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A HIERARCHICAL MODEL OF THE
CAUSAL RELATIONS BETWEEN ENVIRONMENTAL
ATTITUDES, BELIEFS AND BEHAVIOR:
WITH SPECIFIC DATA RELATING TO THE
RECYLING OF BEER CONTAINERS

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Kadayam H. Padmanabhan

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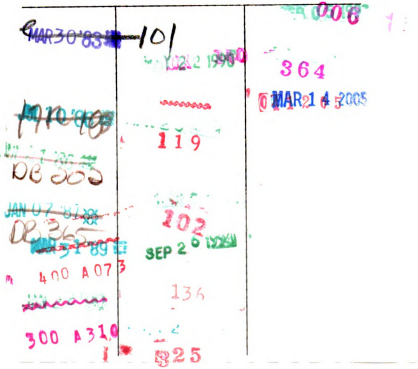

A HIERARCHICAL MODEL OF THE CAUSAL RELATIONS BETWEEN ENVIRONMENTAL ATTITUDES, BELIEFS AND BEHAVIOR: WITH SPECIFIC DATA RELATING TO THE RECYCLING OF BEER CONTAINERS

By

Kadayam H. Padmanabhan

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ABSTRACT

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The relationship between attitudes and between attitudes and behavior is complex. This complex relationship has been studied in the form of a hierarchical model by Hunter, Levine, and Sayers (1976). The model hypothesizes that attitudes or concepts are logically related to each other, and arranged hierarchically from the most concrete and specific to the most abstract and general. Poole and Hunter (1980) extended the hierarchical model to a theory of the attitude behavior relationships by postulating that specific behaviors are causally attached to the specific attitudes at the bottom of attitude hierarchies.

The purpose of this research is to explore the relationship between attitudes such as a belief that we suffer energy crisis and a specific behavior, viz. frequency of returning empty beer containers. This is done by testing mediation and network hypotheses underlying the hierarchical model.

The population studied is Greater Lansing, and included both students and non-students. Data was collected through mail survey. Appropriate belief and behavior scales were formed by grouping

individual questionnaire items on the basis of content similarity, internal and external consistencies. A confirmatory factor analysis was conducted to check the groupings. Also computed were the means, standard deviations, and reliabilities. Correlations between scales were computed, corrected for attentuation due to error of measurement. Path analysis was performed on the belief and behavior correlations matrix using PATHPAC (Hunter and Hunter, 1977).

The path model fitting the data differed only in trivial ways from the model predicted by the hierarchical theory. Causal links follow logical relations. The influence of higher order environmental beliefs on behavior is indirect and mediated by more specific environmental beliefs. Causal chains run from general environmental beliefs to specific environmental behavior.

Findings confirmed the prediction that beliefs at the top of the hierarchy are adopted before beliefs lower down; that beliefs at increasingly lower levels, i.e. beliefs that are more specific will have increasingly lower means.

The major conclusions are: (1) Causal relations between environmental beliefs have a hierarchical structure stemming from the belief that resource shortage is real at the top and flowing down to a large number of more specific beliefs. (2) Causal influence among environmental beliefs goes from top down; from the most abstract and general belief to more concrete and specific beliefs and finally from highly specific beliefs to the adoption of corresponding behaviors.

The hierarchical model is shown here as a theory of the relationship between general and specific beliefs, and between beliefs

and behavior. Study upholds the hierarchical model prediction that attitude-behavior correlations are highest if they are measured at an equivalent level of generality. Specific behavior (i.e. frequency of returning empty beer containers) is best predicted by correspondingly specific environmental beliefs. The study stresses the need to understand the hierarchy of general and specific beliefs if we wish to understand how behavior choice occurs.

This is the first attempt at developing a broad network of environmental attitudes in the form of a hierarchical model and tracing the mediating causal links between abstract environmental attitudes and specific environmental behavior. General environmental beliefs form the basis for more specific beliefs which in turn determine behaviors. Campaign messages must incorporate the mediating beliefs which will enable change at the higher level to induce change at the lower level.

In regard to marketing strategy, study stresses the need to create goodwill for the product as a whole rather than one given brand, and for the company as a whole rather than one given product. This will enable companies to fully exploit the wide-ranging impact of causally prepotent beliefs regarding industry and company as a whole.

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Dr. Gilbert Harrell, as co-chairman of the dissertation committee, led me firmly into the field of consumer behavior theory. At his insistence, bulk of the early drafts were rewritten so would conform to a theoretical mold--and with good result. I am grateful to Dr. Harrell for welcoming my research ideas with friendliness and openness.

Dr. John Hunter is one of a kind. As co-chairman of the dissertation committee, he has been my guiding light throughout the conduct of this research. His enormous intellectual discrimination, formidable analytical skills and total dedication in guiding me have all been an inspiration and a joy.

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AN OVERVIEW

The purpose of this research is to explore the relationship between abstract attitudes such as a belief that we suffer energy crisis and specific behaviors such as returning beer cans. The guiding hypothesis is that such correlations will be low because the relationship between abstract attitudes and behavior is mediated by intervening attitudes of more specific nature. It is hypothesized that there is a hierarchy of attitudes that causally mediates relations between more abstract attitudes and less abstract attitudes and between attitudes and behavior. The purpose of the empirical study is twofold: (a) to lay out in detail the entire network of environmental beliefs relevant to a particular environmental behavior, returning beer containers, and (b) to test the mediation hypothesis using path analysis.

CHAPTER I

INTRODUCTION

Background

Human behavior is governed by a variety of phenomena. While many factors influence how people behave, attitudes are often the psychological mechanism through which these factors shape behavior. Social and intrapersonal variables give rise to a structure of attitudes that ultimately control behavior.

The concept of attitude has enjoyed a central position in the field of applied psychology as well as in the marketing literature. Its importance in marketing theory and practice is underscored by the pivotal role it occupies in the major descriptive models of consumer behavior. The notion that we tend to buy those products we like and avoid those we dislike is a truism, borne out by our direct experience as well as convincing evidence from marketing studies.

The relationship between attitude and behavior is sometimes complex. Apparent inconsistencies often develop between attitudes and behavior because studies fail to recognize the complexities involved--in how attitudes are assessed, the conditions in which behavior is undertaken and the societal constraints governing behavior.

A frequently debated question is whether behavior is predicted better by general attitudes or by specific attitudes. Fishbein (1973) suggested that attitude and behavior would show a strong relationship

when both are measured at an equivalent level of generality. Crespi (1971) and Weigel et al. (1974) went further to propose that attitude-behavior consistency is high when both measures are highly specific. The general vs. specific attitudes debate can be most meaningfully resolved through an understanding of how attitudes (both general and specific) are themselves related.

Hierarchical Model

The complex relationship among attitudes is highlighted by the presence of attitudes with varying levels of generality or specificity. This complex relationship has been studied in the form of a hierarchical model by Hunter, Levine, and Sayers (1976). The model primarily examines the properties of a set of attitudes toward a set of concepts that is organized in the form of hierarchical chains. The attitude concepts are hypothesized as being logically related to each other, arranged at different levels from the most concrete and specific to the most abstract and general. Poole and Hunter (1980) extended the hierarchical model to a theory of the attitude behavior relationship by postulating that specific behaviors are causally attached to the specific attitudes at the bottom of attitude hierarchies. The extended hierarchical model predicts the exact relationships between general and specific attitudes on the one hand and between attitudes and behavior on the other.

According to the hierarchical model, the correlations between a general attitude and a specific behavior is mediated by intervening attitudes of a more specific nature. Each step in the chain reduces

the level of correlation in accordance with the product rule of path analysis. Thus a general attitude will not be highly correlated with any particular behavior. However, a general attitude is superordinate to many attitudes leading to many specific behaviors. Thus it will be correlated with a large number of specific behaviors. If an index of the many logically subordinate specific behaviors were formed, then that index would have a high correlation with the general attitude. This has been confirmed by the studies of Fishbein and Ajzen (1974), and Tittle and Hill (1967).

Purpose of Research

The purpose of this research is to test the hierarchical model by studying the relationship between a particular environmental behavior and a set of environmental attitudes. We will:

(1) Lay out the concrete network of interrelated attitudes for a particular environmental behavior: container return

(2) Test the network hypotheses implied in the hierarchical model

(3) Test the mediation hypotheses emerging from the hierarchical model

We will measure the direction, intensity, and distribution of consumer attitudes regarding environment in general and beer container returns in particular. These attitudes will then be related to the frequency with which beer containers are returned, and the distribution of such behavior among consumers.

