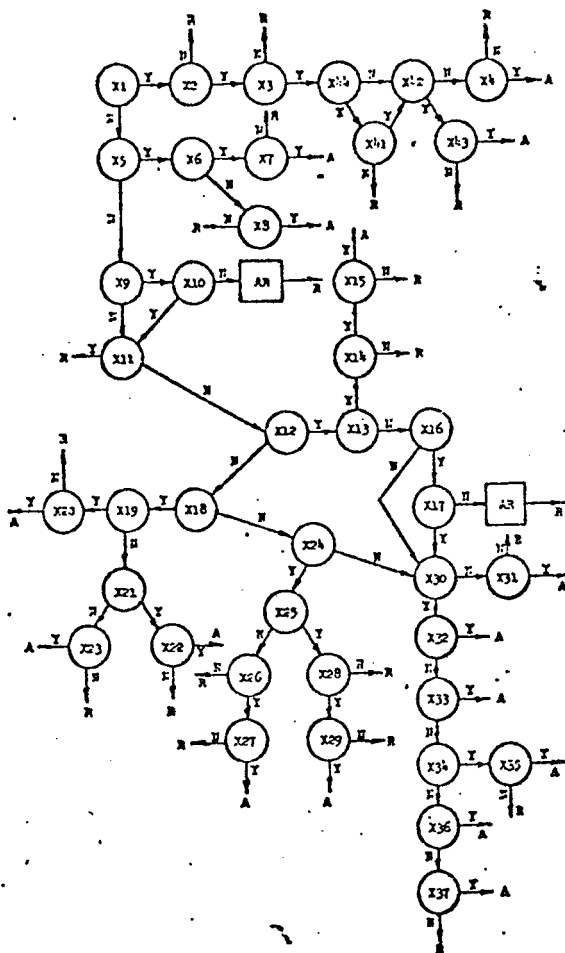
- |   |  |
|---|--|
| 1. Reject item!   | 11. Is the item worth the price?                       |
| 2. Do I need this type of item?   | 12. Do I like the item in general?                     |
| 3. Do I have this type of item, color included, already in my wardrobe?                                     | 12 (A) Does it have large, rounded, glossy buttons?    |
| 4. Is the item practical - in style, in fabric - i.e., will it be comfortable to wear and easy to care for? | (B) Does it have short cap sleeves                     |
| 4 (A) Is it a dress I could not make?   | (C) Is it a shirtwaist, or does it accent the waist?   |
| (B) Is it well made?  | (D) Does it have long sleeves?                         |
| (C) Can I wear it in many situations?   | (E) Is it youthful and/or innocent and demure?         |
| 5. Is the item on sale?   | (F) Is the skirt straight?                             |
| 6. Is my size available?  | (G) Is the skirt pleated?                              |
| 7. Is the item within the price range I can afford?   | (H) Is it not polka dot or clashing patterns?          |
| 8. Does the item fit in hips, thighs, rear, and at the waist?   | (I) Round or roll (cowl) collar?                       |
| 9. Does the item fit at the neckline, shoulders, and bust-line?   | (J) Cotton or synthetic mixture?                       |
| 10. Color:  | (K) Cotton pique?                                      |
| 10 (A) Is it black?   | (L) Arnel knit?  |
| (B) Is it yellow or blue?   | 13. Do I like it better than other dresses considered? |
| (C) Is it red with white flowers?   | 14. Is it a known and favored brand?                   |
| (D) Are the colors not too bright?  | 15. Length   |
| (E) Green, cranberry, or butterscotch print?  | 15 (A) Is it too long?                                 |
|   | (B) Is it too short?                                   |
|   | (C) Can the length be easily adjusted?                 |
|   | 16. Purchase item                                      |

Figure 3. SHOPPING PROCESS DECISION TREES

be tested with more subjects and in different situations. Ultimately, they believe that a computer program could be developed for the processing of information about women's clothing,

Haines continued the research he began with Alexis and Simon and studied information processing of student female volunteers toward the product classes of women's dresses (21) and women's suits (22). Decision trees similar to Figure 3 were constructed in both instances. The most significant theoretical development to come out of this work was Haines' principle of information processing parsimony. The principle "is that consumers seek to process as little data as is necessary in order to make rational decisions" (22, p. 96). This means that people take advantage of patterns in the task environment to reduce the amount of information processed. His principle also ties in with Miller's (45) proposition that processing capabilities are limited. Therefore, consumers adjust their underlying attitude structure to their task environment.

The most extensive research in consumer information processing models has been undertaken by Bettman (4, 5, 6, 7). He uses the work of Newell, Shaw, and Simon (47, 48) as the foundation for his decision net models. Bettman views the consumer decision process as a net through which an array of cues passes. Using tape recorded protocols, five housewives' supermarket shopping behavior over six to eight weeks served as the data for developing his model. An example of the decision net model for the price conscious consumer is shown in Figure 4. In validating the model Bettman found that the decision nets were accurate in predicting individual purchases over 85 percent of the time. Thus, he drew the implication that consumer information processing models offer a rich field for research.

THE MODEL FOR CONSUMER C<sub>1</sub>

Dictionary: A: Accept  
 R: Reject  
 AR: Associate risk (bad experience) with this product  
 Y: Yes  
 N: No.

X1: Is this meat or produce?  
 X2: Is price below justified level?  
 X3: Is color okay?  
 X4: Is this the biggest "okay" one?  
 X5: Is this eggs?  
 X6: Is the price of extra large over 5 cents more than the price of large?  
 X7: Is this large size?  
 X8: Is this extra large size?  
 X9: Was this product bought last time for this product type?  
 X10: Was experience with it okay?  
 X11: Is risk associated with this product (bad experience)?

X12: Is this product class high risk?  
 X13: Do children or husband have a specific preference?  
 X14: Is this their preference?  
 X15: Is it the cheapest size?  
 X16: Does this class have health (hygiene, diet) factors?  
 X17: Is this okay on these factors?  
 X18: Is this for company?  
 X19: Is the cheapest brand good enough?  
 X20: Is this the cheapest?  
 X21: Had a good experience with any brands in this class?  
 X22: Is this that brand?  
 X23: Is this the cheapest national brand?  
 X24: Are children the main users?  
 X25: Did they state a preference this week?  
 X26: Have they used this up in the last two weeks?  
 X27: Is this cheapest size?  
 X28: Is this that one?  
 X29: Is this the cheapest size?  
 X30: Are several "okay" brands cheapest (that they have in stock)?  
 X31: Is this the cheapest (that they have in stock)?  
 X32: Have a coupon for this one?  
 X33: Is this one biggest?  
 X34: Is there a single national brand?  
 X35: Is this it?  
 X36: Have I used this before?  
 X37: Is this the closest?  
 X41: Does this feel okay?  
 X42: Is this for a specific use?  
 X43: Is this size okay for that?  
 X44: Is this produce?

Figure 4. MODEL FOR PRICE CONSCIOUS BUYER

In a later article Bettman (6) designed a general decision model of consumer behavior based on the cue processing schemes, Figure 5 depicts this general choice model. One rationale for attempting this global model is that the complex models can be collapsed into more simple models since individuals perceive the world in terms of separate cues. He optimistically likens his model to Howard and Sheth's (29), but just as theirs is likely not "the" theory of buyer behavior, Bettman's is probably not "the" model of consumer information processing, because the area is so multifaceted and dynamic.

Bettman (7) has recently carried his research on decision net models to the point of developing statistical tests for them. The following excerpt summarizes his position,

The major factor leading to these difficulties is the lack of a theory of statistics for decision nets. In cases where the measurements are numbers, many well-defined and well-known procedures exist for combination and analysis. The decision net approach, however, yields complex nets as its data points. The problem is that there is no technique for combining or analyzing this type of data. The purpose of this paper is to develop several types of analytical procedures that can be used to examine decision nets. By using such tools, it is hoped that regularities and patterns in consumer choice processes will emerge from future decision net studies, rather than simply complex diagrams. In other words, development of a counterpart to statistical methods for numerical measures is necessary. (7, p. 72)

Drawing on past work by Haines (22) and Clarkson (8), Bettman (7) formulated a "measure of information processing efficiency". It is a measure of the average amount of information that must be analyzed for any alternative. He then developed the formulae to be used in analyzing decision net models. Through these statistical techniques Bettman hopes that general patterns of consumer information processing will emerge and this finding would be a valuable input to general consumer behavior models.



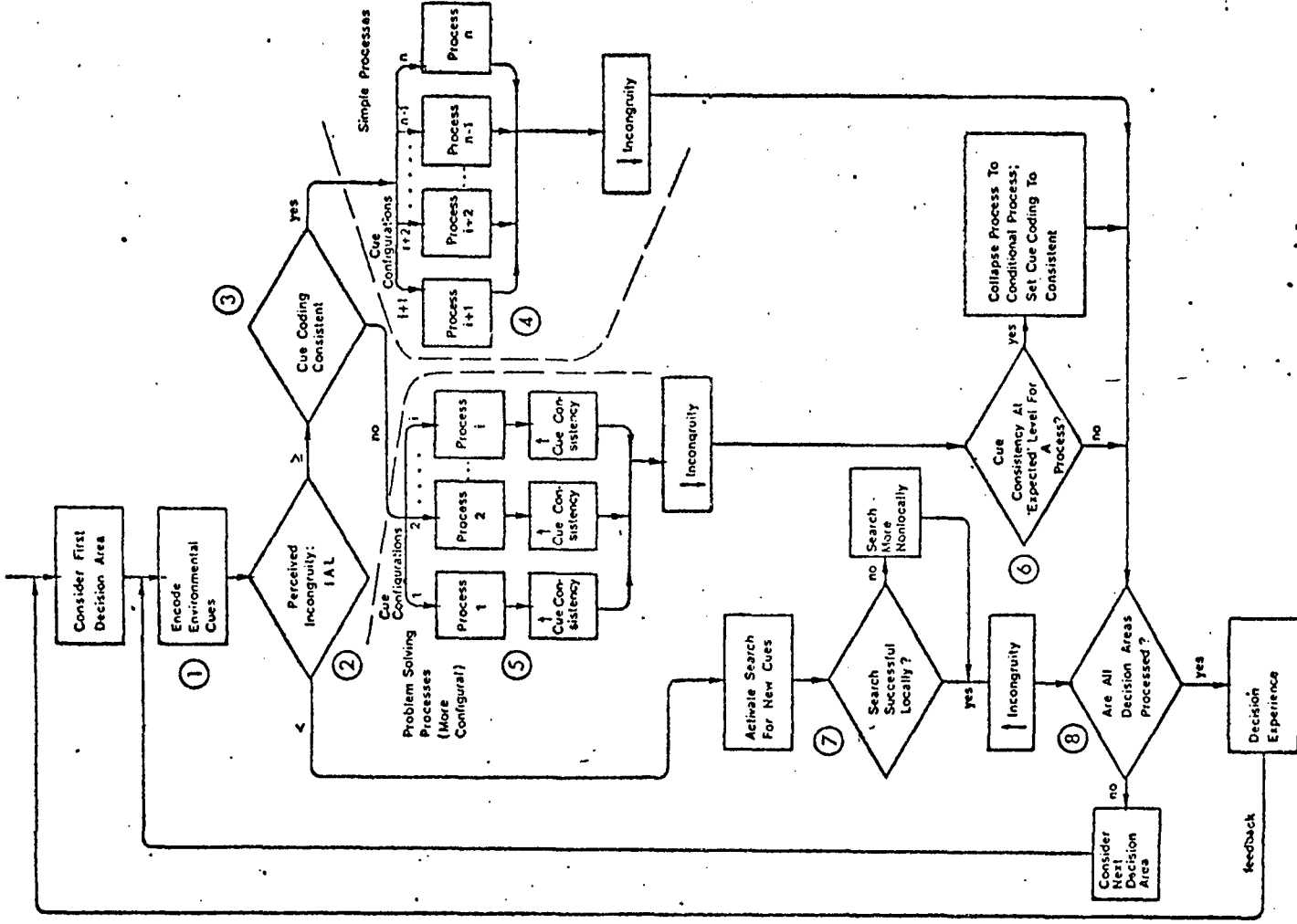


Figure 5. A GENERAL DECISION AND CHOICE MODEL

Source: (6, p. 469)

In an article designed to examine the current status of research on decision net models of buyer information processing, Bettman (4) extensively reviewed the literature. He discussed some of the problems confronting consumer information processing. Six general problem areas were pinpointed: data collection; modeling methodology; memory structure; social influences; analysis of models; and generality of models. Inadequacies of published research regarding these problem areas were listed as well as potential solutions. Finally, prospects and directions of future research were hypothesized in relation to the six problems.

The current state of consumer information processing literature revolves around the similarity of the researchers' model building techniques. All of them except Cox have used the protocol method of data gathering (1, 21, 22, 37), and consequently decision tree type models have evolved. Even Bettman's (5, 6) "decision nets" could be labelled decision trees. Another common belief among these model builders is that consumers process only small amounts of useful information in decision making. Haines' "principle of information processing parsimony" (22), Bettman's "measure of information processing efficiency" (7), and Cox's notion that consumers make decisions using a little "high value" information (9) are examples.

Future research efforts in the area of consumer information processing should build upon the common thread of small amounts of useful information. It seems that computer simulation techniques would be well suited for modeling consumer information processes. Rather than Bettman's global model (6), models for different product classes or categories (i.e., durables, nondurables, services and subsections of each like repair, entertainment, or food services) could be developed. The next step would be to model multiple buying decisions across these product categories to check for

similarities. This evolution would likely bring the discipline closer to understanding the nature of consumer information processing.

The second major theoretical area (i.e., information load) encompasses the research of Jacoby, Speller and Berning (Kohn) (33, 34, 35) who conducted several experiments examining information processing capacity of consumers. Their work has been limited to the amount of package information for prepared dinners, rice and detergents. The first study (33) analyzed the processing of package information for rice and prepared dinners, of 32 Lafayette, Indiana housewives. Their findings tend to support the theories on information load of Miller (45) and Schroder, et. al. (59) in the psychology literature.

Within the limits of the products, sample size, and laboratory-like procedures employed in this exploratory investigation, and assuming that the present results are replicated, it would appear that consumers will continue to spend time acquiring package information as the number of brands increases (at least up to 16 brands); however, they will tend to stop spending time to acquire package information as the number of bits (i.e., amount) of information per brand begins to exceed 12, regardless of how this information may be organized. (33, p. 814)

In an expanded study (34) they again explored the effects of increasing information load on brand choice behavior and included its effect on several psychological states. This time a laboratory experiment with 153 Purdue students was used for data collection. Six information dimensions concerning detergents taking on one of seven values and 12 fictitious brands comprised the information treatment. The students were initially asked to rate the importance of the six information dimensions (i.e., bleach content, enzyme content, fabric softening content, phosphate content, price and quantity required per washload) on a five-point scale. The respondents were also asked to indicate the characteristics of their "ideal" brand on these dimensions. After

arriving at a decision, the students then took an eight question dissonance type test to check their subjective state,

Using an analysis of variance to statistically test the data, significant main effects were that: "as the number of brands increased, satisfaction with the decision and the desire not to have additional information regarding the new brand also increased" (34, p. 66). Another important finding was that using the student's ideal brand as the standard for a correct choice, students felt more confident with more information but actually made poorer (less "correct") purchase decisions. This means that more information does not necessarily lead to better purchasing decisions. On the basis of these findings the theory of information load was supported.

Jacoby's, et. al, (35) most recent research is a replication and extension of their former work. In this study 192 housewives served as subjects for the laboratory experiment and the products about which the package information was given were rice and prepared dinners. Values of the package information were dichotomous (high-low) and the maximum information load was increased (16 brands and bits of information). They found once again that an individual's ability to choose her "correct" brand and the time necessary to make a purchase decision increases and then decreases beyond some information overload point.

Two general conclusions can be drawn from these studies dealing with information load. First, "the research conducted thus far suggests that there are finite limits to the consumer's ability to accommodate substantial amounts of package information within a limited time span" (35, p. 41). Second, from a public policy point of view one cannot assume that if Congress or the regulatory agencies forced marketers to provide more information to

the consumer that it will make him a better decision maker. The emphasis, therefore, should be on what, not how much, information is useful to the consumer.

The characteristics of the product itself can also be viewed as information. Most authors refer to these characteristics as choice or evaluative criteria. In this paper they are described as types of information. Specifically these information bits are brand name, brand assortment, price, and quality. Often a combination of these information bits are used in decision making. Thus, published research on these individual information criteria as well as the studies which examine several choice criteria are reviewed.

Although the marketing literature contains a plethora of writings on brand loyalty, few make a stronger case for the importance of the brand name label than Allison and Uhl.(2). In a study of 326 frequent beer drinkers, they found that without the brand label little difference was perceived in the taste of the various brands of beer on several attributes. However, when the beer was properly labeled, subjects significantly upgraded their favorite brand and downgraded other brands on the same taste dimensions. From this study's results, it appears that information on the brand name is an important choice criteria for beer buyers.

The assortment of brands available to consumers was the subject of analysis by Seggev (60). Utilizing data supplied by the Chicago Tribune panel in 1960 and 1961 for five separate 20-week segments on nine product categories, he investigated the brand choice behavior with respect to brand assortment--"operationally defined as the set of unique brands purchased by a household in a specific product category over a 20-week period" (60, p. 19). Major findings were that the average brand assortment size ranges

from less than 2 to 5,5 for the supermarket products and that consumers relied on a limited number of brands in switching to take advantage of lower prices (1,0-3,7 is range), Information concerning only a few of the brands in the assortment seemed to be important to these consumers. This conclusion seems to conflict with Jacoby's finding (33) that housewives tend to seek more information about brands available than specific features of the brand.

Information about the variable price is sought by almost everyone. Gabor and Granger (19) are well known for their research on the price consciousness of British housewives for grocery products. In their 1958 study 425 housewives from different social class groups were personally interviewed about their price sensitivity toward a total of fifteen food and cleaning products. Important results were: (1) that housewives paid close attention to the price of tea and eggs and relatively little attention to the price of breakfast cereal and flour and (2) the percentage of respondent's able to name the exact price paid for products declined as the number of items bought increases. Thus, information load is operative in remembering prices,

In their 1964 article, Gabor and Granger (20) formulated a relevant range in which consumers would be price sensitive. If information about price falls outside this range, the housewife will delete the product as a potential purchase (20, p. 44).

Studies discussed above show the impact of specific types of information on consumer choice, but they are not particularly realistic since the purchasing decision is usually made on the basis of several informational inputs rather than just one. A few published articles do examine a number of these choice criteria over a range of products,

Two of the articles relate not to the type of information consumers process, but also the amount. In a study primarily designed to examine how consumers perceive quality in products, Olson and Jacoby (51) listed possible product attributes that housewives used in buying several products. Some of these attributes (choice criteria) were packaging, price, brand name, etc. "The average number of product attributes these consumers reported considering in each product category was: hair dryers = 5.97; living room rug = 7.17; ground coffee = 4.64; shampoo = 5.13; aspirin tablets = 4.51" (51, pp. 168-169). Thus, the propensity of consumers to process information varies according to product class.

Hansen (24) conducted an experiment with students using six simulated product choice decisions. Although his choice criteria were examined in the perspective of "value importance" and "perceived instrumentability" measures, he used price and similar evaluative criteria. He found that the students limited the number of values perceived as important for choice making as evidenced by the following:

However, from the raw data it is clear that a limited number of values accounted for most of the difference in the attractiveness scores. To pursue this further, the three most important values were taken for each subject, and attractiveness scores were computed. These predictions were as good as those based on the total number of values. This further emphasizes that the number of values actually influencing the choice is limited. (24, p. 442)

It is not clear whether Olson and Jacoby and Hansen's studies make a convincing case for information load, but it does seem that consumers process what they perceive to be "relevant" information in a given situation. These findings tend to reinforce the aforementioned theories of Bettman (7), Cox (9) and Haines (22) on consumers' processing of small amounts of useful information.

Rizzo and Naylor (55) factor analyzed the relationship between individual values and consumer choice parameters (criteria) of 104 Ohio State students in 1964. They concluded that values were not good predictors of consumer choice. However, their research is useful to this study because they developed a table of the relative importance of certain product attributes. It is shown in Table 1. The means shown in the table were calculated from a 9-point Thurstone scale. According to Table 1 different dimensions or types of information have differing values over several product categories. Although performance ranks first for all products, except clothing, the 2nd most important criteria varies considerably across products.

In a study of product labels as an information transmission vehicle Darden and French (13) said "... it is the aim of this paper to investigate the types of product information that buyers and channel members believe are important in the purchase process" (13, p. 648). The research was conducted in Atlanta, Georgia. Seventy-five marketing executives were queried by a mail questionnaire and seventy-five housewives from each of the three social classes determined by the Hollingshead two factor index of social position were personally interviewed. Table 2 depicts the types of label information as well as the pertinent conclusions. They named Factor I-product descriptive importance, Factor II-product image importance and Factor III-product price importance. From part II of the table, executives believe that the brand and legal name and price are most important, but consumers see open dating, unit pricing and percent labeling as more important. Finally, implications are that consumers feel that many pieces of information not required by law, such as the date after which the product should not be used, are important to them. Therefore, both marketing managers and public policy makers should take heed of these findings.



TABLE 1  
Mean Importance Ratings for Selected  
Consumer Choice Criteria

<u>Dimension</u>	<u>Clothing</u>	<u>Car</u>	<u>Appliance</u>	<u>Home</u>	<u>Food</u>
Comfort	7.64 <sup>+</sup> (1)*	7.19 <sup>+</sup> (3)*	7.68 <sup>+</sup> (2)*	8.09 <sup>+</sup> (2)*	6.23 <sup>+</sup> (3)*
Style	7.42 (2)	6.84 (4)	5.33 (5)	7.30 (5)	6.04 (5)
Performance	6.96 (3)	8.36 (1)	8.40 (1)	8.22 (1)	8.11 (1)
Cost	6.65 (4)	7.47 (2)	7.28 (3)	7.61 (4)	6.80 (2)
Manufacturer	4.69 (5)	6.76 (5)	6.53 (4)	6.85 (6)	5.88 (6)
Place of purchase	4.67 (6)	5.39 (6)	5.28 (6)	7.84 (3)	6.16 (4)

<sup>+</sup> Importance ratings were calculated by a Thurstone scale where 9 = extremely important..., and 1 = extremely unimportant.

\* Relative rank orders are depicted within the parentheses.

Source: (55, p. 243)

TABLE 2

Factor Analysis of Consumer Importance Ratings of Product Labels<sup>a</sup>

LABEL INFORMATION TYPE	I FACTORS			II Mean importance rate <sup>b</sup>	
	I	II	III	Consumers	Executives
1. Product's legal name.....	.25	.71	.05	5.77	6.37
2. Product's brand name.....	.01	.85	.05	5.98	6.65
3. Net quantity.....	.63	.35	.06	5.38	6.53
4. Average number of servings/pkg.....	.46	.50	.07	5.18	4.79
5. Name and address of distributor or mfg....	.58	.23	-.32	3.90	5.43
6. Price of product.....	.13	.41	.61	6.25	6.68
7. Ingredients of product.....	.56	.40	.28	5.62	5.32
8. Cents off specials.....	.06	-.03	.75	5.53	5.17
9. Percent of solids and liquids in package or can.....	.79	.14	.14	4.55	3.44
10. Price per unit of weight.....	.66	-.09	.47	5.04	3.63
11. Listings of each ingredient by its percent of total contents.....	.74	.10	.27	4.73	3.15
12. Variety, style or grade of product.....	.25	.58	.46	6.16	5.91
13. Date after which the package should not be used.....	.35	.43	.53	6.25	5.04

<sup>a</sup>The three factors above explain over 58% of the total item variance; after principal components solution, those factors with eigen values greater than unity were subjected to varimax rotation.

<sup>b</sup>Each item of label information was rated on a seven point scale, with positions ranging from very unimportant to very important.

Source: (13, p. 649)

The present status of the information load and choice criteria research to date tie in with the efforts of the consumer information processing model builders. Consumers do prefer greater amounts of information about products if available (33, 34, 35) but ultimately it is the saliency (24, 51) not the amount, of information that is of paramount importance. However, the bits of salient information are perceived to be different across products (55) and consumers (13). This research seems to dictate that the model builders broaden their efforts to include information processing about many classes of products.

Exposure to new information represents the fourth major theoretical area within consumer information processing literature. As in the case of the psychological theory building efforts on new information, little research has been undertaken on this subject by consumer behavior theorists. Day (14) specifically identified exposure to new information as an environmental factor affecting durables and non-durables purchases. He expressed concern whether new information is internalized by the consumer in decision making. Like Turner, Newcomb and Converse (46), Day made a direct linkage between new information and attitude change. "However, a more probable effect of new information is an actual attitude change in order to maintain congruity between affect and cognition" (14, p. 64).

Day operationally defined new information about appliances (durables) as being exposure to print media, preference for print media over television, desire for shopping oriented information, changes in the household and additions to the appliance inventory. For a new brand of food products (non-durable) new information was defined as the number of visitors, number of out-of-home visits and number of hours of television viewing by the respondents. He hypothesized that new information would be more extensively

used in appliance decision making. However, Day found that new information did not affect appliance (or food) brand choice, and the following quote amplifies his reasoning.

The failure of the hypothesis about exposure to new information in the durables context is due in part to the use of variables that applied to all kinds of buying decisions, including food and drugs, and not just durable goods. (14, p. 148)

New information, therefore, and its impact both on consumer information processing and purchasing behavior suffers from little empirical research and operational definition problems.

This study attempts to apply some of these theoretical notions about information processing to the problem of ecology. Before discussing specific research efforts within the ecological information processing area, a brief analysis of ecological problems directly relating to use of consumer products is given.

#### Ecological Problems and Consumer Products' Marketing

The second major focus of this research concerns the relationship of consumer products to the degradation of the natural environment. Although the total number of people as well as their density and industrial emissions are thought to be major contributors to environmental decay, these problems are not pertinent to this particular study. All consumer products cause a certain amount of ecological damage, but recent developments such as the substitution of nonbiodegradable plastics for paper and the growth of convenience packaging has increased the impact of consumer products upon the environment. In the remainder of this brief section, ecology and the three major environmental problems attributable to consumer products are defined and discussed.

Ecology deals with the way all living things interrelate with one another and to the earth, air, and water which support life on this planet. From this definition, the fact that the intricate web of nature can be easily upset by man is evident. In attempting to satisfy the desires of consumers for more products and services, businessmen and especially marketers have tended, often unintentionally, to place a low priority on the effects of their actions upon the eco-system. The major reason for this behavior can be attributed to the current economic system which does not penalize firms for environmental externalities they produce. Many problems have resulted, but three general types of environmental problems can be identified. They are (1) pollution, (2) natural resource depletion, and (3) energy consumption.

Pollution is a word that is widely used but rarely defined. One definition is "pollution is the level of effluent discharge sufficient to overload the capacity of the environment" (58, p. 101). This infers that pollution is a relative concept and can also have many technical meanings. In other words, burning one's leaves in New York City is considered air pollution, but in a rural setting it may not be because the capacity of the environment is not overloaded in the second instance. Although there are many types of pollution, the two most commonly associated with consumer products are air pollution and solid waste pollution. Air pollution is produced by the emissions of products like cars and lawn mowers and the incineration of others (i.e., plastics and paper packaging). Solid waste pollution refers to the garbage generated by households, and an average American produces one ton of solid waste each year. Growth in usage of nonreturnable beverage containers, frozen foods packaged in individual containers and use of multiple and especially smaller size packages

for food and personal care products have certainly contributed to the rise in solid waste pollution.

Depletion of nonrenewable natural resources is the second major environmental problem associated with consumer products' marketing. Although shortages of paper and certain food products have recently plagued society, the resources from which these products are made are renewable and supply will in time likely catch up with demand. However, other natural resources are being rapidly depleted that cannot be renewed. Basic metals such as iron ore to produce steel with in turn is used to make cans, bauxite for aluminum containers, and also energy sources such as oil, coal and natural gas used to manufacture and transport all consumer products fall into this class. A recent publication projected the global reserves of these non-renewable resources and the estimated years before they would be depleted using both static and exponential indices (44, pp. 56-60). Unless greater reuse and recycling of consumer products and packaging is achieved, resource supply will likely constrain the availability of certain consumer products like steel and aluminum containers in the future.

The third type of environmental problem is energy consumption. It could be included in the natural resource depletion category, but because of energy's importance to the marketing and use of consumer products, it is discussed here as a separate problem. The total amount of energy used for manufacture, marketing and consumption of products and services not only in this country, but also worldwide has been on the increase during the past few years. Sales of more energy intensive products such as high powered automobiles, color television sets, frost-free refrigerators, central air conditioning units and a large number of small electrical appliances (i.e., can openers, blenders, electric knives, pencil sharpeners,

etc.) are indicative of the trend toward higher energy consumption levels. Consequently, pressures are being placed on energy supplies that cannot be met over a prolonged period.

A linkage can be made between ecological problems (i.e., pollution, resource depletion, and energy consumption) and consumer information processing theory. If consumers were given more information about the relationship between their purchases and environmental problems, it would be interesting to see how they evaluate this data in relation to more traditional forms such as price and brand name. Also, the reaction of the consumers to ecological information in the form of purchase behavior has implications to both marketers and public policy makers.

#### Research on Ecological Information

This section deals with research that directly relates to information processing and ecological issues. Initially articles discussing the "socially conscious" and "ecologically concerned" consumers are reviewed. Two articles that utilized differing methods of providing ecological information are also examined. Finally, significant research gaps which exist in the literature that this research is designed to at least partially fill are enumerated.

Anderson and Cunningham (3) identified the socially conscious consumer (i.e., one that is concerned with social issues) by using an eight item Social Responsibility Scale (SRS) developed by psychologists Berkowitz and Daniels. A sample of 1200 Austin, Texas, housewives were sent a self-administered questionnaire and they received 412 usable replies. The dependent variable was the housewives score on the Social Responsibility Scale computed by a five point "strongly agree to strongly disagree" scale

on the eight statements. No measure of consumption behavior was gathered as a dependent variable. Independent variables were demographics, alienation, dogmatism, conservatism, status consciousness, cosmopolitanism, and personal competence. Linear discriminant analysis was employed to analyze the data. Anderson and Cunningham found occupational attainment and socioeconomic status varied directly with the degree social responsibility and age varied inversely. Also, alienation and personal competence were not as strongly correlated with social responsibility as were the other sociopsychological variables. Their conclusion was that the sociopsychological variables were better predictors of social responsibility than demographic factors.

A study of Kinnear, Taylor and Ahmed (38) extended the work of Anderson and Cunningham. Their purpose was "to empirically explore the relationship between the socioeconomic and personality characteristics of consumers and the amount, if any, of ecological concern they indicate" (38, p. 20). Five hundred members of the Canadian Family Opinion-University of Western Ontario who responded to a mail questionnaire were the subjects of the study. The concept of "ecological concern" was the dependent variable and it has two dimensions. First is the buyer's attitude toward ecology and in the second he/she must indicate purchasing behavior that is consistent with the maintenance of the ecosystem. This concept of ecological concern is discussed in more detail later. Independent variables were (1) seven demographic variable such as age, employment, education of wife, and occupation of major wage earner; (2) scores on twelve personality scales (i.e., dominance, understanding rebelliousness, tolerance, etc.); and (3) a measure of the belief of the effectiveness of individual consumers in solving pollution problems. Their findings were that personality variables were better



indicators of ecological concern than demographic variables. Implications were that an ecologically concerned segment does exist but it may not be worth the marketers' effort to cultivate it because they are not demographically defined and this segment represents only a small portion of all consumers.

Since Kinnear, et. al. (38) were somewhat critical of Anderson and Cunningham's use of the social responsibility scale because it has no behavioral dimension, the limitations of their ecological concern index should be recognized. This index was developed in an article by Kinnear and Taylor (39) using the Western Ontario panel and contains both an attitude and behavioral component. However, they used only one product, detergent brands, to develop the measure of ecological concern. It seems doubtful that a response concerning one product is an accurate reflection of an individual's overall concern toward ecology. This drawback detracts from the conclusions and implications of their 1974 article.

Herberger and Buchanan (27) conducted an experiment with 202 Denver area housewives to test their reaction to information regarding products' ecological compatibility and changes in price. Products used were the four leading laundry detergent and soft drink brands in that geographic area. Ecological information treatments were the amount of phosphate content for detergents and the type of beverage containers for soft drinks. Three levels of price treatments varied from 15 percent less, to equal prices, and finally to 15 percent more for the ecologically compatible products. The experiment consisted of a simulated shopping trip where the housewives were asked to rank order the four products before and after the ecological information was presented.