In testing mediation hypotheses, the following two major propositions will be examined:

(a) That the causal impact of environmental beliefs follows logical relations

(b) That the influence of higher order beliefs on behavior is indirect and mediated by more specific beliefs

In testing network hypotheses, the following two major propositions will be examined:

(a) That causal relations between environmental beliefs are structured in a set of hierarchical relationships

(b) That the causal structure of environmental beliefs is arranged from most abstract and general to the most concrete and specific

Importance of Research

This represents the first attempt at developing a broad network of environmental attitudes in the form of a hierarchical model and tracing the mediating causal links between abstract environmental attitudes and specific environmental behavior. Do the various attitudes and behaviors form an integrated system? How favorable are consumers toward environmental conservation? Does an orientation to environmental conservation increase the frequency of returning empty containers?

Identification of superordinate and subordinate attitudes can go a long way in clarifying the basis and direction for an effective environmental education program. It is especially helpful

in developing a long-term approach to environmental education. In the long run, environmental education based on entire network of related environmental attitudes is likely to be both more effective and efficient than one based on isolated environmental behaviors.

CHAPTER II

GENERAL ATTITUDES, SPECIFIC ATTITUDES, AND THEIR HIERARCHICAL RELATION TO BEHAVIOR

Outline

This chapter briefly outlines the role of attitude as a leading concept in the field of applied psychology, and the nature of the relationship between attitude and behavior. Second, it describes a hierarchical attitude model in some detail, along with research support in other areas.

The chapter closes with a summary propositions emerging from attitude-behavior studies and specifically from the hierarchical conceptualization of the attitude-behavior relationship.

Role of Attitude Concept

Gordon Allport began his classic paper on attitudes in the 1935 Handbook of Social Psychology with this statement: "The concept of attitude is probably the most distinctive and indispensable concept in contemporary American social psychology." "Perhaps," comment Murphy et al. (1937), "no single concept within the whole realm of social psychology[1] occupies a more nearly central position than that of attitudes."[2] Indeed, writers like Bogardus (1931), Folsom (1931),

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[1] Thomas and Znaniecki (1918) have been credited for the establishment of the concept of attitude as a permanent and central feature of social psychology.

[2] Murphy et al., Experimental Social Psychology (New York: Harper, 1937), p. 889.

and Thomas and Znaniecki (1918)[3] went so far as to define social psychology as the scientific study of attitudes.

The concept is central in other disciplines too; " . . . the attitude concept has come to play an important part in all of the behavioral sciences and many of the applied disciplines." (Fishbein, 1967, p. v). Perhaps, no other concept from the behavioral sciences has been used so widely by theorists and researchers as the term attitude.

The study of attitude is well-entrenched in marketing theory and practice. The acceptance by theorists is evident in the pivotal role that the concept of attitude plays in the major descriptive models of consumer behavior. Attitudes can directly affect purchase decisions and experience with a product or service can shape an attitude. Purchase decisions are based upon attitudes existing at the time of purchase.

Janis and Hoffman (1970) observed a high relationship between attitude toward smoking and extent of smoking behavior. Similar results were found by Veevers (1971) for attitude toward drinking alcoholic beverages and drinking behavior; by Kothandapani (1971) in regard to attitude toward personal use of birth control methods and use (or nonuse) of birth control methods; by Fishbein and Coombs (1974) in regard to attitudes toward presidential candidates and

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[3] E. S. Bogardus, Fundamentals of Social Psychology, 2nd ed., (New York: Century, 1931), p. 444; J. K. Folsom, Social Psychology (New York: Harper, 1931), p. 701; and Thomas and Znaniecki (1918), p. 526.

voting behavior in presidential election; Albrecht et al. (1972) in regard to attitude toward legalization of marijuana and petition signing.

It has also been reported that good commercial affects both attitude and behavior (Lair, 1965); that attitudes toward trading stamp usage are reflected in trading stamp usage (Udell, 1965); and that the use of price as an evaluative criterion in convenience goods purchases can be predicted by an attitude battery (Craig, 1971). Studies have also consistently demonstrated that the affective dimension is significantly more effective in explaining variance in market share than the cognitive dimension.

Reviews by Ajzen and Fishbein (1977), Schuman and Johnson (1976) and Kelman (1974) all concluded the relationships of at least moderate strength are the rule rather than the exception.

The relationship between attitude and behavior is complex. Attitudes and behavior are influenced by other attitudes and beliefs, by situational constraints, and societal expectations or norms. Apparent inconsistencies between attitudes and behavior often arise because the studies have not provided a refined and detailed assessment of all relevant attitudes, the situation in which action takes place, and the societal constraints governing the action situation.

General Attitudes, Specific Attitudes, and Their Relation to Behavior

Fishbein (1973) observed that a strong relationship between attitude and behavior depends on the extent to which attitude and behavior are measured at an equivalent level of generality.

He suggested that when the attitude object is general or comprehensive, the behavior criterion should be equally general or comprehensive.

Crespi (1971) suggested that attitude-behavior correlation is highest when the attitude and the behavior are highly specific. Weigel et al. (1974) found that the attitude with the highest correlation was that attitude most highly specific to the behavior. Liska (1974) noted that only the relevant specific attitude has a direct causal impact; more remote attitudes have indirect effects.

Weigel et al. (1974) assessed attitudes toward objects ranging from general ("a pure environment") to specific ("the Sierra Club") and later gave subjects an opportunity to volunteer for activities that implied different levels of commitment to the Sierra Club. Heberlein and Black (1976) assessed purchases of lead-free gasoline in relation to attitude scales at differing levels of specificity. In both studies, the most general attitude scale yielded the weakest relationship to behavior, and the most specific scale yielded moderately high correlations.

General attitudes are not irrelevant. Studies show that general attitudes become indirectly relevant to a large number of specific behaviors, though not maximally relevant to any one of them. Consequently, while a general attitude may not strongly affect any one specific behavior, its effect on a large number of behaviors can be very large in total. An abstract attitude may be a poor predictor of any particular behavior, but will be a good predictor of an index where multiple acts are used as the criterion

of behavior (Tittle and Hill, 1967). Weigel and Newman (1976) found that their measure of attitude toward environmental issues had an average correlations of only .29 with single behaviors while the correlation with an index of several such behaviors was .62. Fishbein and Ajzen (1974) found that general attitudes toward objects exhibit a mean correlation of .14 with single behaviors contrasted with a correlation of .66 with a multiple behavior index.

Hierarchical Structure of Attitudes

Background

The structural relationship between attitudes of different generality has been studied in the form of a hierarchical model by Hunter, Levine, and Sayers (1976). An empirical study of such a system by Poole and Hunter (1979) suggested only slight modifications to that model. Poole and Hunter (1980) extended the hierarchical model to include a theory of the attitude behavior relationship.

Model

The basic premise of the model is that people respond to psychological objects or concepts in three different ways: belief, attitude (i.e., emotion or affect), and behavior. Where two concepts are related logically, the researchers have long suspected that the corresponding beliefs, attitudes, and behaviors will also be related.

Hunter et al. derive their model from a more general theory of affective cognitive organization. A logical hierarchy is one of several possible cognitive organizations, each of which could give rise to different models of influence between attitudes. The model

considers the properties of a set of attitudes toward a set of concepts that is organized in the form of hierarchical chains.

Concepts can be frequently organized into logical classes or subclasses that form the superordinate subordinate relationship with each other. The concepts are arranged at different levels from the most concrete and specific to the most abstract and general. Their main example is shown in Figure 1. Hunter et al. present a specific mathematical model that will predict the course of changing attitudes associated with concepts that are logically related to each other in such a hierarchy.

Origin

The idea that attitudes are arranged in logical hierarchies is suggested by two major research groups. First, several social psychologists have proposed that attitudes are hierarchically arranged. Allport (1937) posited an attitudinal continuum with opinions, attitudes, interests, and values as successive points along the continuum. McGuire (1960, 1968) has always made a strong argument for long-run logical consistency in belief structures. Rokeach (1969) has suggested that beliefs, attitudes, and values are arranged hierarchically--beliefs being specific and least central, and values being general and most central.