Their findings were that a significant shift based on a chi-square test in preference did take place for detergents after the phosphate information was made available. Preferences likewise shifted in the hypothesized direction but were not statistically significant for soft drinks. Also, higher prices produced lower rankings for the ecologically compatible products. Herberger and Buchanan's conclusions are well stated in the following quote,

The results of this study suggest several conclusions: the type of product is an important consideration in determining whether or not consumers will alter buying behavior as a result of ecological compatibility; and there is an identifiable effect of product environmental compatibility on buyer behavior. (27, p. 646).

Two further critical comments about this article are in order. First, Herberger and Buchanan admitted that offering the four top selling brands of soft drinks in only one package was unrealistic. In the supermarket the housewife has the option to buy her family's favorite brand in the ecologically compatible (i.e., returnable) container. This constraint likely inhibited the preference shift for soft drinks. Second, the range of phosphate content in the four leading brands of detergent seemed to be rather narrow. It ranged from 27% for Cheer to 40% for Tide. Since there was no low phosphate or phosphate free choice alternative available, the shift in preference may not be indicative of the strength of the women's feelings about the phosphate content issue. The second limitation is probably more a function of the time period (1970) of the study, but it is important from the ecological perspective,

The only field experiment conducted in the area of ecological information was carried out by Henion (25). He investigated the effect of information about the phosphate content of detergent brands on sales of those

products in Austin, Texas. Four stores, two in medium to high income areas and two in medium to low income areas were used in data collection. Method of information presentation was a 3 x 5 inch white card with the brand name and its percent of phosphate taped to the shelf in front of the product. Detergents were broken into five classes from very low to very high depending on their phosphate level. Using a chi-square test he found that there was a significant decline in market share for the high phosphate detergents in both the low and high income stores. Regarding his prediction that high income persons would be most likely to act on ecological information, his conclusion stated that: "There is no evidence that shoppers of the low-income area stores were less likely to act on the ecological information; shoppers in both types of income stores appeared, overall ( $\chi^2$  9.85,  $p \leq .025$ ), to prefer brands with low-phosphate content" (25, p. 13). In his final statement Henion concluded that there appears to be a latent demand for this type of socially useful information.

Although Henion's article is superior to the other ecological information literature because an actual behavioral change was found, it too suffers from several limitations. First, only one class of products (detergents) was tested. Second, the method of disseminating the information (three by five inch card) took an unnatural form. Third, his use of share market data on three by five cards in the control stores is puzzling. Fourth, the rearrangement of the brands on the shelf according to their phosphate content seems to be a contaminating factor. These points do not constitute major flaws in his research, but they do raise several unanswered questions.

In addition to the common thread of ecological information and consumer behavior running through these articles, they exhibit several other similarities. First, the products examined in these studies were either

detergents or soft drinks or both. Second, although differing methods for data collection were used (i.e., Kinnear and Taylor-survey, Herberger and Buchanan-lab experiment, Henion-field experiment), the findings were similar. They all found that inclusion of ecological information does influence behavior. Third, the subjects were women (housewives) in all instances because they are the primary decision makers in the choice of the products. Finally, a common limitation of the articles is that their underpinnings are not strongly grounded in theory.

### Research Gaps

From the literature review discussed in preceding sections on the theoretical development of information processing, ecology, and ecological information several research gaps exist. They are:

- (1) There has been no effort to examine the impact of ecological information about more than two products on consumers.
- (2) The relationship of social class to concern for ecologically compatible purchases has not been substantiated.
- (3) The relative importance of ecological choice criteria vis-a-vis price, brand name, etc. to the consumer is not known.
- (4) No study on ecological information processing included both an attitudinal and behavioral measure.
- (5) Attempts have not been made to vary the amount of ecological information made available to consumers.

### Summary

The diversity of the literature cited in preceding sections is evidence that this study has multiple theoretical underpinnings. Several conclusions can be drawn regarding the current status of consumer information processing literature and ecological problems. First, computer

simulation models have been developed both by psychologists and consumer behavior researchers, but similarities in approach within each field limits their generalizability. Second, the obvious fact that individuals capacity to process information is limited is documented by both types of researchers. Third, and likely more significant, the selectivity with which consumers utilize information is widely recognized by the consumer behavior researchers. However, since the specific type of information consumers use varies across products and consumers, consumer information processing seems more complex than hypothesized by the computer simulation model builders. Fourth, the concept of "new" information has received so little research attention that no generalizations can be made about except that its effect seems inconclusive. Fifth, ecological information processing literature, although narrow in focus, has shown that this type of information is used by a certain segment of consumers in their purchasing decision.

The research proposed by this study is intended to amplify previous findings in the effect of ecological information on consumer product decision making. These prior studies have provided ample background to conduct the current project. Its purpose is to tie together some of these seemingly diverse areas such as information processing models, information load, new information and ecological problems using this chapter as its theoretical base.

## CHAPTER 3

### RESEARCH METHODOLOGY

#### Introduction

The purpose of this chapter is to explain the methodology used to carry out this study. The major hypotheses are stated first and then explained via the operational definitions. The products selected for use in the study as well as the rationale for choosing them are discussed next. The formal research design is presented and its major elements are analyzed. The test units, independent and dependent variables are stated and the reasons why the particular respondents and measures were selected are given. Finally, the methods of statistical analysis utilized to test the hypothesis are reviewed.

#### Major Hypotheses

The major hypotheses, stated in the null form, are as follows:

- $H_1$ : Women receiving varying ecological information treatment levels (no, moderate and high) will not score on the average significantly different on the environmental concern index importance measures (.05 level).
- $H_2$ : The effect of social class level (lower, middle, or upper) on women's environmental concern index importance scores will not be on the average significantly different (.05 level).
- $H_3$ : The average rank ordering of the value importance environmental concern feature will not be significantly different for women who receive the various levels (no, moderate, high) of ecological information treatment (.05 level).

- H<sub>4</sub>: The average rank ordering of the perceived instrumentality environmental concern feature will not be significantly different for women who receive the various levels (no, moderate, and high) of ecological information treatment (.05 level).
- H<sub>5</sub>: The average rank ordering of the value importance environmental concern feature will not be significantly different for women who belong to the lower, or middle, or upper social class (.05 level).
- H<sub>6</sub>: The average rank ordering of the perceived instrumentality environmental concern feature will not be significantly different for women who belong to the lower, or middle, or upper social class (.05 level).
- H<sub>7</sub>: In a simulated product choice situation women receiving varying ecological information treatment levels will not choose the environmentally correct brand with differing frequencies (.05 level).
- H<sub>8</sub>: In a simulated product choice situation women belonging to one of the three social classes will not choose the environmentally correct brand with differing frequencies (.05 level).

#### Operational Definitions

In this section the operational definitions are explicitly stated. The two ecological information treatments are defined in the following manner. High level ecological information treatment is defined as statements about a product's functional features, pollution resulting from current use patterns, energy use, and resource scarcity and the statements about outcome of continued product consumption on these four dimensions. (See pages 7 and 8, 11 and 12, and 15 and 16 of Appendix A.) Moderate level ecological information treatment refers only to the four statements about a product's functional features, pollution resulting from current

use patterns, energy use and resource scarcity. (See pages 7, 11, and 15 of Appendix A.)

The operational definitions which follow pertain to the facets of the environmental concern index. Environmental concern index is computed by multiplying the value importance and perceived instrumentality features together for each product. Value importance feature refers to the "harm to the environment" variable for paper towels, soft drinks and laundry detergents. Perceived instrumentality feature refers to the specific variable made from recycled paper for paper towels, returnability of the container for soft drinks and phosphate content for laundry detergents. Importance measures are calculated using a seven point Likert instrument with 1 being extremely important and 7 being extremely unimportant.

Other phrases which need to be defined are social class, average rank ordering and environmentally correct brands. Social class is defined as an individual's position in society and in this study is determined by Hollingshead's two factor index of social position with occupation and education of household head as the factors delineating class membership. Average rank ordering is computed by summing individual respondents rank orders for each of the two environmental concern index features and dividing by the number of respondents in the group (either by social class or information treatment). Environmentally correct brands are the two brand choices of paper towels that are made from recycled paper, the two brand choices of soft drinks that come in returnable containers and the two brand choices of detergents that contain no phosphates.

These definitions are explained in more detail in later sections of this chapter. Why these specific measures were chosen are discussed within the formal research design portions.



## Products

The three products about which ecological information was provided were laundry detergents, paper towels and soft drink containers. Detergents were chosen because their phosphate content contributes to the eutrophication of waterways (i.e., a form of water pollution). Specifically, phosphates fertilize algae causing their rapid growth to a point where the algae ultimately die from overgrowth. Their decay uses up oxygen within the water leaving an inadequate supply for fish and other forms of vegetation. Also, laundry detergents have been studied by several other researchers (25, 27, 38, 39, 40) and this study will provide a more recent examination of the issue.

Paper towels were selected because paper is the largest component (over fifty percent) in household solid waste and it is possible to manufacture paper towels using many kinds of waste paper. Recycling waste paper for this use is only a small step toward alleviating solid waste problems, but consumer's use of recycled paper towels may lead to choosing recycled paper napkins and toilet tissue. Brands of paper towels made from recycled paper are available on the market and consumer's reaction to them has not been researched.

Soft drink containers are an excellent example of a product that has multiple impacts on the environment. Nonreturnable beverage bottles and cans contribute extensively to solid waste disposal problems, consume natural resources and waste energy. Most brands of soft drinks are available in a multiplicity of containers. Consumers therefore have an opportunity either to maximize convenience while simultaneously damaging the environment with nonreturnables or to use returnables thus minimizing convenience and protecting the environment. In summary, these three

products--detergents, paper towels, and soft drink containers--meet the necessary conditions for use in this study analyzing the manner in which ecological information is processed by consumers.

One reason for choosing the three products is that they have easily identifiable relationships to the typology of environmental problems discussed in the ecological problems and consumer products' marketing section of the theoretical foundation chapter. Further, in these product categories alternative brands or product compositions which are less harmful to the environment exist. Finally, the products selected are widely used by consumers so the respondents are likely to have either prior knowledge or personal experience with them.

#### Experimental Design

Data were collected in this study using a randomized block design as shown below in Figure 6. Ninety respondents from each of three social classes (blocks) were randomly assigned to one of the three ecological information treatments (independent variables). The randomized block design was chosen because the social class to which a woman belongs was believed to be a major source of extraneous variation.

The actual experiment in which information treatment levels were manipulated was carried out in the community at women's group meetings. Although a field experiment conducted within a supermarket would have been a more realistic data collection method, the nature of the ecological information to be disseminated dictated a rigid form of control. Control was exercised by randomly assigning the women to a particular information treatment level, giving them extensive directions on the proper method of responding to the different types of questions, and policing their answers

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<u>Social Class</u>	<u>Ecological Information Treatment Level</u>		
	<u>No</u>	<u>Moderate</u>	<u>High</u>
Lower	30	30	30
Middle	30	30	30
Upper	30	30	30
	<hr/>	<hr/>	<hr/>
Total Respondents	90	90	90 = 270

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Figure 6, Randomized Block Design for Paper Towels,  
Soft Drinks and Laundry Detergents

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(i.e., making sure they did not consult with their neighbors). Thus, some external validity was sacrificed by using this type of experiment, but the tradeoff in terms of stronger internal validity (i.e., more accurate answers) seemed to justify it. Before discussing the elements of the experimental design, the preliminary measure is explained.

Appendix A contains the data gathering instrument. The first four pages included questions about the respondent's past purchase of soft drink containers, laundry detergents and paper towels. Specifically, rate of usage of the products, the three most important product features, and degree of brand loyalty were ascertained in the preliminary measure. The purpose for collecting this information was to compare responses in later portions of the instrument with the initial responses in order to determine if any changes in the respondent's predispositions took place.

### Test Units

Test units for this project were Houston area women who were contacted primarily through church and school groups in various sections of the city. The instrument was administered at a regular meeting of the group and the women received financial remuneration for participating in the study. The remuneration commonly took the form of a donation to the group of one dollar per respondent. As shown in Figure 6, the total projected sample was 270 women (90 from each social class). The rationale for choosing women as the test units as well as the method of determining social class are important and are discussed in more detail below.

The primary justification for using women rather than students as test units for this experiment was that women add more realism to the study. Two recent research efforts support this supposition. Enis, Cox, and Stafford (17) found significant differences between student and housewife samples in the influence of racial origin of models on perception of advertisements and in biases relating to country of manufacture in glassware preferences. Their findings were inconclusive in supporting the hypothesis that student's responses in consumer behavior studies accurately reflect housewife's responses, but they said "Where external validity is important, for example, the use of students as housewife surrogates in consumer behavior studies may be undesirable" (17, p. 73). Similarly, in attempting to answer the question, "are students real people?", Cunningham, Anderson and Murphy (11) conducted a study of households and students concerning four consumer behavior issues. In each case there was a significant difference between the undergraduate Marketing students responses and those of Austin household consumers. The authors concluded that students are not good surrogates for household consumers,

Other obvious reasons existed for selecting women over students. First, they generally have had more experience in purchasing paper towels, soft drinks and laundry detergents and should be able to relate to the questions posed more easily. Second, women (whether single, married, divorced, or widowed) are the primary supermarket product decision makers. Third, most studies in the ecological information literature have used women as subjects. More importantly, if the findings of this research are to be generalizable, women must be used as test units.

#### Blocking Variable

Although much demographic data were gathered about the women and their families (see pages 22-25 of Appendix A), questions 5 and 6 (or 10 and 12 if the woman is the head of the household) of this section were the relevant ones in measuring their social class. Hollingshead's two factor "Index of Social Position" (28) was used to categorize the women into lower, middle, or upper social class by occupation and education. This particular technique was used because it is both objective and easy to administer. Hollingshead's three factor-index includes place of residence as a determining factor. Since the city of Houston could not be objectively divided into specific social class areas, place of residence was excluded. Other objective social class indexes such as Warner's Index of Status Characteristics and Coleman's Index of Urban Status were dismissed because of difficulty in defining differences in housing type for the Houston area for both indexes and in computing the "associational behavior" element of Coleman's index. Finally, subjective methods, such as asking respondents to rate themselves on social class, were ruled out because of the tendency of people to over rate their own class position.

The actual computation of social class was determined by multiplying the occupation category score by seven where one equals the highest status job category and seven the lowest and the educational level score by four and summing the two factors for a total social class score (see page 23 of Appendix A). Although the Hollingshead index originally listed five social classes, it has been collapsed into three social classes using guidelines provided by an author of a study (13) who employed the two factor Hollingshead index to divide respondents into three classes. A comparison of the two breakdowns is shown below.

Hollingshead		This Study	
Social Class Categories	Range of Computed Scores	Social Class Categories	Range of Computed Scores
I	11-17	Upper	11-23
II	18-27		
III	28-43	Middle	24-52
IV	44-60	Lower	
V	61-77		53-77

Upper social class in this study includes all of Hollingshead's category I and top half of category II; middle social class encompasses the bottom half of category II, all of III, and the top one-half of IV; lower social class is made up of the lower half of category IV and all of V. With this framework in mind, women's groups were contacted that were thought to conform to the above classes, but ultimately social class was defined by the women's responses to the occupation and education questions.

### Independent Variables

Independent variables manipulated in the study were the three levels of ecological information about the three products. Since this information did not exist in the form desired for the experiment, it was necessary to develop the information treatments. In the first treatment no ecological information was provided to respondents and they served as the control group. The moderate level ecological information treatment contained four statements about the product's current environmental harm. In the high level ecological information treatments the same statements were repeated along with four more statements about the long term ecological damage from continued use of these products. The framework of ecological concerns which these statements relate to needs amplification as well as other steps that were taken in presenting this information to the test units.

Figure 7 shows the framework used to design the information treatments. It is broken down into: (1) the present--which refers to the current level of ecological harm caused by the consumption of certain types of the three products and; (2) the outcome--which projects the future ecological consequences, of continued use of these products. The first three dimensions of this framework--pollution, resource use, and energy usage--relate directly to the environmental problems discussed in chapter two. Comparison of product features of the ecologically benign and ecologically damaging alternatives delineates the limitations of the ecologically benign product.