A second source of support for the hierarchical model can be found in research on semantic memory by investigators of human information processing. There is evidence supporting the hierarchical nature of the storage network in semantic long-term memory (Collins

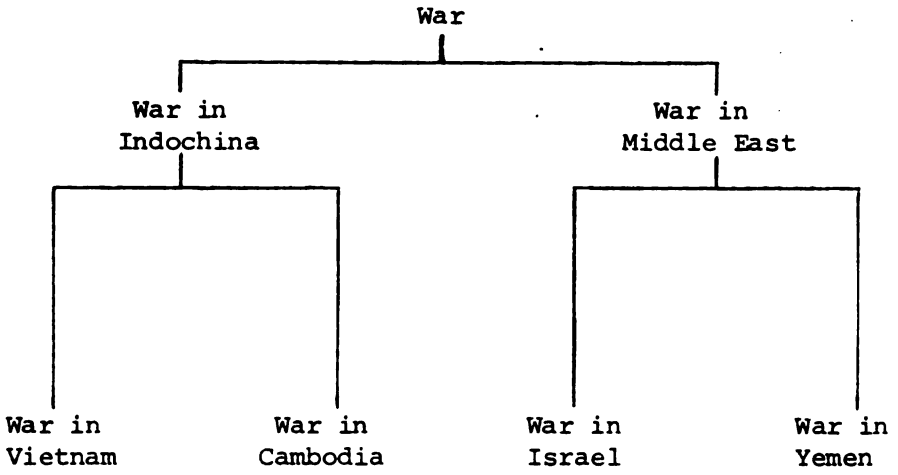

Figure 1.--The Hierarchical Structure of Concepts Associated with War in General.

SOURCE: Hunter, Levine, and Sayers (1976).

and Loftus, 1975; Collins and Quillan, 1972; Lindsay and Norman, 1972; Wood, 1972). Given that (a) memory often contains hierarchical structures, and (b) feelings and emotions about concepts or experiences are often part of a memory trace, it is not surprising that attitudes can be viewed organizationally in the same fashion as concepts are stored in memory.

Assumptions

The hierarchical model makes the following assumptions:

(a) Attitudes can be associated with concepts found at all levels.

(b) There is a strong downward influence in the hierarchy. Upward influence is much weaker than downward influence; nor is there any sideways influence. Only downward influence is recognized.

(c) One can attempt to change attitudes by presenting independent messages about concepts at any level in the hierarchy.

(d) Attitudes can be influenced by attitudes about concepts at higher levels in the hierarchy. In other words, we assume that change in any given attitude is produced by two possible agents: a direct external message or the attitude toward the concept immediately above the given concept in the hierarchy.

(e) Belief structures exert a strong influence on attitudes, but attitudes will not affect beliefs.

(f) Their equations consider only the case in which the structure of belief system is given by the beginning of the time

period under consideration. However, their equations could be adapted to changing structures.

Summary

Attitudes are important determinants of behavior. Significant correlations between attitude and behavior have been reported in many studies. However, the relationship between attitude and behavior is sometimes complex.

Hierarchical models explain complex relationships. Beliefs, attitudes and behaviors are organized in the form of hierarchical chains. The impact of attitudes on behavior is predicted from this hierarchical structure.

The hierarchical model predicts that:

(a) Attitudes are hierarchically arranged and internal causal influence goes down only along hierarchical channels.

(b) Behaviors are associated only with attitudes at the bottom of the hierarchy.

(c) The influence of higher order attitudes on behaviors is indirect and mediated by more specific attitudes.

CHAPTER III

ENVIRONMENTAL ATTITUDES, ENVIRONMENTAL BEHAVIOR AND CONTAINER RETURNS

Environmental Attitudes and Environmental Behavior

Background

There has been a lack of commonly accepted definitions, objectives, and mechanisms for applying research results to the needs of environmental planning and decision making (Brookfield, 1969; Canter, 1971). However, understanding of environmental perception and behavior has increased rapidly in recent years. The objectives of these studies were to:

(1) Assess environmental attitudes in individuals and groups

(2) Identify variables that could explain observed differences in attitudes

(3) Investigate the impact of environmental attitudes on environmental behavior

Environmental Cognition, Attitude, and Behavior

Maloney and Ward (1973) first developed an ecology inventory to measure ecological attitudes and knowledge. After analyzing the data on people's attitude and knowledge regarding ecology, environment, and pollution, Maloney and Ward concluded that the average

person did not appear to know very much about the environment and that knowledge about the environment has little effect on behavior.

However, Dispoto (1977) found that knowledge was more predictive of activity than was emotion. He inventoried college students' specific factual knowledge of environmental issues, verbal commitment toward environmental issues, and actual behavior in improving the environment. It is not environmental emotion but environmental knowledge that accounted for a consistently moderate amount of the variance in how many environmental groups joined in environmental efforts.

Ideally, both knowledge and attitudinal factors should be incorporated in environmental education. The success of public policy decisions, educational programs, and other efforts dependent upon environmentally-oriented actions of specific individuals may well hinge upon understanding of the relationships among their personality characteristics, attitudes, values, knowledge and environmental behavior. Some support to this direction is also provided by Arbuthnot and Lingg (1975) who found that compared to the French, there was a high degree of consistency between Americans' environmental action and environmentally specific attitudes.

Environmental Attitude-Behavior Relationship

Arbuthnot (1977) correlated selected attitudinal and personality characteristics, attitudes toward environmental problems, environmental knowledge and behavioral commitment to the use of

recycling centers. Recyclers are no more likely to score high on Pro-Ecological Attitudes, but they did score higher on Environmental Cynicism and Ecological Responsibility.

Thus, while nonrecyclers appear to share many of the recyclers' concerns, the recyclers were more concerned about the future consequences of present policies and felt more compelled to take action (which they did). At the same time, the recyclers felt that their individual actions may have little long-range impact in the face of the anti-ecological activities of large corporations and governmental agencies. The nonrecyclers have a more benign attitude about the motives and impact of the industrial and technological systems in which they live.

Perry et al. (1976) found a positive correlation between attitude toward stopping air pollution and action against air pollution.

General Attitudes, Specific Attitudes, and Environmental Behavior

Bruvold (1973) studied a community that had used water reclaimed from domestic sewage to supply the public golf course, recreation park, and swimming pool. He found that attitudes of users of reclaimed water were more favorable than those of nonusers.

He also found that attitude toward reclaimed water in the community was correlated with an index of several specific behaviors. This confirms the prediction that a behavior index

will correlate more highly with attitude than will behavior scores taken singly.

Heberlein and Black (1976) tested the hypothesis that specific environmental attitudes are more highly correlated with environmental behavior than general environmental attitudes. They observed purchase behavior of lead-free gasoline and regular gasoline as well as attitude toward air pollution. They found that attitude measures that are more specific to a given behavior are better predictors of that behavior than are more general measures.

Weigel and Newman (1976) found that their attitude measure correlated .62 with a behavioral index but had an average correlation of only .29 with the separate behaviors.

General Attitudes, Specific Attitudes, and Environmental Behavior--A Summary

General attitudes are important to study, not because they predict a single behavior well, but because they influence a wide range of specific beliefs and hence a large number of behaviors. Both specific and general attitudes ought to be included in a study to predict behavior, and the entire causal model from general attitudes to specific attitudes to behavior ought to be traced. Including only specific beliefs in a study is likely to give high attitude-behavior correlations but will not show how the belief and action relate to other attitudes and behavior. Including only general attitudes is likely to be disappointing because not much of the variance in behavior can be predicted. By including both, one can

better predict behavior from attitudes, yet show how the beliefs and actions are part of a large cognitive configuration.

Hierarchical Model and Adoption of Environmental Beliefs

The order of adoption of environmental beliefs can be predicted from the hierarchical model. Environmental beliefs form a logical hierarchy and are adopted in logical order, i.e. from top down. Once a given belief is adopted, then logic leads to the adoption of implied beliefs. The adoption of the implied belief will thus lag the adoption of the given belief by the time interval for the logic of the system to work down one step. Ideally, the adoption of the implied belief might be as fast as thought. But there are various factors which slow things down. First of all, the implied belief might not come to mind. If a person does not consider a belief, then he will not think of it in relation to other beliefs and hence will not be subjected to the logical influence of the implying belief. This means that salient beliefs will be brought into logical agreement much faster than non-salient beliefs. Second, not all logical relations are binding. One belief may be necessary for the adoption of another, but the more specific belief may require adoption of some additional premise. Thus adoption of the implied belief will not come about until the second premise is accepted. Third, persons may doubt a belief even though they see that logic dictates that belief. They may think the equivalent of "It sounds logical, but may be I'm missing something. I'll wait and see what other people think." The more often the person thinks

about the belief, the shorter the time until the doubt is dispelled. And there are other factors.