The pages entitled Paper Towels Information (page 7), Soft Drink Container Information (page 11), and Laundry Detergent Information (page 15) in Appendix A depict the moderate level information treatments. When these pages were combined with the future outcomes immediately following, they together made up the high level information treatments. Upon examining

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Present	Outcome
1) Pollution resulting from current use patterns	1) Future pollution
2) Resource Scarcity	2) Rate of resource depletion
3) Energy Use	3) Rate of energy utilization
4) Comparison of product features of ecologically benign and damaging alternatives	4) Damage to the environment

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Figure 7. Framework for Designing Information Treatments

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these pages one sees that the statements were rather simply worded. A conscious effort was expended to make the statements understandable to the women. Most of the specific facts in the treatments were taken from published sources including those by the Environmental Protection Agency and the Midwest Research Institute. At times it was necessary to estimate some specific figures because published data could not be found. However, since the purpose of this research was to study the women's reaction to ecological information, accuracy of the information was not of extreme importance. Further, sources of the information were not divulged and consequently, source effect was removed from this experiment.

In the actual experiment a particular respondent received the same level of information treatment for all three products to avoid the trouble the respondents would have in making the transition from one level to another. For example, a middle class woman was randomly assigned to the



moderate level ecological information treatment for all products. Another was assigned to the no information treatment and still another to the high ecological treatment and so forth. To minimize any ecological information build-up effect the order of information presentation about the products was randomized across all treatments so that some test units received the soft drink information first, others would get it second, still others third, and so on for detergents and paper towels as well.

### Dependent Variables

Three separate dependent measures were utilized in this experiment to test ecological information processing capability of the women. The first was the importance rating of two product features which were combined into the environmental concern index; the second was a rank ordering of the same two features; the third was a simulated product choice situation. Each of these is discussed below and the rationale for choosing them is stated.

As shown in Appendix A, the importance rating for these products was measured using a seven point Likert instrument ranging from extremely important to extremely unimportant (see pages 9, 13, and 17). Price, brand name and harm to the environment were features common to all three products, but the other features listed were ones salient to only one product. Phosphate content for detergents, made from recycled paper for paper towels, and container returnability for soft drinks represented a key environmental fact distinctly unique to each product. When combined with harm to the environment, an environmental concern index importance measure was computed for each product.

The environmental concern index importance measure was borrowed and modified from Rosenberg's PI.VI notions (56). "Value importance" (VI),

in this instance, referred to the harm to the environment feature for each of the products. The importance of harm to the environment for paper towels, soft drinks and laundry detergents to the respondent is a value question. Made from recycled paper, returnability of the container, and phosphate content represented the "perceived instrumentality" (PI) dimension of the environmental concern index. Importance of these features reflected the extent the value (harm to the environment) was achieved by the women.

Although more sophisticated methods were available to ascertain an individual's predisposition toward these products, the importance rating was both simple and relevant. It allowed the woman to react to the information treatments in a manner that is natural to her by circling the importance she placed on the various features. In this case, the environmental concern index was composed of only the two importance measures and was not a Rosenberg or Fishbein attitude measure. Rather it was a weighted importance score which was used because it was believed that the women could not handle the more complicated scales. Given the actual problems encountered by respondents in completing the questionnaire, the use of the simpler environmental concern index seems justified.

The rank ordering which followed the importance rating (see pages 10, 14, and 18 of Appendix A) forced the women to decide the actual order of importance of each product feature. Since the same features were used, it served as a point of comparison with the importance rating. It also provided the data to test the hypotheses pertaining to the average rank ordering of individual environmental concern features and their relationship to information treatment level and social class. The order of the product

features on the page was reversed from the importance rating to minimize position bias.

Pages captioned "Paper Towel Choice", "Soft Drink Choice", and "Laundry Detergent Choice" in Appendix A (pages 19-21) contained the third dependent measure. In this simulated product choice there were two environmentally "correct" choices and two "incorrect" choices for each product based on the information provided. The choice allowed the testing of the hypotheses relating to housewives' behavioral intention (i.e.,  $H_7$  and  $H_8$ ).

Although simulated product choice was considered to be a good indicator of actual purchase, its limitations in this experiment should be recognized. First, the range of choices was restricted to four alternatives. Second, only three bits of data were provided about each alternative-price, brand and ecological criteria. Third, there was no visual appeal to any of the brands. Finally, it forced the women to make a decision on the basis of data that might not include her most important decision criteria. Despite these limitations the choice situation offered an opportunity to compare rating, ranking and ultimate choice by the respondents for consistency.

### Statistical Analysis

Since three dependent measures were used to collect the data, several different statistical tests were employed to test the various hypotheses. Given the framework of the randomized block design an analysis of variance was utilized to test the average environmental concern index importance rating differences among the three treatments and social classes (41). If the overall F ratio was significant, Duncan's New Multiple Range Test

was applied to the individual social class and treatment means (15). It was assumed that the seven point rating scale produced interval data and that the assumption of normality of the population was met. Thus, the analysis of variance appeared to be the proper statistical test.

To test the rank order positions of the environmental concern index measures, a nonparametric test was used because the difference between the ranks cannot be assumed to be equal. Thus, they were ordinally scaled. The Kruskal-Wallis one-way analysis of variance (61, p. 184) was the appropriate test. It determined whether there was an overall difference among the three treatments or social classes. If a difference was found, then another Kruskal-Wallis test was computed on the mean rank order to ascertain if the high level ecological information treatment rank of the individual environmental concern feature was significantly different than the moderate level ecological information treatment. Also, the rank of the moderate versus the no ecological information treatment and the no versus high treatment levels were tested. Each of the social class comparisons was handled in a similar manner.

The three simulated product choice decisions (see pages 19, 20, and 21 of Appendix A) were analyzed using a chi-square test (61). For paper towels Brands B and C were the ecologically "correct" choices because they were made from recycled paper. The frequency of selection of these two brands was computed for levels of treatment and social class. Laundry detergents were also tested explicitly for the ecological correct choices (B and C) on the basis of their no phosphate content. For soft drinks it was impossible to ascertain of the returnability of container or price was the variable influencing their choice (C and D). Since the prices of the products were designed to simulate the real world, the national brand of soft drinks in returnable containers were listed being less expensive than

store brands in nonreturnables. Therefore, the chi-square test was used to determine the specific significance of the ecological information provided for two of the three products,

## CHAPTER 4

## FINDINGS

Introduction

This chapter contains the major findings of the study. Each of the eight hypotheses are statistically analyzed and means tables for the various information treatment and social class levels are included. The three consumer products included in the analysis are reported in the following order in all instances: (1) paper towels, (2) soft drinks, and (3) laundry detergents. At the end of the chapter a summary of the results of all hypotheses tests is given as well as the conclusions which can be drawn from these findings.

Ecological Information, Social Class and Environmental Concern Index Importance Rating

H<sub>1</sub>: Women receiving varying ecological information treatment levels (no, moderate, and high) will not score on the average significantly different on the environmental concern index importance measures (.05 level).

H<sub>2</sub>: The effect of social class level (lower, middle, or upper) on women's environmental concern index importance scores will not be on the average significantly different (.05 level).

Hypothesis one shown above states that there is no relationship between information treatment level and importance scores while hypothesis two predicts that no relationship exists between social class level and importance scores. Since the randomized block experimental design was employed in this study, it was necessary to utilize the two-way analysis of variance

to test this hypothesis. Treatments were differing amounts of ecological information and the blocks were social class levels. The dependent variable is the environmental concern index computed as the product of the value importance (harm to the environment) and perceived instrumentality (made from recycled paper, returnability of the container, phosphate content) features.

The F test was used to determine whether to accept or reject null hypotheses one and two. Data from the seven point importance scale were assumed to be intervally scaled and thus this parametric test was applicable. Although the sample was not chosen randomly and the assumption of normality of population distribution is uncertain, the F test still is appropriate (41). Presentation of the findings of testing for this hypothesis encompasses a means table, overall ANOVA and Duncan's "new multiple range test" where significant differences are found for the environmental concern index of the three products.

Actual computation of the means and variances and F ratio was performed by the STATJOB NWAY1 analysis of variance program developed by the University of Wisconsin (50). Because ANOVA assumes equal cell sizes and the cell sizes were unequal for the product choice criteria in this experiment, Scheffe's (57) approximation was used by STATJOB to correct for this assumption violation. Duncan's multiple range test also assumes equal cell size so it was necessary to use Kramer's (43) "Extension of Multiple Range Tests to Group Means Replications." Thus, using this combination of statistical programs and techniques, it was possible to test the first two hypotheses.

Table 3 (on the next page) depicts the cell means of the three treatments and social classes for paper towels' environmental concern index

TABLE 3

Importance Rating Means by Information Treatment and Social Class  
for Paper Towel's Environmental Concern Index Measure<sup>+</sup>

<u>Social Class</u>	<u>Information Treatment</u>			
	<u>No</u>	<u>Moderate</u>	<u>High</u>	<u>Total</u>
Lower	15.94 n=31	13.88 n=33	14.63 n=27	14.80 n=91
Middle	15.87 n=30	11.47 n=36	10.61 n=36	12.46 n=102
Upper	15.23 n=30	9.42 n=31	8.03 n=31	10.85 n=92
Total	15.68 n=91	11.63 n=100	10.92 n=94	12.69 n=285

<sup>+</sup> Environmental concern index is the product of harm to the environment (value importance) and made from recycled paper (perceived instrumentality) where 1=extremely important ... and 7=extremely unimportant for each feature.

importance measures. The total mean scores decrease as the amount of ecological information is increased and as social class level rises, meaning that women who receive more information or belong to higher social class place more importance on the environmental concern index features. The only individual cell means which deviate from this pattern are lower class women who received the moderate and high level treatments. Those getting the moderate level were more concerned with the ecology issues that the women who received the high ecological information treatment



level, The overall analysis of variance was performed to ascertain whether the total mean difference between information treatments and social classes were statistically significant,

Since the F ratio for information treatment in Table 4 exceeds the critical value of 3.0, the paper towels' environmental concern index importance ratings are different than would be expected on the basis of chance. Null hypothesis one, therefore, is rejected at the .05 level of significance. However, null hypothesis two concerning social class is accepted because the F value of 2.51 is not significant. To determine which specific differences between ecological information treatment levels were significant, Duncan's new multiple range test was applied to the total column means.

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TABLE 4

Analysis of Variance by Information Treatment and Social Class  
for Paper Towels' Environmental Concern Index Importance Measures

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<u>Source</u>	<u>Sum of Squares</u>	<u>df</u>	<u>Mean Squares</u>	<u>F Ratio</u>
Information Treatment	1194.68	2	597.34	4.13*
Social Class	726.99	2	363.495	2.51
Interaction	290.50	4	72.63	.50
Residual	39930.56	276	144.68	
Total	42142.73	284		

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\* Significant at the .05 level,

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According to Table 5 (below) which shows the range values derived by Duncan's new multiple range test, there is a significant difference between the no and moderate level ecological information treatments and the no and high levels. This means that the important distinction is between the presence or absence of ecological information. In other words, women who received the high or moderate ecological information levels placed significantly greater importance on the environmental concern index importance features than women who received no information.

TABLE 5

Duncan's New Multiple Range Test by Information Treatment  
for Paper Towels' Environmental Concern Index Importance Measures

<u>Differences</u>	<u>Range Values</u>
$\bar{X}_{NO} - \bar{X}_{MOD}$	39.53*
$\bar{X}_{MOD} - \bar{X}_{HI}$	7.04
$\bar{X}_{NO} - \bar{X}_{HI}$	45.72*

\* Significant at the .05 level.

Table 6 shows all pertinent information treatment and social class means for soft drinks' environmental concern index importance measures. The total information treatment means vary according to the amount of ecological information provided with the largest difference occurring between the moderate and high levels. In the case of social class, however, women from the lower social class were more concerned with the ecology issue than upper or middle class women. A possible explanation

TABLE 6

Importance Rating Means by Information Treatment and Social Class  
for Soft Drinks' Environmental Concern Index Measure<sup>+</sup>

<u>Social Class</u>	<u>Information Treatment</u>			
	<u>No</u>	<u>Moderate</u>	<u>High</u>	<u>Total</u>
Lower	6.27 n=30	9.52 n=29	6.70 n=27	7.50 n=86
Middle	13.39 n=31	8.32 n=38	7.50 n=34	9.57 n=103
Upper	9.23 n=30	9.52 n=31	5.94 n=31	8.22 n=92
Total	9.67 n=91	9.05 n=98	6.74 n=92	8.50 n=281

<sup>+</sup>Environmental concern index is the product of harm to the environment (value importance) and returnability of the container (perceived instrumentality) where 1=extremely important,...and 7=extremely unimportant for each feature.

of the social class findings is that lower class women live in sections of the city that likely have poor solid waste collection and thus more litter, especially beer and soft drink containers is in evidence. Therefore, they might be more sensitive to this problem,

Table 7 lists the analysis of variance for soft drinks' environmental concern index importances scores on the basis of information treatment and social class level. Since the F ratio for information treatment does not exceed the critical value of 3.0, the first hypothesis which states that the level of ecological information will not affect importance ratings is

TABLE 7

Analysis of Variance by Information Treatment and Social Class  
for Soft Drinks' Environmental Concern Index Importance Measures

<u>Source</u>	<u>Sum of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F Ratio</u>
Information Treatment	450.22	2	225.11	2.78
Social Class	241.96	2	120.98	1.49
Interaction	617.84	4	154.46	1.91
Residual	<u>22,039.78</u>	<u>272</u>	81.03	
Total	23,334.24	280		

accepted. The second null hypothesis pertaining to social class, likewise, is accepted. Thus, there is no significant difference in environmental concern index importance ratings for soft drinks by women receiving no, moderate, and high level ecological information treatments who belong to either the lower, or middle or upper social classes.

According to Table 8 the total mean importance ratings of the environmental concern index for laundry detergents increase in importance as the amount of ecological information provided goes up. For the total social class means, the upper social class women are most concerned about laundry detergents ecological impact and the lower social class women are slightly more sensitive to the issue than middle class women. It is interesting to note that middle class women receiving no ecological information placed the least importance on the environmental concern index importance measures. They evidently do not consider phosphate content and harm to the environment

TABLE 8

Importance Rating Means by Information Treatment and Social Class  
for Laundry Detergents' Environmental Concern Index Measure<sup>+</sup>

<u>Social Class</u>	<u>Information Treatment</u>			
	<u>No</u>	<u>Moderate</u>	<u>High</u>	<u>Total</u>
Lower	11.24 n=29	11.39 n=28	10.43 n=30	10.01 n=87
Middle	13.28 n=29	9.97 n=38	7.90 n=38	10.13 n=105
Upper	10.32 n=31	7.00 n=31	6.77 n=30	8.04 n=92
Total	11.58 n=89	9.43 n=97	8.33 n=98	9.73 n=284

<sup>+</sup>Environmental concern index is the product of harm to the environment (value importance) and phosphate content (perceived instrumentality) where 1=extremely important...and 7=extremely unimportant for each feature.

important features in selecting laundry detergents possibly because they are least aware of the ecological problems. Possibly upper social class women, who are likely better educated, may have read about this problem and lower social class women, who are more likely to live in areas close to open streams, may have seen results of water pollution firsthand.

Table 9 shows that there are no significant relationships between information treatment level or social class and the environmental concern index importance ratings for laundry detergents. Therefore, hypothesis one and two ( $H_1$  and  $H_2$ ) must be accepted for this product. Sensitivity

TABLE 9

Analysis of Variance by Information Treatment and Social Class  
for Laundry Detergents' Environmental Concern Index Importance Measures

Source	Sum of Squares	df	Mean Square	F Ratio
Information Treatment	511.53	2	255.765	2.53
Social Class	464.77	2	232.385	2.30
Interaction	211.37	4	52.84	.52
Residual	<u>27,801.84</u>	<u>275</u>	101.10	
Total	28,989.51	283		

to ecological problems caused by laundry detergents is not related to the amount of ecological information made available to the women or to their social class.

From the discussion of hypotheses one and two it seems that the amount of ecological information and the social class level have little impact upon environmental concern index importance scores. Only in the case of paper towels did ecological information treatment ( $H_1$ ) affect importance ratings. No relationship exists between social class membership ( $H_2$ ) and environmental concern index importance ratings for paper towels, soft drinks and laundry detergents. The means tables (Tables 3, 6, and 8), however, do show that upper social class women were almost always more concerned with ecology issues than lower or middle class women, but the difference is not pronounced enough to be statistically significant. A possible explanation may be that the upper class women who are likely the better educated than the others have read more about ecological problems

and are more sensitive to the relationship between their buying behavior and ecology.

### Ecological Information and Value Importance Rank Ordering

$H_3$ : The average rank ordering of the value importance environmental concern feature will not be significantly different for women who receive the various levels (no, moderate, or high) of ecological information treatment (.05 level).

Data for this hypothesis are derived from the women's rank ordering of the harm to the environment choice feature for the three products. It was one of the items which was used as a component in the importance rating for each product. (See pages 10, 14, and 18 in Appendix A). The items were presented in reverse order from the importance rating to minimize item position bias. In this instance, each respondent had to consciously differentiate between all criteria and place consecutive numbers next to the criteria according to the importance placed on each variable. This task proved to be especially difficult for most of the women. Since the rank ordering represents an ordinal measurement procedure, a different statistical test, than that used previously, was employed.

The Kruskal-Wallis one-way analysis of variance by ranks which ascertains whether K independent samples are from different populations was the nonparametric test chosen (61). The test shows whether women receiving one of the three information treatment levels tend to rank order each environmental concern index feature differently. The reason for choosing this test is because the Kruskal-Wallis test seems to be the most efficient of the nonparametric tests for K independent samples, and it has a power-efficiency ratio of  $\frac{3}{\pi} = 95.5$  percent, when compared with the F test.

However, the major limitation of the Kruskal-Wallis test is that only main effects can be tested and not interaction effects (61). Since no other parametric test is capable of testing interaction effects, Kruskal-Wallis seems, on balance, to be the best method of testing the third hypothesis.

In order to test hypothesis three which states that the average rank ordering of the value importance environmental concern feature will not be significantly different for women receiving differing levels of ecological information treatment, it was necessary to employ the same procedure used in testing  $H_1$  and  $H_2$ . Initially, an overall Kruskal-Wallis test was applied to individual means to determine which specific treatment level rank orders are significantly different.

TABLE 10

Rank Order Means and Overall Kruskal-Wallis Values by  
Information Treatment for Paper Towels', Soft Drinks', and  
Laundry Detergents' Value Importance Environmental Concern Feature<sup>+</sup>

Product	No	Moderate	High	Total	df	Kruskal-Wallis Value
Paper Towels	5.58 n=93	5.20 n=103	4.87 n=97	5.21 n=293	2	3.78
Soft Drinks	6.24 n=89	5.47 n=98	5.10 n=97	5.59 n=284	2	11.55 <sup>**</sup>
Laundry Detergents	6.29 n=92	5.60 n=102	5.60 n=97	5.82 n=291	2	3.98

<sup>+</sup> Value importance environmental concern feature is defined as the harm to the environment measure for all three products where 1 denotes the most important feature, 2 is second in importance and so on,

<sup>\*\*</sup> Significant at the .01 level,



Table 10 depicts the rank order means and Kruskal-Wallis test for all three products. On the basis of the results, hypothesis three is accepted for paper towels and laundry detergents, but is rejected for soft drinks. Women receiving differing levels of ecological information do not rank order harm to the environment significantly different for paper towels and laundry detergents, but, as the means point out, they do rank order this feature significantly different for soft drinks. Increasing amounts of information do yield a higher mean rank ordering for soft drinks possibly because the women feel that ecological problems caused by soft drinks are of greater magnitude than those caused by paper towels and laundry detergents. It was necessary to conduct another Kruskal-Wallis test on the three treatment level rank order pairs to determine which differences were significant.

According to Table 11, women's rank ordering of the value importance (harm to the environment) environmental concern index feature is significantly affected by the presence or absence of ecological information. This finding parallels the results of Table 5 ( $H_1$ ) which showed that significant differences occurred between no and moderate and no and high information treatments for paper towels environmental concern index importance rating.

#### Ecological Information and Perceived Instrumentality Rank Ordering

$H_4$ : The average rank ordering of the perceived instrumentality environmental concern feature will not be significantly different for women who receive the various levels (no, moderate, high) of ecological information treatment (.05 level).

Hypothesis four refers to the second component of the environmental concern index. Stated in its null form, information treatment levels have

TABLE 11

Individual Kruskal-Wallis Value by Information  
Treatment for Soft Drinks' Value Importance Environmental Concern Feature

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<u>Information Treatment Pairs</u>	<u>df</u>	<u>Kruskal-Wallis Value</u>
No - Moderate	1	4.22*
Moderate - High	1	1.64
No - High	1	11.69***

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\* Significant at the .05 level.

\*\*\* Significant at the .001 level.

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no effect upon the rank ordering of made from recycled paper for paper towels, returnability of containers for soft drinks and phosphate content for laundry detergents. The statistical test here is the same as in hypothesis three.

Since none of the Kruskal-Wallis values exceed the critical value of 5.99 for .05 level of significance, the fourth hypothesis is accepted for all three products. Respondents' rank ordering of perceived instrumentality environmental concern features are not affected by the level of ecological information provided. It is interesting to note that the mean rank orders for every product do become more important as the amount of ecological information increases, but this shift is not sufficient to be statistically significant,

TABLE 12

Rank Order Means and Overall Kruskal-Wallis Value  
by Information Treatment for Paper Towels', Soft Drinks', and  
Laundry Detergents' Perceived Instrumentality Environmental Concern Feature<sup>+</sup>

Product	No	Moderate	High	Total	df	Kruskal-Wallis Value
Paper Towels	6,20 n=93	5,67 n=103	5,51 n=97	5,78 n=293	2	4,36
Soft Drinks	6,17 n=89	5,90 n=98	5,73 n=97	5,93 n=284	2	1,77
Laundry Detergents	6,91 n=92	6,56 n=102	6,21 n=97	6,55 n=291	2	2,62

<sup>+</sup>Perceived instrumentality environmental concern feature is defined as made from recycled paper, returnability of the container, and phosphate content measures for the respective products where 1 denotes the most important feature, 2 is second in importance, and so on.

#### Social Class and Value Importance Rank Ordering

H<sub>5</sub>: The average rank ordering of the value importance environmental concern feature will not be significantly different for women who belong to the lower, or middle, or upper social class (.05 level).

Hypothesis five examines the rank order differences for the harm to the environment feature of the three products utilizing social class as the independent measure. In this instance it is hypothesized that value importance concern feature rank ordering is not affected by social class level. The Kruskal-Wallis test, once again, is used to test this hypothesis.

TABLE 13

Rank Order Means and Overall Kruskal-Wallis Value by  
Social Class for Paper Towels', Soft Drinks', and Laundry  
Detergents' Value Importance Environmental Concern Feature<sup>+</sup>

Product	Lower	Middle	Upper	Total	df	Kruskal-Wallis Value
Paper Towels	5.42 n=97	5.29 n=106	4.89 n=90	5.21 n=293	2	3.70
Soft Drinks	5.86 n=92	5.61 n=103	5.27 n=89	5.59 n=284	2	3.40
Laundry Detergents	6.47 n=97	5.64 n=105	5.31 n=89	5.82 n=291	2	10.32**

<sup>+</sup>Value importance environmental concern feature is defined as the harm to the environment measure for all three products where 1 denotes the most important feature, 2 is second in importance and so on.

\*\*Significant at the .01 level.

Table 13 depicts the mean rank orders and Kruskal-Wallis values for the rank ordering of the value importance (harm to the environment) environmental concern features for all three products. Although the mean rank orders for paper towels and soft drinks become more important with increasing levels of social class, the difference is not large enough to be statistically significant. For laundry detergents, however, the overall difference in rank orders among the three classes is statistically significant at the .01 level. Social class, therefore, is related to harm to the environment importance rank orders. The individual Kruskal-Wallis was

applied to pairs of means to determine exactly which combinations were significant.

TABLE 14

Individual Kruskal-Wallis Test by Social Class  
for Laundry Detergents' Value Importance Environmental Concern Feature

<u>Social Class Pairs</u>	<u>df</u>	<u>Kruskal-Wallis Value</u>
Lower - Middle	1	4.64*
Middle - Upper	1	.82
Lower - Upper	1	10.26**

\* Significant at the .05 level.

\*\* Significant at the .01 level.

Table 14 shows that lower class women are significantly different from both the middle and upper class women in their rank ordering of the laundry detergents value importance environmental concern feature. The importance of the harm to environment caused by laundry detergents appears to be of greater concern to middle and upper class women because they are more likely to understand the problem because of higher educational attainment. Also, middle and upper class women were more likely sensitive to the water recreation arguments raised in the information treatments since their families probably utilize these resources for leisure activities more often than lower class ones.

Social Class and Perceived Instrumentality Rank Ordering

H<sub>6</sub>: The average rank ordering of the perceived instrumentality environmental concern feature will not be significantly different for women who belong to the lower, or middle, or upper social class (.05 level).

Hypothesis six predicts that rank ordering of (a) paper towels' made from recycled paper feature, (b) returnability of soft drink container feature, and (c) laundry detergents' phosphate content feature will not be different for women from different social classes. The Kruskal-Wallis was employed to statistically analyze this hypothesis.

Table 15 lists the social class means and the overall Kruskal-Wallis values for the perceived instrumentality environmental concern feature for the products. Results indicate that the null hypothesis must be rejected for every product. Lower, middle, and upper social class women do rank order this feature significantly different at the .05 level for paper towels and soft drinks and at the .001 level of significance for laundry detergents. Social class level appears to be strongly related to the rank ordering of the perceived instrumentality feature. Class membership which is associated with educational background relates directly to the women's understanding of the specific linkage between the perceived instrumentality features (i.e., recycled, returnability, phosphate) and environmental problems. In other words, upper social class women who are probably more highly educated are likely more aware of the connection between phosphates and water pollution than lower class women. To ascertain which classes were significantly different from one another, another Kruskal-Wallis test was performed on the pairs of means.

TABLE 15

Rank Order Means and Overall Kruskal-Wallis Values by Social Class for Paper Towels', Soft Drinks', and Laundry Detergents' Perceived Instrumentality Environmental Concern Feature<sup>+</sup>

<u>Product and Choice</u>	<u>Lower</u>	<u>Middle</u>	<u>Upper</u>	<u>Total</u>	<u>df</u>	<u>Kruskal-Wallis Value</u>
Paper Towels	6.01 n=97	5.99 n=106	5.29 n=90	5.78 n=293	2	8.32 <sup>*</sup>
Soft Drinks	6.24 n=92	6.03 n=103	5.48 n=89	5.93 n=284	2	7.31 <sup>*</sup>
Laundry Detergents	7.62 n=97	6.61 n=105	5.33 n=89	6.55 n=291	2	29.50 <sup>***</sup>

<sup>+</sup> Perceived instrumentality environmental concern feature is defined as the made from recycled paper, returnability of the container, and phosphate content measures for the respective products where 1 denotes the most important feature, 2 is second in importance and so on.

<sup>\*</sup> Significant at the .05 level.

<sup>\*\*\*</sup> Significant at the .001 level.

According to Table 16 which lists the individual Kruskal-Wallis values for the three products, upper social class women rank order the perceived instrumentality environmental concern feature significantly more important than lower class women in every case, Middle and upper class women rank order the paper towels' made from recycled paper and laundry detergents' phosphate content features with differing importance at the .01 level of significance. Only in the case of laundry detergents perceived instrumentality feature do the lower and middle social class women differ significantly in the their importance rank ordering. Also it is somewhat

TABLE 16

Individual Kruskal-Wallis Values by Social Class for Paper Towels', Soft Drinks', and Laundry Detergents' Perceived Instrumentality Environmental Concern Features

<u>Social Class Pairs</u>	<u>df</u>	<u>Kruskal-Wallis Value</u>
(a) Paper Towels		
Lower - Middle	1	.13
Middle - Upper	1	6.75**
Lower - Upper	1	5.78*
(b) Soft Drinks		
Lower - Middle	1	.84
Middle - Upper	1	3.65
Lower - Upper	1	6.67**
(c) Laundry Detergents		
Lower - Middle	1	6.69**
Middle - Upper	1	10.11**
Lower - Upper	1	28.32***

\* Significant at the .05 level.

\*\* Significant at the .01 level.

\*\*\* Significant at the .001 level.



surprising to see that for paper towels the difference between the lower and upper class women is less significant than between the middle and upper. No plausible explanation for this occurrence can be deduced. Thus, it seems that social class especially at the lower and upper levels is related to the rank ordering of the perceived instrumentality environmental concern feature rank ordering. A possible explanation as mentioned earlier, may be that upper social class women are more knowledgeable about the particular product feature that minimizes pollution and takes this in account in making product decisions.

#### Ecological Information and Brand Choice

H<sub>7</sub>: In a simulated product choice situation women receiving varying ecological information treatment levels will not choose the environmentally correct brand with differing frequencies (.05 level),

Hypothesis seven predicts that when women are confronted with a hypothetical choice situation, information treatment level will have no effect upon the frequency of environmentally correct choices. Before presenting the findings, the choice alternatives and chi-square test are discussed.

Since ultimate success or failure of any consumer product depends upon the willingness of people to purchase it, a measure of buying intention was derived through a simulated brand choice situation for each product. (See pages 19, 20, 21 of Appendix A for the paper towels, soft drinks and laundry detergent brand alternatives). Environmentally correct brands are paper towels made from recycled paper, soft drinks that are packaged in returnable containers and laundry detergents that contains no phosphates. The respondent's choices for these three products then provide the data to test hypothesis seven.

To statistically test this hypothesis a chi-square ( $\chi^2$ ) test for k independent samples was used. This test enables one to determine whether the proportion of women choosing the environmentally correct or incorrect brands is different from what is expected by chance. Since only nominal scaling (i.e., categorization) of the data is possible, chi-square is an appropriate test (61). In the case of paper towels and laundry detergents, it is possible to discern whether the significant difference is caused exclusively by an ecological effect by performing a series of  $\chi^2$  analyses.

Only three lists of information are available in the choice situation (i.e., brand, ecology, and price), and price and brand effects are combined because the national brands are higher priced than store brands of paper towels and laundry detergents. The other effect that can be isolated is attributable to ecological information (i.e., regular or recycled for paper towels, 8.7% or no phosphate for laundry detergents) because there is both a national brand and a store brand which is environmentally "correct." However, for soft drinks the ecological effect is combined with the price effect since the returnable bottles are always lower priced. The reason is that in reality national branded soft drinks in returnable containers are less expensive than store brands in nonreturnables. Hence, the real world environment is approximated but at the expense of an exclusive ecological effect.

Table 17 depicts the frequency of environmentally correct and incorrect choices of paper towels according to the three ecological information treatments. Environmentally correct choices increase with the amount of ecological information provided, but the  $\chi^2$  analysis was performed to find out if there was a significant information treatment effect.

TABLE 17

Frequency of Environmentally Incorrect or Correct Brand  
Choice by Information Treatment for Paper Towels

<u>Information Treatment Level</u>	<u>Environmentally Incorrect Brand Choice (A &amp; D)<sup>+</sup></u>	<u>Environmentally Correct Brand Choice (B &amp; C)<sup>++</sup></u>	<u>Total</u>
No	68 (58.1)*	34 (43.9)*	102
Moderate	58 (59.8)	47 (45.2)	105
High	48 (55.9)	50 (42.1)	98
Total	174	131	305

<sup>+</sup>A & D = Regular paper towels

<sup>++</sup>B & C = Recycled paper towels

\* Parentheses denote expected frequencies.

As shown in Table 18 (on the next page) the overall  $\chi^2$  value of 6.64 is significant at .05 level. Therefore, null hypothesis seven is rejected for paper towels choice. There is a substantial difference between the no and high level information treatments (6,36) which implies that for paper towels choice it takes a large amount of ecological information to have an effect upon behavioral intentions.

The results of women's choice of soft drinks is shown in Table 19. There appears to be little difference in their choice according to information treatment level. However, it was necessary to run the  $\chi^2$  analysis to statistically verify if the differences were significant at the .05 level.

TABLE 18

$\chi^2$  Analysis of Environmentally Incorrect or Correct Brand Choice Frequencies by Information Treatment for Paper Towels

<u>Information Treatment Effect</u>	<u>df</u>	<u><math>\chi^2</math> Value</u>
Overall	2	6.64*
No - Moderate	1	2.82
Moderate - High	1	.63
No - High	1	6.36*

\* Significant at the .05 level.