Thus the lag in time for logical processes to work their way into causal impact may range from minutes to weeks, months, or even years for very esoteric beliefs. Thus one would expect great individual differences in the extent to which adoption works its way down in any given hierarchy.

In the environmental area, nearly all of the relevant beliefs involve either personal inconvenience or imposing behaviors on others. Both are naturally repugnant and hence it is likely that most beliefs in the environmental domain would tend to be rejected unless persuasion is brought to bear. Thus the earliest message that any given consumer is likely to hear on the topic of environment is likely to be counter to his prior leanings. A message which persuades the consumer to adopt a relatively specific belief is likely to have only a temporary effect, since logical processes would tend to bring the changed belief back into agreement with higher order beliefs which are still negative. Thus the first permanent change would occur when the consumer is first convinced to adopt the belief at the top of the hierarchy. Permanent change would then work its way down from there.

After a long campaign in which all aspects of a given hierarchy are made salient to all consumers, we would expect belief patterns to settle down into two types: one group that accepts the belief at the top of the hierarchy and all the beliefs that follow

from it, and a second group which rejects the belief at the top of the hierarchy and everything under it.

The longitudinal pattern of development of environmental beliefs in most populations can thus be predicted from the hierarchical model. In the beginning, nearly all consumers will reject nearly all the beliefs in the hierary. Then some consumers will adopt the belief at the top and begin moving down the hierarchy as logic and the salience of events dictate. Over time, more and more consumers adopt the top belief and begin the downward adoption process. Finally, all of those who are going to adopt the top belief will have done so and will have completed the logical development of all the beliefs in the hierarchy. At this point, there will be just two kinds of belief system: believe all or believe none.

A cross sectional study of environmental beliefs and behaviors is a snap shot of the population at some point in this developmental sequence. If the study is conducted at an intermediate point, then there will be great individual differences in the extent to which each consumer has progressed along the developmental path that he will eventually follow. This diversity has two sets of implications: implications for correlations between beliefs and implications for mean belief adoption. The correlational implications are contained in the hierarchical path model laid out elsewhere.

The hierarchical model postulates that all beliefs in the hierarchy will be correlated, though for different reasons. A belief that is directly superordinate to another belief will have

a direct causal impact on the implied belief. A belief that is superordinate to another belief but is separated by one or more mediating beliefs will have an indirect causal impact on the remotely implied belief. Finally, two beliefs that have a joint superordinate belief (i.e. beliefs which are directly or indirectly subordinate to the same third belief) will be "spuriously" correlated because of this common causal antecedent. Thus the hierarchical model dictates the nature of the path analysis that should fit the correlations between the belief scales in this study.

The means of the beliefs should also be patterned in terms of the hierarchy. A belief score is high if the person has adopted the belief and low if the belief is rejected. Thus the mean for a belief is highly correlated with the count of the number of consumers who have adopted that belief. Since consumers typically adopt the top belief first, that belief should have the highest mean. Beliefs directly implied by the top belief are adopted next and should have the next highest means. As beliefs become more and more specific, the mean should be lower and lower. This pattern is only a rough one since different branches of the hierarchy may have very different degrees of salience, but on the average groups of beliefs at levels of greater specificity should have lower means.

Beer Containers and the Environment

Bottle Return Laws

> "No deposit. No return. Born circa 1935.
> Died in Oregon September 30, 1972.
> May it rust in peace."

So reads a tombstone mockingly erected in Porland by environmentalists in 1972, when Oregon became the first state to outlaw the sale of beer and soft drinks in non-returnable bottles and cans.[1] The "bottle bill" also bans detachable pull-tab tops. Since then, 1200 deposit bills have been introduced in the 50 states and the U.S. Congress. Mandatory deposit to encourage recycling has also been strongly recommended by the National Commission on Supplies and Shortages (NCSS).[2] There was an unsuccessful attempt at the federal level to enact a national anti-litter law in 1974 and again in 1975.

Michigan Deposit Law

Here in Michigan, the voters passed the beverage container deposit bill in the 1976 general election and the bill went into effect in 1978. Under the law, all soft drink and beer containers sold, offered for sale, or given to consumers in Michigan must be returnable and carry a cash deposit. The bottles (glass and plastic) and cans of beer are thus tagged with a deposit of 5¢ or 10¢. Returnable containers used by more than one manufacturer (termed "certified" bottles) carry a deposit of 5¢, and those that can not be used by more than one bottler (termed "uncertified" bottles) carry a deposit of 10¢. Certified bottles are used primarily for beer.

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[1] Business Week (7/28/73): pp. 76-77.

[2] Progressive Grocer (March 1977): pp. 37-

Bottle Return and Environmental Benefits

The objective of bottle bills is cleaner environment and reduced expenditures of materials and energy. The Environmental Protection Agency (EPA) has argued that by 1980 national deposit legislation would reduce the annual litter of beverage containers from 5.3 billion to 1.6 billion.[1]

Nonreturnables cost 6¢ to make, whereas the returnables cost 8¢.[2] The differential manufacturing cost is more than offset by repeated use of returnables. After 10 trips, a refillable bottle saves more than two-thirds of the energy needed to make a one-way bottle. It also takes 87% less energy to make a recycled aluminum can than one of virgin metal, while the energy savings from a recycled steel can is 39%. A national deposit bill would result in an annual savings of 530,000 tons of aluminum, 1.5 million tons of steel, and 5.2 million tons of glass.[2]

Similar differences are noted between glass and can containers. GAO has estimated a return rate of 90% for bottles and 70% for cans--suggesting that glass containers are more efficiently reused than metal containers. Glass also offers advantages in terms of greater simplicity, and lower stabler raw material and manufacturing costs.

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[1] *Business Week* (2/21/77): pp. 84-85.

[2] *Advertising Age* 42 (3/1/71): pp. 6-

Bottle Return Controversy

Resource shortage and public litter have evoked widespread national concern. There is persistent demand for a massive switch to returnable, refillable bottles. The deposit bill was, however, trenchantly opposed before it was adopted in Michigan. Passed at the end of an intense and prolonged debate on the economic and ecological issues involved in waste disposal, the bill continues to evoke heated debate. The two opposing groups continue to debate the pros and cons of the deposit bill. Indeed, ever since Oregon enacted its Minimum Deposit law in 1972 to reduce roadside litter, the throwaway ban has proved to be one of the most controversial moves in the ecology bottle.

Bottle Return and Industry Critics

Appearing before the U.S. Senate sub-committee for the National Soft Drink Association, University of Chicago Professor Richard A. Posner disputed the contention that federal deposits or product changes in nonreturnable containers would necessarily help reduce litter and solid waste or even save energy.[1]

The basic argument is that people simply do not like to return empties. They will do it during an altruistic campaign, but in the day-to-day course of affairs, the consumer likes the convenience and mobility of one-way containers.[2] The National

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[1] Food Processing 39(3) (March 1978): pp. 30-31.

[2] Industry Week 173 (8/17/70): pp. 58-

Soft Drink Association claims that 15 years ago, average trippage for beverage bottles was 24-34 trips, but the range now is 10-12 trips, and in some urban areas it is more like 3-6 trips.[1]

It is contended that forced deposit tends to reduce consumer choice. It may further lead to higher prices and disappearance of house brands. Overall, it is claimed "the consumer welfare will be diminished by a forced substitution of returnables for nonreturnables."[2]

Bottle Return and Economic Costs

Industry fears the costly overhauls of filling lines, restructured production costs, and slashed production rates. Industry argues that installing just one new refillable bottle line costs about $13 million. The soft drink bottles would suffer the most, because it is packaged in a larger number of plants than is beer. For instance, Anheuser-Busch packages Budweiser beer in 15 plants, whereas Coca-Cola packages coke in 1000 filling plants.[3]

The switch to refillables would also be a switch from a capital intensive system to one that is labor intensive. At Anheuser-Busch's Newark, N.J. brewery, which packages some 5 million bbl of beer each year, it takes only 6.5 people to work the can line,

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[1] Commerce America 1 (11/18/76): pp. 16-

[2] Food Processing 39(3) (March 1978): pp. 30-31.

[3] Business Week (2/21/77): pp. 84-85.