TABLE 19

Frequency of Environmentally Incorrect or Correct Brand Choice by Information Treatment for Soft Drinks

<u>Information Treatment Level</u>	<u>Environmentally Incorrect Brand Choice (A &amp; B)<sup>+</sup></u>	<u>Environmentally Correct Brand Choice (C &amp; D)<sup>++</sup></u>	<u>Total</u>
No	30 (30.7)*	66 (66.3)*	97
Moderate	35 (32.6)	68 (70.4)	103
High	<u>30</u> (31.7)	<u>70</u> (68.3)	<u>100</u>
Total	95	205	300

<sup>+</sup> A & B - Nonreturnable containers

<sup>++</sup> C & D - Returnable containers

\* Parentheses denote expected frequencies.

Table 20 lists the insignificant chi-square value of .42 for soft drinks choice by information treatment level. Therefore, hypothesis seven is accepted for the soft drinks choice situation. One reason for the low  $x^2$  value is that in an effort to simulate reality the environmentally correct choices were also the lowest in price. Thus, it was not possible to isolate the ecological information treatment effect from the price effect.

TABLE 20

$x^2$  Analysis of Environmentally Incorrect or Correct Brand Choice Frequencies by Information Treatment for Soft Drinks

<u>Information Treatment Effect</u>	<u>df</u>	<u><math>x^2</math> Value</u>
Overall	2	.42

Table 21 shows the choice responses of women receiving the various levels of ecological information treatment for laundry detergent. The findings do vary according to the information provided with the biggest difference appearing between the no and moderate treatment levels. However, the  $x^2$  analysis was employed to ascertain if the difference were statistically significant.

According to Table 22, null hypothesis seven is rejected. In examining the differences between specific treatment levels, women receiving no ecological information chose the environmentally correct brands significantly less often than women getting the moderate or high treatment levels. Thus, the important distinction for laundry detergents seems to be between the presence or absence of ecological information and not the degree (i.e., moderate vs. high).

TABLE 21

Frequency of Environmentally Incorrect or Correct Brand Choice  
by Information Treatment for Laundry Detergents

<u>Information Treatment Level</u>	<u>Environmentally Incorrect Brand Choice (A &amp; D)<sup>+</sup></u>	<u>Environmentally Correct Brand Choice (B &amp; C)<sup>++</sup></u>	<u>Total</u>
No	62 (48.3) <sup>*</sup>	40 (53.7) <sup>*</sup>	102
Moderate	45 (49.3)	59 (54.7)	104
High	<u>37</u> (46.4)	<u>61</u> (51.6)	<u>98</u>
Total	144	160	304

<sup>+</sup>A & D = 8.7% phosphate

<sup>++</sup>B & C = 0% phosphate.

<sup>\*</sup>Parentheses denote expected frequencies.

TABLE 22

$\chi^2$  Analysis of Environmentally Incorrect or Correct Brand Choice  
Frequencies by Information Treatment for Laundry Detergents

<u>Information Treatment Effect</u>	<u>df</u>	<u><math>\chi^2</math> Value</u>
Overall	2	11.72 <sup>**</sup>
No - Moderate	1	6.30 <sup>*</sup>
Moderate - High	1	.71
No - High	1	10.59 <sup>**</sup>

<sup>\*</sup>Significant at the .05-level.

<sup>\*\*</sup>Significant at the .01 level.

### Social Class and Brand Choice

H<sub>8</sub>: In a simulated product choice situation women belonging to one of the three social classes will not choose the environmentally correct brand with differing frequencies (.05).

Hypothesis eight states that social class membership has no bearing on environmentally correct brand selection. The same procedure as was used in presenting choice frequencies and the chi-square analysis for hypothesis seven is followed here.

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TABLE 23

Frequency of Environmentally Incorrect or Correct Brand  
Choice by Social Class for Paper Towels

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<u>Social Class Level</u>	<u>Environmentally Incorrect Brand Choice (A &amp; D)<sup>+</sup></u>	<u>Environmentally Correct Brand Choice (B &amp; C)<sup>++</sup></u>	<u>Total</u>
Lower	75 (56.5)*	24 (42.5)*	99
Middle	69 (62.8)	41 (47.2)	110
Upper	30 (54.8)	66 (41.2)	96
Total	174	131	305

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<sup>+</sup>A & D = Regular paper towels

<sup>++</sup>B & C = Recycled paper towels

\* Parentheses denote expected frequencies.

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Table 23 shows the actual and expected frequencies of paper towels choice by social class level. The raw data do not seem to support hypothesis eight, but the  $\chi^2$  test was conducted to determine whether to accept or reject the stated null hypothesis. It is noteworthy to examine the large differential between the environmentally correct and incorrect choices within the lower and upper social classes. Since brands of paper towels made from recycled paper are not readily available on the market and women have little or no experience with them, lower class women who are likely less confident in their personal product evaluation skills probably are more reluctant to choose the recycled brand.

TABLE 24

$\chi^2$  Analysis of Environmentally Incorrect or Correct Brand Choice Frequencies by Social Class For Paper Towels

<u>Social Class Effect</u>	<u>df</u>	<u><math>\chi^2</math> Value</u>
Overall	2	41.13***
Lower - Middle	1	4.14*
Middle - Upper	1	20.25***
Lower - Upper	1	38.87***

\* Significant at the .05 level.

\*\*\* Significant at the .001 level.

Table 24 indicates that social class is highly correlated with paper towels choices. Hypothesis eight which states that social class level is not related to frequency of environmentally correct choices is, therefore,



rejected. In fact, in three of the class comparisons out of four the paper towels choice difference are highly significant (.001 level) and social class seems strongly associated with environmentally correct paper towel choices,

The frequency of soft drink brand choice according to lower, middle, and upper social class is depicted on the bottom of this page. Choice differences between the lower and middle classes are not large, but the upper social class deviates substantially from the other two. An interesting finding is that only 11 of 96 upper social class women preferred the environmentally incorrect soft drink choice. It appears that they have a level of commitment to minimize environmental harm by choosing soft drinks in returnable bottles. In order to test hypothesis eight for soft drinks,  $\chi^2$  analysis was again used.

TABLE 25

Frequency of Environmentally Incorrect or Correct Brand  
Choice by Social Class for Soft Drinks

<u>Social Class Level</u>	<u>Environmentally Incorrect Brand Choice (A &amp; B)<sup>+</sup></u>	<u>Environmentally Correct Brand Choice (C &amp; D)<sup>++</sup></u>	<u>Total</u>
Lower	41 (29.8)*	53 (64.2)*	94
Middle	43 (34.8)	67 (75.2)	110
Upper	11 (30.4)	85 (65.6)	96
Total	95	205	300

<sup>+</sup> A & B = Nonreturnable containers

<sup>++</sup> C & D = Returnable containers

\* Parentheses denote expected frequencies.

From the  $x^2$  values shown in Table 26 null hypothesis eight is rejected. There is highly significant overall difference among the women's soft drink choices on the basis of social class. However, the large overall value is attributable to the difference between upper social class women and the other two classes. Finally, the magnitude of the difference between the middle and upper and lower and upper classes seems to indicate that upper class women have a much stronger concern for the potential environmental harm of soft drink containers.

TABLE 26

$x^2$  Analysis of Environmentally Incorrect or Correct Brand Choice Frequencies by Social Class for Soft Drinks

<u>Social Class Effect</u>	<u>df</u>	<u><math>x^2</math> Value</u>
Overall	2	27.10***
Lower - Middle	1	.44
Middle - Upper	1	20.33***
Lower - Upper	1	24.80***

\*\*\* Significant at the .001 level.

Table 27 lists laundry detergent responses according to social class level. The environmentally correct choices do increase as one proceeds up the social class scale, but it remained for the  $x^2$  analysis to discriminate between the level of significance of the choices.

TABLE 27

Frequency of Environmentally Incorrect or Correct Brand  
Choice by Social Class for Laundry Detergents

<u>Social Class Level</u>	<u>Environmentally Incorrect Brand Choice (A &amp; D)<sup>+</sup></u>	<u>Environmentally Correct Brand Choice (B &amp; C)<sup>++</sup></u>	<u>Total</u>
Lower	67 (46.9)*	32 (52.1)*	99
Middle	51 (52.1)	59 (57.9)	110
Upper	26 (45)	69 (50)	95
Total	144	160	304

<sup>+</sup>A & D = 8.7% Phosphate

<sup>++</sup>B & C = 0% Phosphate

\* Parentheses denote expected frequencies.

As shown in Table 28 every chi-square value is significant for laundry detergent choice and thus null hypothesis eight is rejected. In this instance upper social class women do choose the environmentally correct brand with greater frequency than middle social class women who in turn do choose the environmentally correct brand with greater frequency than lower social class women at the .01 level. This finding supports the contention that social class is related to the ecological concern of women toward laundry detergents.

TABLE 28

$\chi^2$  Analysis of Environmentally Incorrect or Correct Brand  
Choice Frequencies by Social Class for Laundry Detergents

<u>Social Class Effect</u>	<u>df</u>	<u><math>\chi^2</math> Value</u>
Overall	2	31.64***
Lower - Middle	1	9.61**
Middle - Upper	1	7.88**
Lower - Upper	1	31.43***

\*\* Significant at the .01 level.

\*\*\* Significant at the .001 level.

### Summary and Conclusions

In order to succinctly summarize the analysis of the eight null hypotheses and their discussion, three summary tables are shown below. Hypotheses one and two which refer to the environmental concern index importance rating by information treatment and social class are combined once again for presentation purposes. Hypotheses three through six are included in one table because they all apply to the rank ordering of the value importance and perceived instrumentality features by information treatment and social class. Finally, the third summary table depicts the results of hypotheses seven and eight which analyze the environmentally correct or incorrect choice frequencies by information treatment and social class.

TABLE 29

Acceptance or Rejection of Null Hypotheses One and Two  
for Paper Towels, Soft Drinks and Laundry  
Detergents at the .05 Significance Level

	<u>Information Treatment</u>	<u>Social Class</u>
	<u>Hypothesis 1</u>	<u>Hypothesis 2</u>
Paper Towels	Reject	Accept
Soft Drinks	Accept	Accept
Laundry Detergents	Accept	Accept

Table 29 indicates that ecological information treatment level and social class level are not related to the environmental concern index importance scores with one exception. The amount of ecological information provided did have an effect on the women's rating of environmental concern index for paper towels, but the difference was significant between only the absence of information (no) and presence (moderate and high) of it (see Table 5). A possible explanation for ecological information about paper towels having a greater impact upon the women is that they were likely already familiar with some of the ecological statements about soft drinks and laundry detergents because of the past exposure of these environmental issues. The information provided about paper towels, however, was probably unknown to them and hence they reacted according to what they read in the experiment rather than relying on prior experience or information.

For social class there was no significant difference in the women's environmental concern index importance rating. One possible reason for

the lack of social class effect is the seven point rating scale. The women tended to circle the numbers over a very narrow range and had difficulty visualizing the seven point scale. The seven scale gradations did not seem to accurately depict most women's importance feelings and likely a three or five point scale would have been less confusing. Thus, when confronted with this overchoice situation, the women responded by circling only a few of the seven possible importance scores (i.e., many women circled all 1's or 2's for every feature shown on pages 9, 13, and 17 of Appendix A.) The null hypotheses one and two were accepted in five cases out of six, but the previous discussion pointed out possible reasons for these results.

According to Table 30 (a) it must be concluded that level of information treatment had little bearing upon the rank ordering of value importance ( $H_3$ ) and perceived instrumentality ( $H_4$ ) environmental concern index importance scores. The only exception was soft drinks value importance ranking measure where the significant importance difference was found between the no-moderate and no-high ecological information treatment levels (see Table 11). Statements about soft drink containers ecological damage may have had more impact on the women because they perceived their "harm to the environment" as a more pressing environmental problem. Overall though women receiving the moderate and high level ecological information treatments were not sufficiently convinced of ecology's importance to rank order these features substantially higher.

For social class (Table 30 (b)) the value importance ( $H_5$ ) (harm to the environment) was ranked differently for laundry detergents (i.e., upper and middle social class women are more concerned with pollution caused by laundry detergents than lower class women -- see Table 14). A

TABLE 30

Acceptance or Rejection of Null Hypotheses Three, Four, Five,  
and Six for Paper Towels, Soft Drinks and Laundry  
Detergents at the .05 Significance Level

<u>Product</u>	<u>Value Importance</u>	<u>Perceived Instrumentality</u>
	<u>Hypothesis 3</u>	<u>Hypothesis 4</u>
(a) Information Treatment		
Paper Towels	Accept	Accept
Soft Drinks	Reject	Accept
Laundry Detergents	Accept	Accept
<u>Product</u>	<u>Value Importance</u>	<u>Perceived Instrumentality</u>
	<u>Hypothesis 5</u>	<u>Hypothesis 6</u>
(b) Social Class		
Paper Towels	Accept	Reject
Soft Drinks	Accept	Reject
Laundry Detergents	Reject	Reject

possible explanation may be that the upper and middle class women are more oriented to water recreation than lower class ones and are more sensitive to their contribution to water pollution problems.

Social class was strongly related to the perceived instrumentality (i.e., made from recycled paper, returnability of the container, and phosphate content) environmental concern feature. As shown in Table 16 the upper social class women were the most involved with the ecology issue likely because of their prior knowledge or experience with the products

and their ability to make the linkage between the specific product features and pollution. Hypothesis three is rejected for soft drinks only; hypothesis four is accepted for all three products; hypothesis five is rejected for laundry detergents only; and hypothesis six is rejected for all products.

TABLE 31

Acceptance or Rejection of Null Hypotheses Seven and Eight  
for Paper Towels, Soft Drinks and Laundry Detergents  
at the .05 Significance Level

	<u>Information Treatment</u>	<u>Social Class</u>
	<u>Hypothesis 7</u>	<u>Hypothesis 8</u>
Paper Towels	Reject	Reject
Soft Drinks	Accept	Reject
Laundry Detergents	Reject	Reject

Table 31 depicts the results of hypotheses seven and eight. For paper towels and laundry detergents the level of ecological information treatment ( $H_7$ ) did affect the women's choices of the environmentally correct brands. Tables 18 and 22 showed that the most significant choices differences occur between the no and high level treatments. Thus, it took a large amount of ecological information about paper towels and laundry detergents to influence environmentally correct brand choices. For soft drinks there was no difference in choices on the basis of treatment. In all likelihood this occurred because the environmentally correct brands were also the lowest priced. For the other two products, however, given a limited number of choice criteria (i.e., national or store brand, price, and ecology feature),



women receiving larger amounts of ecological information did prefer the environmentally correct brands and thus the information seemed to be related to behavioral intention.

Hypothesis eight which refers to choice by social class level was rejected for all products. This means that social class was closely associated with environmentally correct brand choice. For paper towels and laundry detergents each social class' choice frequency was significantly different from the other two (see Tables 24 and 28). In the case of soft drinks upper class women's choices were different from both the lower and middle class women's responses (Table 26). Thus, upper social class women who are likely better educated and more aware of ecological problems chose the environmentally correct brands most often for all products. Women belonging to the middle class who are probably not quite as well educated or involved in ecology chose the environmentally correct brand with significantly greater frequency than the lower class women for both paper towels and laundry detergents. Lower social class women were least concerned with ecology because they are likely more preoccupied with day to day problems of poverty, poor housing and even racism (62). Since the lower class women for the most part had the lowest educational levels, they also probably didn't understand some of the arguments set forth in the information treatments. Therefore, null hypotheses seven and eight were rejected in five instances out of six.

In summary, several conclusions can be drawn from examining the hypotheses. First, importance rating scores ( $H_1$  and  $H_2$ ) were not good discriminators of ecological concern by information treatment or social class. Second, the rank orders ( $H_3$ ,  $H_4$ ,  $H_5$  and  $H_6$ ) yielded consistently significant results only for the perceived instrumentality feature of all products

by social class. Third, in the environmentally incorrect or correct choice situation ( $H_7$  and  $H_8$ ) significant differences resulted in every case except one. Thus, it seems that the behavioral intention (i.e., choice) is a superior measure of women's ecological concern by both treatment and social class than the importance instruments (i.e., rating scales and rank orderings). Respondents' difficulties in visualizing the seven point scales and consecutively ranking the product features likely inhibited the effectiveness of these measures. The problem of social desirability, however, was likely more easily manifested in the behavioral intention than the importance ones and this reservation cannot be overlooked.

## CHAPTER 5

CONSUMER INFORMATION PROCESSING THEORY  
INTERPRETATIONS WITH MARKETING AND  
PUBLIC POLICY IMPLICATIONSIntroduction

This chapter contains three major focal points--consumer information processing theory, marketing management and public policy. The interpretations of the findings of this study are related to the literature reviewed within the theoretical foundation chapter. Next, the usefulness of these findings to consumer products' marketing managers is discussed. Finally, some implications drawn from this study are directed toward public policy makers interested in the value of ecological information to consumers.

Consumer Information Processing Theory Interpretations

Results of this study have particular significance to several aspects of information processing theory, among those are: model building, utilization of new information, and consumer exposure to ecological information. The findings can be related to efforts by both psychologists and consumer behavior researchers to construct models of information processing. Outcomes of the hypotheses tests have a bearing on the status of research on "new" information. Finally, findings about women's rating, ranking, and choices of soft drinks and laundry detergents are mixed with respect to the results of other ecological information studies in the marketing literature.

Information processing model building represents the first area of theoretical interpretation. The findings of this project generally show that the women responded in consistent directions in their rating, rank ordering and choice of paper towels, soft drinks and laundry detergents. This showed that reliable data could be gathered by self-reporting measures. From this interpretation it appears that women's information processing for these products could be modeled using data gathered from consumers. Therefore, the work in the psychology literature of Newell, Shaw and Simon (48) who posited models of individual's problem solving capabilities could be applied to consumer information processing. In the consumer behavior model building area, King (37) built a simulation model of the cognitive processes of supermarket shoppers; Alexis, Haines and Simon (1) formulated decision trees for women's clothing decisions; and Bettman (6) designed a general consumer information processing decision model. Interpretation of the some of the findings of this study tends to affirm these writers' belief that buyers react to information about similar products in a consistent manner.

Interpretation regarding the information treatment level needs amplification. The findings showed that in instances where there was an overall ecological information treatment effect (i.e., four cases out of twelve), no difference was found between moderate and high information levels on the dependent variables. Respondents' commitment in the form of rating and rank ordering of the environmental concern index and "environmentally correct" choices seems to level off after the moderate level treatment. More ecological information, therefore, does not seem to lead to higher levels of concern for ecology features.

Ecological information provided in this experiment was assumed to be "new" information because such information was not likely to be presented to consumers through the regular commercial communication channels i.e., mass media advertising or package labels. Generally the women responded only to moderate amounts of ecological information differently in terms of their ratings, rankings and choices across information treatment levels for paper towels, soft drinks and laundry detergents. Therefore, this does seem to support Newcomb, Turner and Converse's (47) hypothesis that small amounts of new information have the greatest impact on attitude changes. On the other hand, the findings of Day (14) that buyers of both durable and nondurable goods were not significantly affected by the introduction of several types of new information are generally inconsistent with the interpretation of the findings.

Findings from this study also relate to prior research on ecological information conducted by others in marketing (25, 27). First, social class membership seems to be more strongly associated with environmental concern index importance rating, rank ordering and environmentally "correct" brand choice than information treatment level. This interpretation runs counter to the findings of Henion (25) on laundry detergents. He found that detergent sales were positively correlated with the phosphate content level information he provided and that shoppers in lower income area stores did not respond in a significantly different manner to the phosphate information. In this experiment upper social class women were significantly more concerned about ecology than lower and middle class women for all products.

The tendency of the respondents to react more favorably to ecological information about certain products than others in their choice behavior is

another interpretation which relates to past research in this area. In this experiment women who received large amounts of ecological information did choose the "environmentally correct" brands of paper towels with significantly higher frequency than respondents receiving no ecological information. For laundry detergents both moderate and high ecological information treatment levels yielded significantly more environmentally correct choices than no ecological information. No information treatment choice difference, however, was recorded for soft drinks. This is consistent with Herberger and Buchanan's (27) study which found a significant shift in preference for detergents with lower phosphate levels after housewives were given phosphate information. In addition, there was no significant preference shift for returnable soft drink containers in their experiment when respondents were asked to choose between four brand offerings.

#### Marketing Management Implications

Several implications from these findings can be drawn for marketing managers. Among these are that most firms would not likely make available ecological information to consumers, social class may be a way to define an ecologically-conscious segment for consumer products, and ecological features are less important to consumers than price and product performance considerations. These implications are now discussed in depth.

Since ecological information treatment level only had a significant effect in two out of six instances for women's importance ratings and rank orderings, it appears that marketing managers would not have a strong incentive to provide this type of information about their products. Another plausible reason why marketers may be reluctant to give ecological

information, which was not specifically dealt with in this study, is that firms now offering products that are detrimental to the environment would not voluntarily communicate information that spotlighted their products' shortcomings. Therefore, together these two reasons seem to suggest that many consumer goods companies would not find it in their interest to make ecological information available to consumers.

The findings in this experiment generally indicate that social class, rather than information treatment, may be a useful way to determine an ecologically-conscious market segment. Upper social class women consistently demonstrated more concern with ecology issues than women from the middle or lower classes. Thus, it appears that they may represent a potential market segment for ecologically benign products in some categories, i.e., paper products, laundry detergents and beverages packaged in returnable containers. Even if marketers could demographically identify this ecologically-concerned segment, its size still might not satisfy the economic significance criteria of a market segmentation strategy for many manufacturing firms.

At lower levels in the channel, particularly at the retail level, the size of that segment while small in numbers might be economically significant. For example, Giant supermarket chain in the Washington, D.C. area has had success in selling ecologically benign products like a private label phosphate-free laundry detergent and private label paper products (52). Since Giant's stores are located almost exclusively in the wealthier suburban areas of Washington, D.C. housing residents who are primarily upper and middle social class, the success of their program affirms the notion that ample marketing opportunity exists for selling to this segment. Consequently, retailers operating mostly in upper social

class locations should explore this avenue as a means of generating additional sales volume.

Findings in the simulated choice situation showed that women chose the environmentally "correct" brand only if it was equal or lower in price than the environmentally "incorrect" brand. Price and product performance features may simply take precedence over ecological concerns regardless of the economic situation. Further, respondents are more familiar with and sensitive to traditional criteria than ecological ones and habit may be the basis for their choices.

The implications of these findings are consistent with Herberger and Buchanan's (27) results that higher price levels for their ecologically "compatible" brands (i.e., low phosphate detergents and returnable soft drinks) produced a negative effect in women's propensity to choose these products. If a firm were to introduce a new less environmentally harmful product, the company, if possible, should price it competitively with competing brands to gain consumer trial and ultimately acceptance.

Based on the previous discussion, it appears that the value gained by the marketer either in providing ecological information or offering environmentally benign products is limited at the present time. Since the women generally didn't rate or rank order the importance of environmental concern index features significantly higher in response to ecological information, it is likely that an ecological education effort of this kind will likely not be forthcoming by consumer products firms. If marketers do attempt to appeal to the one identifiable environmentally-conscious segment, i.e., upper social class, their efforts should emphasize the specific product feature that relates directly to environmental harm because these women were able to draw the linkage between these features and their actions as buyers.



### Public Policy Implications

The final area in which this study may have relevance is public policy making. This research is germane to public policy decision making for several reasons. First, providing ecological information represents a commitment by some government agencies to full disclosure of a products' social costs. Second, public dissemination of such information is costly. Third, it identifies some problems associated with making ecological information available to consumers.

Public policy makers, particularly the Federal Trade Commission, Food and Drug Administration and the Environmental Protection Agency are committed to offering consumers more functional information through affirmative disclosure programs. They feel that buyers need these objective product performance criteria in their decision making. The "new" ecological information in this experiment yielded significant results in only four instances out of twelve and the high level treatment was never significantly different than the moderate one. Consequently, it appears that affirmative disclosure program emphasizing a modest amount of information over a longer period of time would be more effective.

The costs of this modest program to disseminate ecological information would likely fall on Federal, State or local governments because as discussed in the managerial implications section, marketers would not extensively promote environmental features since only one segment (i.e., upper social class) seems concerned with this issue. The governmental units must ultimately make a decision whether informing citizens about reducing pollution, saving energy, and preserving resources would result in consumptive behavioral change. If not, the question of whether it is worth the cost to provide this information must be answered.

If public policy makers are committed to giving ecological information to consumers, this study points out a potential pitfall that needs to be recognized. The channels of communication for dispensing ecological information must be chosen carefully. In this experiment women were forced to attend to ecological information, which is not likely to be true in public information disclosure programs. Their ratings, rankings, and choices were not significantly affected in most instances. Thus, the need for multiple exposures to such information over long periods of time seem to be essential, for eliciting ecologically positive responses.

There are also two other pitfalls not specifically taken into account in this study which should be mentioned. One is that communication formats for environmental information need to be kept simple. The negative reaction of most lower and middle social class women to ecological information in this study plausibly could have been caused by the complexity of the information format. Second, environmental deterioration is not normally perceived by most individuals as having a direct effect on them. Therefore, a Federally mandated or sponsored informational program needs to stress the relationship between typical consumption patterns and environmental degradation, i.e., loss of water recreational opportunities partially caused by detergent phosphates, and higher costs of solid waste collection and disposal resulting from throwaway containers and convenience packaging.

#### Public Policy Recommendations

Two alternative methods of providing information about the deleterious environmental effects of consumer products are environmental labeling and environmental education. These programs are speculative and do not emanate

directly from the findings of this study. They do, however, offer public policy makers further recommendations to alleviating environmental problems in addition to the possibilities suggested previously.

One program that public policy makers may consider is the establishment of a mandatory environmental labeling program for consumer products. Every product would be required to have a tag or package label giving pertinent environmental information. For example, the new proposed label on laundry detergents might say "13% phosphate by weight-- Detergent phosphates contribute to the water pollution problem," rather than just listing the percentage of phosphates. Paper products or packaging may be labeled "Contains 40% recycled fibers" or "Package made from 100% recycled fibers-- Recycled paper conserves natural resources and energy." Glass, aluminum and steel containers might be similarly marked. Finally, for aerosol containers, while debate still exists on their effect upon the ozone layer of the stratosphere, the environmental label might read "Contains fluorocarbons--Fluorocarbons may have damaging environmental effects on the atmosphere."

The use of environmental labeling would require extensive product testing, specification setting and enforcement by governmental regulatory agencies. Conflicts of agency jurisdiction might also arise. These problems should be recognized and are not insignificant nor easily soluable. Thus, it is incumbent on public policy makers to fully analyze the trade-offs before instituting such a program.

It appears that short run programs by marketers and public policy makers may not have a lasting impact on consumers' perceptions of ecological problems nor their purchase behavior. An extensive long term program of environmental education in the schools funded by the government

is possibly better suited to the nature of this problem. Since most adults probably have strongly held attitudes and behavior patterns, environmental education programs should be directed toward children and young adults whose attitudes and behavior patterns with respect to consumption are still in the formative stages. Even then, the effects of any educational program may take years before yielding positive results.

To be effective an environmental education program should have three major characteristics. First, it needs to be continuous. Efforts to educate students on the effects of human actions on the ecosystem must begin in the primary grades and continue through high school and college. The subject matter on ecology should be simple initially but become more complex in the advanced grades. Second, the approach of an environmental education program must be interdisciplinary. Although ecology traditionally is covered within the natural sciences, particularly Biology, its pervasive nature dictates a broader focus. For example, the subject of trees could be discussed in science, mathematics, language arts, music, social studies and art courses (63, p. 20). Third, if ecological education is to have relevance beyond the classroom, it is necessary for students to become involved. This involvement may begin with class field trips and progress to litter pickup campaigns and even to setting up a paper recycling program, for example. If these characteristics of continuous education, interdisciplinary focus and personal involvement were present, the development of sensitivity to ecologically oriented promotional appeals and products among younger people would probably result. To the extent that environmental concern manifested itself in consumptive behavior, more environmentally benign products and informational appeals would be forthcoming.

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APPENDIX A  
QUESTIONNAIRE

ID # \_ \_ \_ \_ \_

## SUPERMARKET PRODUCTS SURVEY

Directions: Please read each question carefully and follow the instructions given in parentheses. Circle the number on the right side of the page for the answer you choose.

1. How many times in the last four weeks did you buy more than ten products at a supermarket?

3 or less times . . . . . 1

4-7 times . . . . . 2

8 or more times . . . . . 3

2. Do you buy soft drinks (carbonated beverage or soda pop) for your family?

Yes . . . . . 1

No . . . . . 0

(If no, skip to question 7)

3. In what type of container(s) do you usually buy the soft drinks?  
(Circle one)

Only returnable bottles . . . . . 1

Only nonreturnable bottles. . . . . 2

Only cans . . . . . 3

Both returnable bottles and nonreturnables bottles. . . 4

Both nonreturnable bottles and cans . . . . . 5

Both returnable bottles and cans. . . . . 6

Returnable bottles, nonreturnable bottles and cans. . . 7

4. How many quarts (1 quart = 32 ounces) of soft drinks does your family normally drink per week?

1 quart or less . . . . .	1
2-3 quarts. . . . .	2
4 or more quarts. . . . .	3

5. Which of the following features do you consider most important in buying soft drinks? (Circle no more than 3)

Taste . . . . .	1
Safety of container . . . . .	2
Brand name . . . . .	3
Convenience of discarding the container . . . . .	4
Calorie content . . . . .	5
Returnability of container. . . . .	6
Price . . . . .	7
Container size. . . . .	8

6. What brand(s) of soft drinks did you buy in the last four weeks?

---

(please fill in)

7. Do you normally use powdered laundry detergent?

Yes . . . . .	1
No. . . . .	0

(If no, go to question 11)

8. How many loads of laundry do you usually wash per week?

1 washload. . . . .	1
2-4 washloads . . . . .	2
5 or more washloads . . . . .	3

9. Which of the following features do you consider most important in using laundry detergents? (Circle not more than 3)

Cleaning ability. . . . .	1
Price . . . . .	2
Phosphate content . . . . .	3
Brand name. . . . .	4
Contains bleaching power. . . . .	5
Sudsing level . . . . .	6
Softening agent included. . . . .	7
Package size . . . . .	8
Amount of detergent needed per load . . . . .	9

10. What brand(s) of detergent did you buy in the last 3 months?

---

(please fill in)

11. Do you use paper towels?

Yes . . . . .	1
No. . . . .	0

(If no, go to question 15)

12. How many rolls of paper towels do you normally use per week?

Less than 1 roll. . . . .	1
1 roll. . . . .	2
2 or more rolls . . . . .	3

13. Which of the following features do you consider most important in using paper towels? (Circle no more than 3)

Color . . . . .	1
Strength . . . . .	2
Price . . . . .	3
Made from recycled paper . . . . .	4
Absorbancy . . . . .	5
Sheet size . . . . .	6
Brand name . . . . .	7

14. What brand(s) of paper towels did you buy in the last month?

---

(please fill in)

15. STOP. WAIT FOR INSTRUCTIONS. PLEASE DO NOT TURN THE PAGE.

## INSTRUCTIONS

On three of the following pages you will be asked to indicate the importance you place on several product features. There are no right or wrong answers; your own feelings are essential.

You will be asked to record your answers on scales like the ones shown on this page. Here is how to use the scales: for example if you feel that price is extremely important product feature, you should circle the number 1 on the scale shown below:

Price:    (1)       2       3       4       5       6       7

If you feel that price is only a slightly important product feature, circle the number 3 on the scale shown below:

Price:    1       2       (3)       4       5       6       7

If you feel that price is an unimportant product feature, circle the number 6 on the scale shown below:

Price:    1       2       3       4       5       (6)       7

PLEASE BE SURE TO CIRCLE ONLY ONE NUMBER FOR EVERY LISTED PRODUCT FEATURE.  
TURN THE PAGE AND CONTINUE.

## INSTRUCTIONS

On three of the following pages you will also be asked to rank in order several product features based on the importance you place on them. There are no right or wrong answers; your own feelings are essential.

You will be asked to record your answers on a form like the one below. The letters A, B, C etc. in this example stand for the product features. If you feel that C is the most important feature, place a 1 beside it; if E is the second most important put a 2 beside it, continue to number the features until you have a number placed beside every feature.