13.5 to handle one-way bottles, and 20 to man a refillable bottle line.[1]

It also causes extensive disruption for retailers and wholesalers in the form of extra labor for handling, cluttered store front, insufficient backroom space, sanitation, etc. The end result is a reorganization and slowing down of production lines.

Is Bottle Return Necessary?

Industry and consumer critics naturally question the need for bottle return law.

While it is conceded that one-way bottles wind up as eyesores, they represent no more than 4% of the total litter. How about litter in the form of strewn paper, plastic metal, and rubber products?[2] Beer and soft drink containers are apparently picked mainly because they are the most visible. The energy savings derived are also insignificant. Only 16,000 BTUS are expended for every dollar spent on beer, whereas 70,000 BTUS are consumed for every dollar spent on other grocery products.[3]

The success in Oregon can not also be duplicated elsewhere. In the first place, Oregon has only 1% of the nation's population, and its beverage markets are dominated by local brewers and bottlers

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[1] Business Week (2/21/77): pp. 84-85.

[2] Supermarket (September 1978): pp. 107-

[3] Supermarket (June 1977): pp. 67-

who stand to lose very little from the deposit bill. Whereas the impact could be disastrous in other states.[1]

The critics have therefore concluded that both litter reduction and resource recovery are necessary to manage the nation's soaring garbage load. The answer lies in recycling materials, not banning one-way containers.

Summary

Consistency between environmental attitudes and environmental behavior has been noted in a number of studies. Recyclers, for instance, tend to have more pro-ecological attitudes.

Specific attitudes are better predictors of environmental behavior than are general attitudes. However, general environmental attitudes influence a broad range of specific attitudes and thus many behaviors. To obtain greatest insight into cognitive configurations, one ought to look at both specific and general environmental beliefs.

Returnable beer containers are said to yield a number of environmental benefits in terms of material and energy saved. Returnables have, however, remained extremely controversial. Many critics have contended that the container deposit requirement imposes high economic cost and industry disruptions.

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[1] *Business Week* (7/28/73): pp. 76-77.

CHAPTER IV

SCOPE AND METHODOLOGY

Outline

This chapter covers two broad areas--scope of the research and the methodology employed in completing the research. In the first part, we will look at the basic nature of research, specific product examined, and the population studied.

In the second part, we will outline the construction of survey instrument employed, nature of sample selected, and the methods used in analyzing data and modelling.

Scope of Research

The purpose of this research is to explore the relationship between abstract attitudes such as a belief that we suffer an energy crisis and specific behaviors such as returning beer cans.

We will investigate the impact of consumers' environmental beliefs on their beer package choice and container return frequency. Environmental beliefs range from broad natural resource and conservation issues to specific issues involved in container deposit law. Beer is a frequently used product, and hence subject to routinized purchase habits. Beer is a highly visible and extensively promoted product. The environmental implications of beer packaging have been widely publicized. These messages have linked environmental attitudes to beer purchasing behavior.

The population studied is Greater Lansing. Of total 433 respondents in the sample, 225 are students in Michigan State University and 208 are others living in Greater Lansing area. The procedures employed in selecting the two samples and combining them into one large sample are explained in the methodology section next.

Methodology of Research

Instrument Construction

Prior studies provided a general outline of environmental and other issues involved in beer container returns. A pilot study was conducted to more sharply define the issues. Ten people were interviewed: six beer drinkers/buyers, two beer distributors, and two bottle managers in Shop Rite Super Market and Meijer Thrifty Acres.

The preliminary questions covered

- Consumer beliefs regarding
  - :resource shortage
  - :energy shortage
  - :seriousness of shortage
  - :conservation need
  - :conservation willingness
  - :need for society to control resource use
  - :role of beer companies in resource shortage
  - :significance of resource used in metal can or uncertified bottle

- Consumer support for container return

- Frequency of container return by consumer

In the second stage, a written questionnaire was developed and pretested. The objective was to measure the consumers' attitude toward a number of environmental issues. A preliminary draft was given to 30 respondents including MSU students, white and blue collar workers, and professionals. The respondents were asked to be critical, especially in regard to poorly constructed or ambiguous items. Should they have any trouble in understanding the meaning of any word or phrase, they were encouraged to speak out or write so on the margin.

These procedures greatly helped in identifying problem questions or sections, and making the final survey instrument to be clearer, easier, and quicker to complete. Certain inconsistencies in the language were noted and hence modified. The pretest responses were then analyzed in terms of means, standard deviations, and correlation coefficients, so we could eliminate unnecessary items or modify them.

The questionnaire was then formalized for the final survey. All the attitude questions were answered on a five-point Likert scale from strongly disagree to strongly agree. The direction of one-half the items were reversed, and the items were reordered based on random numbering.

The General Population Sample

Two separate samples were initially collected: a non-student sample and a student sample.

Formal sample selection procedures were employed to obtain the general population or non-student population. The number and strength of 3-digit telephone districts in the Greater Lansing area were obtained from Michigan Bell. Random number tables were then used to generate the last four numbers. The sample distribution among the telephone districts was allowed to correspond to the strength of different telephone districts. Once a bank of numbers is selected, calls were made using random digit dialing within the bank until a specified number of households in each district was reached.

Calls were made to the households explaining the purpose of the survey and eliciting consumers' consent to receiving and completing the questionnaire by mail. Approximately 65% of the households consented to participate in the survey. The questionnaires were then sent out by mail along with stamped return envelope. Approximately 70% of the mailed questionnaires were returned. Of the total 212 questionnaires returned, 208 were found complete and usable.

The Student Sample

In respect of student population, convenience sampling procedures were employed. Although randomized selection on an individual basis was not attempted, an effort was made to select students belonging to different courses, levels, and backgrounds

at Michigan State University. These variables were systematically varied to obtain a sample which, it is believed, broadly represents the student population at MSU.

Of the total 234 questionnaires returned, 225 were found complete and usable.

The Combined Sample

The responses were then coded on computer coding forms. Attitude items were reversed, wherever necessary, so that all the statements would lie in one direction. The responses were then transferred from computer sheets to computer cards.

The student and non-student samples were studied separately, and significant differences in responses, if any, were examined. Such an examination revealed no significant differences in responses. Hence, student and non-student samples were merged at this stage and the reported data analysis is for the combined sample. This combined sample consisted of 337 student and non-student respondents who both consumed and purchased beer.

The Measurement Model

Our next step was to derive appropriate attitude and behavior scales based on the sample responses. Provisional scales were formed using content analysis. These scales were then tested and modified using confirmatory factor analysis. PACKAGE (Hunter and Cohen, 1969) was used to find correlations among the attitude items. The questionnaire items were then grouped according to the construct being tapped. Multiple groups procedures were used to form item

clusters on the basis of content similarity, internal consistency, and external consistency or parallelism (Hunter and Gerbing, in press). The grouping of questionnaire items into different attitude and behavior scales is summarized in Appendix B. The corresponding clusters were scored and correlated, and this matrix was corrected for attentuation due to less than perfect reliability (Nunnally, 1967). Correction for attentuation provides estimates of the correlations between scales that would be obtained if measurement error were not present. This corrected matrix constituted the input for path analysis.

The Causal Model

The first step in a path analysis is to formulate a causal model predicting the structure of the correlations between the variables studied. We used the logical precedence rules of the hierarchical model to generate the causal model. The most general belief scale was placed at the top. Those beliefs directly implied by the general belief were added next. And so on. This model was subjected to path analysis and showed almost perfect fit. However the empirical analysis suggested a few links between beliefs in different logical chains that require premises which were not thought of prior to the study and were thus not predicted. The modification added to the hierarchical structure, they did not contradict it.

Path analysis was performed on the belief correlation matrix using PATHPAC (Hunter and Hunter, 1977). Path coefficients are derived by ordinary least square estimation (Heise, 1975) using

simple or multiple regression of each variable onto its causal antecedents. If a variable has only one antecedent, then the path coefficient is the correlation between the dependent variable and its antecedent. Where a variable has a number of antecedents, then the path coefficients are the beta weights obtained from the multiple regression of the dependent variable onto the posited antecedent variables within the model.

The path coefficients are used to generate a predicted correlation matrix which is subtracted from the observed correlation matrix to provide a residual matrix from which the goodness of fit of a proposed model can be judged. In the reproduction of the correlations from the path diagram, the errors would not be expected to be uniformly distributed unless the sample size were so large that the estimation could be regarded as perfect. Otherwise, the estimated correlation from the model depends on the length of the causal paths which go into that estimate. The longer the causal path, the greater the cumulated error in the estimate of the predicted correlation.

CHAPTER V

RESULTS AND DISCUSSIONS

Overview

The chapter begins by describing the intensity, direction, and distribution of environmental beliefs and behavior observed in the population studied. Special attention is paid to the level of environmental awareness, specific environmental beliefs, perceived role of beer companies, and beer container return behavior.

The second section describes the procedures employed and data used in testing the hierarchical model. The model is tested in two ways: by testing mediational hypotheses and by testing network hypotheses. The third section tests the mediational predictions and the fourth section tests the hierarchical network hypotheses.

The fifth section resolves the dispute over general vs. specific attitudes within the context of hierarchical model.

The sixth and final section compares the path model derived in this study with results from prior studies.

Intensity, Direction and Distribution of Environmental Beliefs and Behavior

Belief and behavior scales were formed by grouping individual belief and behavior items on the basis of content similarity, internal and external consistencies. A confirmatory factor analysis was conducted to check the groupings. The results of confirmatory factor analysis are contained in Appendix C.

Also computed were the means, standard deviations, and reliabilities for the belief and behavior scales. These are shown in Table 1. Item responses were averaged rather than summed to preserve the original response scale. Thus scales are also scored from 1=Strongly Disagree to 5=Strongly Agree. Category 3 is neutral.

Environmental Awareness

A mean score of 3.79 was found for the belief that we are experiencing serious resource shortage (506). A mean of 3.27 was found for the belief that resource shortage is real (505). So, while most consumers believe that we are passing through a period of serious resource shortage, there is considerable disagreement as to whether the current alleged resource shortage is real. A number of consumers believe that the current resource shortage is hoax.

The highest positive mean scores were obtained in respect of two general environmental beliefs: that the consumers must conserve resources (504), 3.88, and that such conservation would make a difference (507), 3.82. A majority of consumers believe that they should conserve resources and that, if they conserve, it would help. A conservationist sentiment seems to prevail in the majority of consumers studied.

The lowest standard deviation of .60 was obtained for the belief that consumers' conservation would make a difference (507). Whereas a standard deviation of .65 was obtained for the belief that consumers must conserve resources (504). There is a substantial agreement regarding what consumers can and should do for resource

TABLE 1.--Belief and Behavior Scales.

Scale No.	Content	Mean[a]	SD	Reliability[b]
501	Society must control resource use	3.63	.63	.76
502	Resources more important than jobs	3.18	.93	.83
503	Industry will not act on their own	3.54	.89	.74
504	Consumers must conserve resources	3.88	.65	.61
505	Resource shortage is real	3.27	.78	.70
506	Resource shortage is serious	3.79	.72	.73
507	Consumers can help	3.82	.60	.65
508	Industry not doing their best	2.79	.64	.65
509	Resources used in cans significant	3.65	.79	.80
510	Prefer glass over metal containers	3.24	.64	.57
511	Beer companies prefer can containers	3.03	.78	.71
512	Favor container return	3.24	.85	.75
513	Certified bottles conserve resources	3.36	.68	.76
514	Government is doing nothing	2.62	.90	.74
516	Frequency of container return	4.24	.85	.69

[a]On a scale from 1=Strongly Disagree to 5=Strongly Agree. Category 3 is neutral.

[b]Coefficient Alpha.

conservation. Consumers who question such beliefs are not numerous and/or do not believe so strongly.

Role of Government and Beer Companies

Lowest mean scores were obtained in regard to the beliefs that government is doing nothing about resource shortage (514), 2.62, and that beer companies are not doing their best (508), 2.79. Consumers are divided as to whether either the government or the beer companies are doing their best. We could not detect any inclination to blame either industry or government for the current shortage.

A considerably higher standard deviation, .90 was obtained for the belief that government is doing nothing (514) than for the belief that beer companies are not doing their best (508), .65. Consumers' beliefs regarding what government is doing differ more widely than their beliefs regarding what beer companies are doing.

Need for Societal Control

A mean score of 3.54 was obtained for the belief that industry will not act on its own (503) and 3.63 for the belief that society must control resource use (501). The respondents are thus divided in their beliefs regarding what industry does and the need for societal control of resources.

Jobs vs. Resource

A mean score of 3.18 was obtained for the belief that resource is more important than jobs (502). Consumers seem roughly

equally divided in their support for resource priority over jobs. There is a minority of consumers who strongly believe that resource is more important than jobs.

Overall, both the issues of resource priority over jobs and of societal control of resources, seem to divide the consumers into two distinct groups, one supporting and the other opposing. In fact, highest diversity among all the beliefs was obtained in regard to resource priority over jobs, as reflected by a standard deviation of .93.

Specific Environmental Beliefs and Package Type Preferences

We obtained a mean score of 3.65 in regard to the belief that resource used in cans is significant (509). Lower mean scores are recorded for a number of other specific beliefs: that certified bottles do conserve resources (513), 3.36; that they prefer two way beer containers (512), 3.24; and that they prefer glass over metal containers (510), 3.24.

A majority of consumers do recognize that resource used in cans is significant. There, however, are those who disagree.

Consumers are significantly divided in their belief that certified bottles conserve resources, in their preference for two way beer containers and for glass over metal containers. There is a minority of consumers who strongly believe that certified bottles conserve resources, and who prefer two way beer containers and glass over metal containers. One of the highest response variabilities is obtained in regard to their preference for two way

containers. Consumers seem to be as divided in their preference for two way containers after the passage of the bottle bill as they were before.

Container Return Behavior

The highest positive mean score of 4.24 is obtained in respect of reported behavior, viz. the frequency of container returns (516). Consumers return beer containers with an extremely high frequency and thus contribute significantly toward the recycling effort. There is only a small minority of consumers who do not return empty containers.

The high frequency with which consumers return beer containers in the face of their divided support for two way containers probably results from the economic cost involved in not returning empties. So that even those who do not favor two way containers return them lest they lose the deposit. We did not ask the frequency with which beer containers are returned solely for resource conservation rather than for the deposit.

Testing the Hierarchical Model

Correlations between environmental belief and behavior scales were computed and corrected for attentuation due to error of measurement. These correlations are presented in Table 2.

The highest correlations are found between attitudes at the same level of generality, as predicted. However, simple correlations between belief scales do not specify the direction of causality.

TABLE 2(a).--Observed Scale Correlations.

Input R-Matrix	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516
501	100	35	43	60	42	48	41	26	32	14	21	49	11	-7	-3	32
502	35	100	29	31	15	15	19	15	15	6	5	20	13	5	8	7
503	43	29	100	37	8	21	-9	62	23	33	22	25	4	17	-5	7
504	60	31	37	100	41	59	45	3	38	7	4	40	-1	-17	8	17
505	42	15	8	41	100	70	40	7	20	13	3	47	6	-29	-5	9
506	48	15	21	59	70	100	58	21	28	24	25	28	5	-4	1	8
507	41	19	-9	45	40	58	100	-24	24	2	-1	16	3	-13	1	18
508	26	15	62	3	7	21	-24	100	2	34	30	7	-3	37	-1	8
509	32	15	23	38	20	28	24	2	100	46	17	43	28	0	-12	22
510	14	6	33	7	13	24	2	34	46	100	50	27	25	10	-11	-6
511	21	5	22	4	3	25	-1	30	17	50	100	21	-5	18	5	6
512	49	20	25	40	47	28	16	7	43	27	21	100	15	-4	-2	39
513	11	13	4	-1	6	5	3	-3	28	25	-5	15	100	-7	-1	3
514	-7	5	17	-17	-29	-4	-13	37	0	10	18	-4	-7	100	0	1
515	-3	8	-5	8	-5	1	1	-1	-12	-11	5	-2	-1	0	100	2
516	32	7	7	17	9	8	18	8	22	-6	6	39	3	1	2	100

TABLE 2(a).--Observed Scale Correlations.