<u>5</u>	A
<u>6</u>	B
<u>1</u>	C
<u>7</u>	D
<u>2</u>	E
<u>4</u>	F
<u>3</u>	G

REMEMBER TO PUT A DIFFERENT NUMBER NEXT TO EACH PRODUCT FEATURE WHICH REFLECTS YOUR FEELINGS. STOP. PLEASE WAIT FOR INSTRUCTIONS.



## PAPER TOWELS INFORMATION

Directions: Read carefully each of the following statements two times and follow the instructions at the bottom of the page.

-----Disposable paper towels now account for 20% of all disposable paper products (i.e., napkins, toilet and facial tissue, etc.) used by households. When these paper products are added to newspapers, packaging paper, etc. the total amount of paper accounts for 50% of all household garbage.

-----Paper towels can be manufactured using exclusively waste paper.

These recycled paper towels are as strong, as absorbant and come in the same sheet sizes as regular towels. They are comparably priced, but paper towels made from recycled paper are available only in the color *gray*.

-----15% of all trees cut are used to make disposable paper products-- including paper towels. On the other hand, recycled paper products only use waste paper as raw material.

-----The energy needed to produce a ton of paper products from trees is approximately 20% greater than the amount needed to recover a ton of waste paper which can be recycled into other paper products.

PLEASE TURN THE PAGE AND CONTINUE

-----Increases in popularity of disposable paper products will create a larger market for waste paper. Unless a 10% higher level of waste paper recycling into paper towels and other products is achieved, we will spend \$200 million more in garbage disposal costs in the next ten years.

-----If consumers are willing to give up the many colors of paper towels and begin to use the gray colored recycled brand, there will be less damage done to the environment.

-----Cutting trees to manufacture disposable paper products uses our limited forest reserves. If greater use of waste paper can be reached, forest reserve losses would be decreased by \$180 million by 1985 and a substantial amount of waste paper would be removed from garbage.

-----Energy savings would continue indefinitely by making recycled paper towels because large quantities of waste paper will always be available in city garbage.

PLEASE TURN THE PAGE AND CONTINUE.

## PAPER TOWELS

Directions: Please circle the number that best expresses the importance you now place on the following features of paper towels. Use this list as your guide.

- 1 = extremely important
- 2 = important
- 3 = slightly important
- 4 = indifferent (neutral)
- 5 = slightly unimportant
- 6 = unimportant
- 7 = extremely unimportant

Brand name:	1	2	3	4	5	6	7
Absorbancy:	1	2	3	4	5	6	7
Color:	1	2	3	4	5	6	7
Harm to the environment:	1	2	3	4	5	6	7
Price:	1	2	3	4	5	6	7
Sheet size:	1	2	3	4	5	6	7
Made from recycled paper:	1	2	3	4	5	6	7
Strength:	1	2	3	4	5	6	7

PLEASE TURN THE PAGE AND CONTINUE.

## PAPER TOWELS

Directions: Please rank in order from 1 to 8 the following features of paper towels by placing a number in the blank indicating the importance you now put on them. Put a 1 beside the most important, a 2 beside the second most important and so on up to 8.

_____	Strength
_____	Made from recycled paper
_____	Sheet size
_____	Price
_____	Harm to the environment
_____	Color
_____	Absorbancy
_____	Brand name

PLEASE TURN THE PAGE AND CONTINUE.

## SOFT DRINK CONTAINER INFORMATION

Directions: Read carefully each of the following statements two times and follow the instructions at the bottom of the page.

-----In the past 15 years usage of nonreturnable containers--glass bottles, steel cans with aluminum pull-tab tops, and all aluminum cans--has increased from 2% of all soft drink packages to over 50%. As a result of this increased popularity, soft drink containers now account for 4% of all household garbage.

-----Approximately five times more raw materials (i.e., steel, glass, aluminum, etc.) are needed to make nonreturnable bottles and cans than to manufacture returnable bottles which are reused 15 times.

-----The amount of energy used in making nonreturnable bottles and cans is 3 to 6 times greater than the energy required to make returnable bottles.

-----Leading soft drink manufacturers package their products in several sizes of returnable and nonreturnable containers and the taste is not affected by the type of container. Nonreturnable bottles and cans are more convenient to discard, because they do not have to be returned to the store.

PLEASE TURN THE PAGE AND CONTINUE.

- If consumer preference for nonreturnable bottles and cans continues we can expect soft drink containers to account for 10% of household garbage by 1985. Thus, garbage disposal costs which are already the third largest expenditure for cities behind schools and roads can be expected to increase.
- The manufacture of nonreturnable bottles and cans use scarce raw materials. If we continue to use these limited raw materials to make nonreturnables which are thrown away after one filling, we are speeding up the rate that our natural resources will be used up.
- Energy is a scarce resource. Continued use of excessive amounts in making nonreturnable bottles and cans drains our energy reserves which could be used to heat homes, run factories, or saved as part of our energy conservation program.
- If consumers are willing to give up the convenience of nonreturnable containers, there will be less damage done to the environment.

PLEASE TURN THE PAGE AND CONTINUE.

## SOFT DRINKS

Directions: Please circle the number that best expresses the importance you now place on the following features of soft drinks. Use this list as your guide.

- 1 = extremely important
- 2 = important
- 3 = slightly important
- 4 = indifferent (neutral)
- 5 = slightly unimportant
- 6 = unimportant
- 7 = extremely unimportant

Container size:	1	2	3	4	5	6	7
Price:	1	2	3	4	5	6	7
Harm of container to the environment:	1	2	3	4	5	6	7
Taste:	1	2	3	4	5	6	7
Safety of container:	1	2	3	4	5	6	7
Returnability of container:	1	2	3	4	5	6	7
Calorie content:	1	2	3	4	5	6	7
Brand name:	1	2	3	4	5	6	7
Convenience of discarding the container:	1	2	3	4	5	6	7

PLEASE TURN THE PAGE AND CONTINUE.

## SOFT DRINKS

Directions: Please rank in order from 1 to 9 the following features of soft drinks by placing a number in the blank indicating the importance you now put on them. Put a 1 beside the most important, a 2 beside the second most important and so on up to 9.

\_\_\_\_\_ Convenience of discarding the container

\_\_\_\_\_ Brand name

\_\_\_\_\_ Calorie content

\_\_\_\_\_ Returnability of container

\_\_\_\_\_ Safety of container

\_\_\_\_\_ Taste

\_\_\_\_\_ Harm of container to the environment

\_\_\_\_\_ Price

\_\_\_\_\_ Container size



## LAUNDRY DETERGENT INFORMATION

Directions: Read carefully each of the following statements two times and follow the instructions at the bottom of the page.

-----Laundry detergents containing phosphates are used by almost all families in cleaning dirty clothes. Phosphates from the detergent wastewater accounts for 18% of all phosphates in our waterways and are one of the major causes of water pollution.

-----Bodies of water available for recreation (i.e., boating, water skiing, and pleasure fishing) are being reduced because of water pollution from phosphate detergents.

-----About 5% more energy is needed to manufacture laundry detergents containing phosphates than to make phosphate free brands.

-----Both types of detergents (phosphate and phosphate free) are about equal in cleaning ability, sudsing level, and price. However, at the present time phosphate free brands do not contain softening and bleaching agents.

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- Elements other than phosphates contribute to water pollution, but they cannot be as easily controlled as the phosphates in detergents. Thus, if we don't eliminate at least this one source, we can expect water pollution problems to become more serious in the future.
- If we continue to dump phosphates into our waterways, water resources used for recreational purposes will decline even further.
- Since phosphate detergent brands need more energy than phosphate free brands, more energy resources will be necessary to produce phosphate detergents.
- If consumers are willing to give up the features of some phosphate detergents like bleaching and softening agents and begin to use phosphate free brands, there will be less damage to the environment.

PLEASE TURN THE PAGE AND CONTINUE.

## LAUNDRY DETERGENT

Directions: Please circle the number that best expresses the importance you now place on the following features of laundry detergents. Use this list as your guide:

- 1 = extremely important
- 2 = important
- 3 = slightly important
- 4 = indifferent (neutral)
- 5 = slightly unimportant
- 6 = unimportant
- 7 = extremely unimportant

Cleaning ability:	1	2	3	4	5	6	7
Phosphate content:	1	2	3	4	5	6	7
Price:	1	2	3	4	5	6	7
Amount of detergent needed per load:	1	2	3	4	5	6	7
Sudsing level:	1	2	3	4	5	6	7
Harm to the environment:	1	2	3	4	5	6	7
Package size:	1	2	3	4	5	6	7
Brand name:	1	2	3	4	5	6	7
Softening agent included:	1	2	3	4	5	6	7
Contains bleaching power:	1	2	3	4	5	6	7

PLEASE TURN THE PAGE AND CONTINUE.

## LAUNDRY DETERGENT

Directions: Please rank in order from 1 to 10 the following features of laundry detergent by placing a number in the blank indicating the importance you now put on them. Put a 1 beside the most important, a 2 beside the second in most important and so on up to 10.

- \_\_\_\_\_ Contains bleaching ability
- \_\_\_\_\_ Softening agent included
- \_\_\_\_\_ Brand name
- \_\_\_\_\_ Package size
- \_\_\_\_\_ Harm to the environment
- \_\_\_\_\_ Sudsing level
- \_\_\_\_\_ Amount of detergent needed per load
- \_\_\_\_\_ Price
- \_\_\_\_\_ Phosphate content
- \_\_\_\_\_ Cleaning ability

PLEASE TURN THE PAGE AND CONTINUE.

## PAPER TOWELS CHOICE

Directions: If you were buying paper towels today, which one of the following brands would you choose? Indicate the brand by circling the number beside it at the bottom of the page and list the reasons for your choice.

<p>BRAND A</p> <p>National Brand Regular Price: 52¢ per roll</p>	<p>BRAND B</p> <p>Store Brand Recycled Price: 48¢ per roll</p>
<p>BRAND C</p> <p>National Brand Recycled Price: 53¢ per roll</p>	<p>BRAND D</p> <p>Store Brand Regular Price: 48¢ per roll</p>

Brand A . . . . . 1

Brand B . . . . . 2

Brand C . . . . . 3

Brand D . . . . . 4

Please state the reason(s) for your choice:

PLEASE TURN THE PAGE AND CONTINUE.

## SOFT DRINK CHOICE

Directions: If you were buying soft drinks today, which one of the following brands would you choose? Indicate the brand by circling the number next to it at the bottom of the page and list the reasons for your choice.

<p>BRAND A</p> <p>National Brand Nonreturnable Bottles or Cans Price: 1.6¢ per ounce</p>	<p>BRAND B</p> <p>Store Brand Nonreturnable Bottles or Cans Price: 1.4¢ per ounce</p>
<p>BRAND C</p> <p>Store Brand Returnable Bottles Price: .9¢ per ounce + deposit</p>	<p>BRAND D</p> <p>National Brand Returnable Bottles Price: 1.1¢ per ounce + deposit</p>

Brand A . . . . . 1

Brand B . . . . . 2

Brand C . . . . . 3

Brand D . . . . . 4

Please state the reason(s) for your choice:

PLEASE TURN THE PAGE AND CONTINUE.

## LAUNDRY DETERGENT CHOICE

Directions: If you were buying laundry detergent today, which one of the following brands would you choose? Indicate the brand by circling the number beside it at the bottom of the page and list the reasons for your choice.

<p>BRAND A</p> <p>National Brand 8.7 Phosphate Price: \$1.20 per 3 lb. box</p>	<p>BRAND B</p> <p>National Brand 0% Phosphate Price: \$1.25 per 3 lb. box</p>
<p>BRAND C</p> <p>Store Brand 0% Phosphate Price: 99¢ per 3 lb. box</p>	<p>BRAND D</p> <p>Store Brand 8.7% Phosphate Price: 97¢ per 3 lb. box</p>

Brand A . . . . . 1  
 Brand B . . . . . 2  
 Brand C . . . . . 3  
 Brand D . . . . . 4

Please state the reasons for your choice:

PLEASE TURN THE PAGE AND CONTINUE.

## DEMOGRAPHIC INFORMATION

Directions: Please answer the following questions about your family completely. The results will be used for classification purposes and you will not be identified. Circle the number on the right side of the page for the answer you choose.

## 1. What is your marital status?

- Single . . . . . 1
- Married. . . . . 2
- Separated, Divorced or Widowed . . . . . 3

(If single, skip to question 9).

## 2. How many children do you now have living at home?

- none . . . . . 0
- 1 or 2 . . . . . 1
- 3 or 4 . . . . . 2
- 5 or more. . . . . 3

(If none, skip to question 4)

3. Which age categories do the children fall into? (circle all categories that apply).

- Under 2 years old. . . . . 1
- 2-5 years old . . . . . 2
- 6-12 years old . . . . . 3
- 13-18 years old. . . . . 4
- Over 18 years old. . . . . 5



## 4. What is your husband's age?

Under 25 . . . . .	1
25-34. . . . .	2
35-44. . . . .	3
45-54. . . . .	4
55-64. . . . .	5
Over 64. . . . .	6

## 5. What is the highest educational level that he reached?

Graduate professional training . . . . .	1
College graduate . . . . .	2
Some college training. . . . .	3
High school graduate . . . . .	4
Some high school . . . . .	5
7-9 years (junior high). . . . .	6
less than 7 years of school. . . . .	7

## 6. Which one of the following job categories best describes his occupation? (or former occupation if retired).

High executive, Professional, Owner of Large Business . . . . . (i.e., Company President of VP, Doctor, Lawyer, etc.)	1
Business Manager, Medium sized co. owner, other Professional. . . . . (i.e., Sales Mgr., Store owner, Pharmacist, etc.)	2
Administrator, Small Independent Business Owner, and Semi- Professional. . . . . (i.e., Insurance agent, Shop Owner, Computer Programmer, etc.)	3
Clerical or Sales Worker, Technician. . . . . (i.e., Bank Teller, Supervisors, Sales clerk, etc.)	4
Skilled Manual Employees. . . . . (i.e., Carpenter, Policeman, Repairman, Welder, etc.)	5
Machine Operators and Semi-skilled Employees. . . . . (i.e., Cook, Truck driver, Garage attendant, etc.)	6
Unskilled Employees . . . . . (i.e., Janitor, Waiter, Maid, etc.)	7

7. a. For what type of company (organization) does he work?

---

(For example, retail store, bank, education, self-employed, etc.)

- b. What is his job title?

---

(For example, chemical engineer, clothing salesman, production manager, etc.)

8. Is your husband the major wage earner in the family?

Yes . . . . . 1

No. . . . . 0

9. Are you currently employed full time outside the home?

Yes . . . . . 1

No. . . . . 0

(if no, skip to question 12)

10. Which one of the following job categories best describes your occupation?

High Executive, Professional, Owner of Large Business. . . . . 1

Business Manager, Medium sized Co. owner, other Professional . . 2

Administrative Personnel, Small Independent Business Owner, and  
Semi-Professionals . . . . . 3

Clerical or Sales Worker, Technician (i.e., Secretary etc.). . . 4

Skilled Manual Employees . . . . . 5

Machine Operators and Semi-skilled Employees . . . . . 6

Unskilled Employees (Cafeteria worker, Domestic, etc.) . . . . . 7

11. For what type of company (organization do you work?

---

What is your job title?

---

## 12. What is the highest level of education you reached?

Graduate professional training . . . . .	1
College graduate . . . . .	2
Some college training. . . . .	3
High school graduate . . . . .	4
Some high school . . . . .	5
7-9 grade (Junior High). . . . .	6
Less than 7th grade. . . . .	7

## 13. What is your age?

Under 25 . . . . .	1
25-34 . . . . .	2
35-44 . . . . .	3
45-54 . . . . .	4
55-64 . . . . .	5
Over 64. . . . .	6

## 14. What was the household's total income last year?

Less than \$4,000 . . . . .	1
\$4,001 - \$7,000 . . . . .	2
\$7,001 - \$10,000 . . . . .	3
\$10,001 - \$15,000. . . . .	4
\$15,001 - \$20,000. . . . .	5
\$20,001 - \$25,000. . . . .	6
Over \$25,000 . . . . .	7

Please make any comments about the study that you would like:

---

If it is necessary to contact you about your answers, is there a number where I can reach you?

# \_\_\_\_\_

THANK YOU. PLEASE WAIT FOR INSTRUCTIONS.