Reordered R-Matrix	505	506	504	507	501	503	508	512	509	510	513	502	511	516
505	100	70	41	40	42	8	7	47	20	13	6	15	3	9
506	70	100	59	58	48	21	21	28	28	24	5	15	25	8
504	41	59	100	45	60	37	3	40	38	7	-1	31	4	17
507	40	58	45	100	41	-9	-24	16	24	2	3	19	-1	18
501	42	48	60	41	100	43	26	49	32	14	11	35	21	32
503	8	21	37	-9	43	100	62	25	23	33	4	29	22	7
508	71	21	3	-24	26	62	100	7	2	34	-3	15	30	8
512	47	28	40	16	49	25	7	100	43	27	15	20	21	39
509	20	28	38	24	32	23	2	43	100	46	28	15	17	22
510	13	24	7	2	14	33	34	27	46	100	25	6	50	-6
513	6	5	-1	3	11	4	-3	15	28	25	100	13	-5	3
502	15	15	31	19	35	29	15	20	15	6	13	100	5	7
511	3	25	4	-1	21	22	30	21	17	50	-5	5	100	6
516	9	8	17	18	32	7	8	39	22	-6	3	7	6	100

TABLE 2(b).--Predicted Scale Correlations.

	505	506	504	507	501	503	508	512	509	510	513	502	511	516
505	100	70	41	41	29	12	8	14	6	5	1	12	3	9
506	70	100	59	58	41	18	11	20	9	8	2	17	5	13
504	41	59	100	34	58	25	15	28	12	11	3	29	7	19
507	41	58	34	100	35	15	9	17	7	7	2	11	4	11
501	29	41	58	35	100	43	27	49	21	18	5	22	12	32
503	12	18	25	15	43	100	62	21	9	25	6	26	20	14
508	8	11	15	9	27	62	100	13	6	36	9	16	31	9
512	14	20	28	17	49	21	13	100	43	24	6	11	13	39
509	6	9	12	7	21	9	6	43	100	47	12	5	22	17
510	5	8	11	7	18	25	36	24	47	100	25	8	50	10
513	1	2	3	2	5	6	9	6	12	25	100	2	13	3
502	12	17	29	11	22	26	16	11	5	8	2	100	6	7
511	3	5	7	4	12	20	31	13	22	50	13	6	100	6
516	9	13	19	11	32	14	9	39	17	10	3	7	6	100

TABLE 2(c).--Observed Minus Predicted Scale Correlations.

	505	506	604	507	501	503	508	512	509	510	513	502	511	516
505	0	0	0	-1	13	-4	-1	33	14	8	5	3	0	0
506	0	0	0	0	7	3	10	8	19	16	3	-2	20	-5
504	0	0	0	11	2	12	-12	12	26	-4	-4	2	-3	-2
507	-1	0	11	0	6	-24	-33	-1	17	-5	1	8	-5	7
501	13	7	2	6	0	0	-1	0	11	-4	6	13	9	0
503	-4	3	12	-24	0	0	0	4	14	8	-2	3	2	-7
508	-1	10	-12	-33	-1	0	0	-6	-4	-2	-12	-1	-1	-1
512	33	8	12	-1	0	4	-6	0	0	3	9	9	8	0
509	14	19	26	17	11	14	-4	0	0	-1	16	10	-5	5
510	8	16	-4	-5	-4	8	-2	3	-1	0	0	-2	0	-16
513	5	3	-4	1	6	-2	-12	9	16	0	0	11	-18	0
502	3	-2	2	8	13	3	-1	9	10	-2	11	0	-1	0
511	0	20	-3	-5	9	2	-1	8	-5	0	-18	-1	0	0
516	0	-5	-2	7	0	-7	-1	0	5	-16	0	0	0	0

*The Sum of Squared Deviations is .86.

A path analysis was conducted to trace the causality, and specifically distinguish between direct, indirect, and spurious effects.

The path analysis model is shown in Figure 2. The model seems to fit the data quite closely. Table 2 presents the statistics required to assess goodness of fit. Table 2(a) presents the actual or observed correlations between scales corrected for attentuation. Table 2(b) presents the correlations predicted by the model. Table 2(c) presents the differences or errors in fit. The overall chi square test shows no significant departure from the model.

The hierarchical model predicts that beliefs at the top of the hierarchy are likely to be adopted before beliefs lower down. Thus the model predicts that beliefs at increasingly lower levels, i.e. beliefs that are more specific, will have increasingly lower means.

To test this prediction, the path model was used to form three sets of beliefs: the most abstract beliefs, the intermediate beliefs, and the most specific beliefs. The means for the beliefs in each set were averaged. The abstract beliefs were: 505, 506, 504 and 507. The intermediate beliefs were: 502, 501, 503, 512, 508 and 509. The specific beliefs were: 511, 510 and 513. The belief averages are shown below:

Abstract beliefs	3.69
Intermediate beliefs	3.34
Specific beliefs	3.20

Thus more specific beliefs are less likely to have been adopted. This bears out the prediction of the hierarchical model.

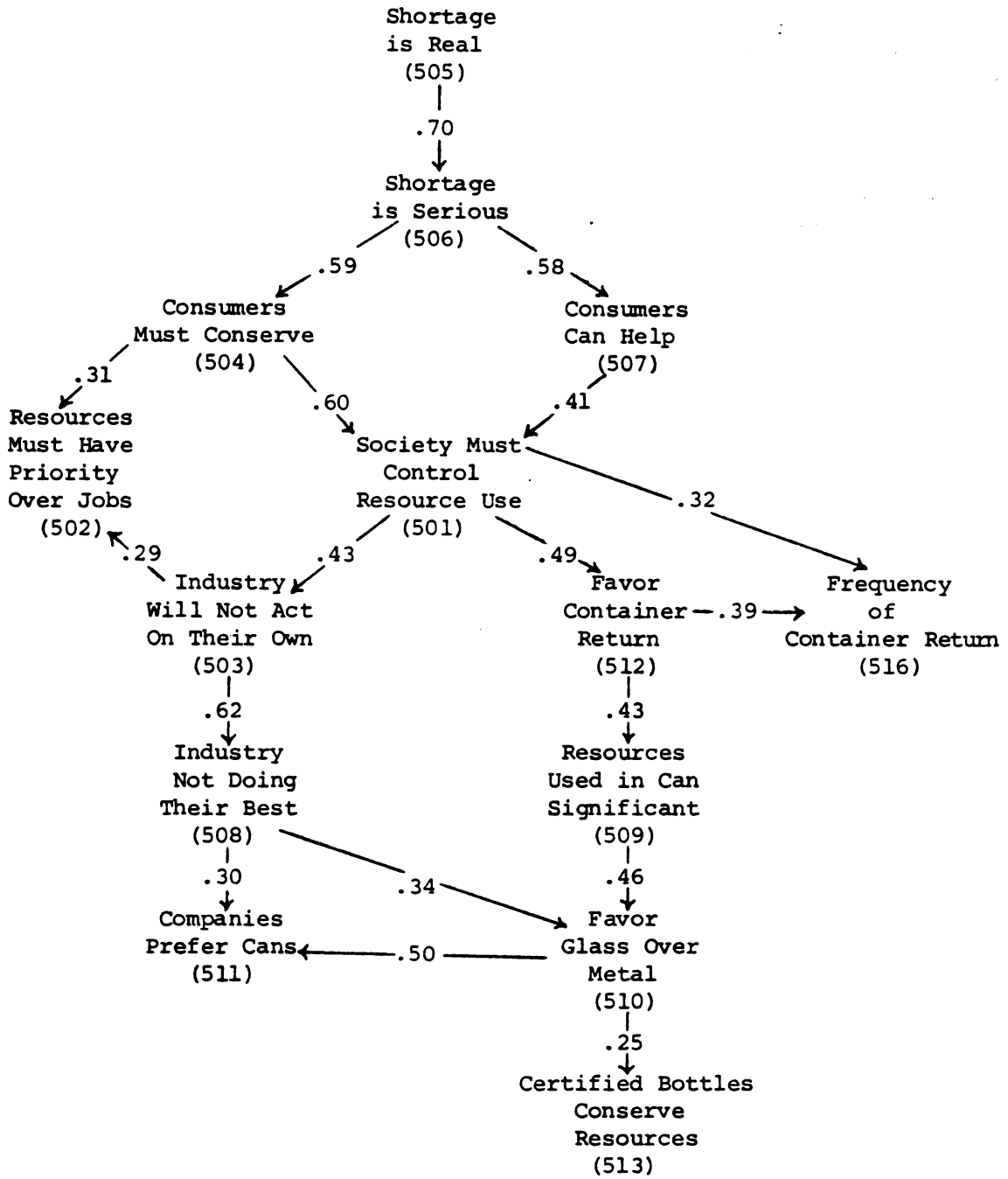


Figure 2.--Path Model

The detailed examination of the path diagram shows that it confirms the hierarchical model. This examination will be presented in two steps: mediational hypotheses and network hypotheses.

Testing the Mediation Hypotheses

The mediation hypotheses concern the immediate linkages between beliefs. The form to be considered here is a belief triad in which belief A tends to imply belief C only because there is an intermediate belief B such that A tends to imply B while B tends to imply C. The correlational form of such a hypothesis is that the correlation between A and C will be much lower than either the correlation between A and B or the correlation between B and C. The path model shows a mediation effect of this type by showing links from A to B and B to C but not from A to C. That is, the correlation between A and C is the result of the indirect causal path from A to B to C rather than a direct impact of A on C.

In the context of our study, the basic proposition is that the influence of higher order environmental beliefs on behavior is indirect and mediated by more specific environmental beliefs.

Belief Triads Showing that Causal Mediation Follows Logical Mediation

For purposes of illustration, we will first consider selected belief triads in detail. In each such triad, the beliefs have the logical structure: A tends to imply B and B tends to imply C, so that A only indirectly tends to imply C. We will show that the correlation between A and C is correspondingly lower than the

correlation between A and B or the correlation between B and C. The rest of the key mediation relations will then simply be listed.

The belief that consumers can do much (507) and that they favor container return requirements (512) have a correlation of .16, whereas the intermediate scale that they support societal control of resource use (501) has a correlation of .41 with the first belief and .49 with the second. Similarly, the beliefs that resource shortage is serious (506) and that resource conservation is more important than jobs (502) have a correlation of .15, whereas the intermediate belief that consumers must conserve resources (504) has a correlation of .59 with the first belief and .31 with the second.

The beliefs that resource shortage is real (505) and that the consumer can do much (507) have a correlation of .40, whereas the intermediate belief that resource shortage is serious (506) has a correlation of .70 with the first belief and .58 with the second. Similarly, the beliefs that resource shortage is real (505) and that consumers must conserve resources (504) have a correlation of .41, whereas the intermediate belief that resource shortage is serious (506) has a correlation of .70 with the first belief and .59 with the second.

These relations between correlations are the basis for the distinction between direct and indirect causal effects in path analysis. The path diagram shows the mediational effects as causal chains. These chains run from general beliefs to specific behavior

and hence show the predicted mediation of causal influence. Other important mediating relations are listed next.

Mediational Beliefs

The impact of belief that resource shortage is real (505) on the belief that consumers must conserve resource use (504) and that consumer conservation would make a difference (507) is mediated by their appreciation of the seriousness of resource shortage (506). It is not enough for consumers to believe that resource shortage is no hoax, they must also appreciate the seriousness of shortage, before they become inclined to conserve resources. Before consumers can be brought to think that they can and should help in the resource crisis, the seriousness of shortage must be communicated to them.

Two parallel beliefs that consumers must conserve resources (504) and that consumer conservation would make a difference (507) seem, in turn, to jointly mediate the impact of the belief that we are in resource shortage (506) on the support for societal control of resource use (501). Consumers that simultaneously believe that they can and should help in the resource problem are more likely to believe that society must control resource use. Correspondingly, those who fail to believe that they can and should help in the resource problem are less likely to believe that society must control resource use. Even when consumers appreciate the seriousness of shortage, they would not support societal control of resource use, unless they are convinced they can and should help in the resource problem.

The impact of the belief that we are in resource shortage (506) on the belief that resources are more important than jobs (502) is mediated by the consumers' willingness to conserve (504). Even in the face of a recognized serious resource shortage, only conservation-minded consumers would agree that resources are more important than jobs.

The belief that society must control resource use (501) seems to shape a broad spectrum of beliefs, in regard to the role played by industry (503, 508 and 511) and disposition toward container return requirements (512, 509, 510 and 513). This belief is a key link in the causal path. The impact of consumers' general environmental beliefs about beer containers and what industry's role is believed to be, is mediated by the belief as to whether or not society has priority right over individual.

The beliefs that consumers must conserve resources (504) and that consumer conservation would help (507) impact on their belief that industry will not act on its own (503), but such an influence is mediated by the belief that society must control resource use (501).

The impact of the belief that society must control resource use (501) on the belief that resources are more important than jobs (502) is mediated by the belief that industry will otherwise not act on its own (503). Even those who recognize that society must control resource use would favor resources over jobs only if they also believe that industry will otherwise not act on its own.

The impact of consumers' beliefs that consumers can and should help in resource shortage (504, 507) on favoring return

containers (512) is mediated by their belief that society must control resource use (501). Even those who believe that they can and should help in the resource problem would favor return containers only if they also agree that society must control resource use.

The belief that society must control resource use (501) impacts on the belief that resources used in can are significant (509), but such an impact is mediated by the preference for container return requirements (512).

The impact of support for return containers (512) on preference for glass over metal containers (510) is not direct, but mediated by the beliefs that resources used in cans are significant (509) and that industry is not doing its best (508). It is not enough for consumers to favor return containers before they prefer glass over metal containers, they should also believe that resources used in cans are significant and also that business is not conserving as it is.

The impact of the belief that resources used in cans are significant (509) on the belief that certified bottles conserve resources (513) is not direct, but mediated by the consumers' preference for glass over metal containers (510). It is not enough for people to understand that resources used in cans are significant, they must also prefer glass over metal and believe that business is not conserving either, before they can recognize that certified bottles do save resources.

Environmental Beliefs Logically Related

The mediation hypothesis assumes that environmental beliefs are logically related. The path model which fits the data does follow such logical relations. For example, consumers who perceive the resource shortage as real would at least consider such shortage as potentially serious. Consumers who believe there is a serious resource shortage should be willing to conserve.

Consumers who believe that society must control resource use would understandably favor container returns. Conservation-minded consumers not only favor container return requirements, but also are conscious that resources used in can are significant. Their perceptions and preferences are consistent.

That even conservation-minded consumers would provide only lukewarm support to sacrifice jobs in favor of resources, is explicable in the background of severe economic stress in Michigan at the time of the study.

Testing the Network Hypotheses

The network hypotheses are the global structure hypotheses of the hierarchical model: that the causal structure will follow the logical structure from general to specific beliefs. The belief which is logically precedent to all others is the most general belief in the inventory: the belief that resource shortage is real (505). According to the hierarchical model, this belief should also be causally prepotent and hence should appear at the top of the path

model, as it does. Other beliefs should then follow this one in order of generality with specific behavior appearing at the bottom of the path diagram.

Two major propositions are involved in the hierarchical network hypotheses:

A. That causal relations between environmental beliefs are structured in a set of hierarchical relationships.

B. That the causal structure of environmental beliefs is arranged from most abstract and general to the most concrete and specific.

Hierarchical Relations Among Environmental Beliefs

(a) Prepotent belief

The most general attitude in the survey is the belief that resource shortage is real (505). The hierarchical model predicts that this belief should be prepotent in causal influence. It was predicted to appear at the top of the path diagram and it does. This belief is substantially correlated with a number of environmental beliefs, and especially with key general environmental beliefs in regard to the role of consumer, need for societal control of resource use, etc. It is correlated with the specific environmental beliefs such as the consumers' disposition toward container return requirements, though to a lesser extent as predicted.

The belief that resource shortage is real (505) impacts directly on the consumers readiness to recognize that resource shortage is serious (506). Alternatively, if they believe that

the shortage is a hoax, they are unlikely to recognize its seriousness. Belief that resource shortage is real (505) significantly impacts on the consumers' willingness to conserve (504), the belief that consumer conservation will make a significant difference (507), that society must control resource use (501), and specifically their support of container return requirements (512). A correlation of .47 between consumers' beliefs that resource shortage is real and that they favor container return requirements, suggests the key role played in our study by the former belief.

(b) Higher level vs. lower level concepts

Hierarchy implies also that higher level concepts are correlated with a large number of other concepts, both among themselves and with lower level concepts. This is an extension of the previous suggestion regarding the existence of prepotent concept (or concepts).

The following general belief scales

505 Resource shortage is real

506 Resource shortage is serious

504 Willingness to conserve

507 Consumers' conservation would help

501 Society must control resource use

are not only substantially correlated with each other. They are also significantly correlated with a number of other scales. The following correlational matrix highlights this observation:

	505	506	504	507	501	503	512	509	502
505	1.00	.70	.41	.40	.42	.08	.47	.20	.15
506		1.00	.59	.58	.48	.31	.28	.28	.15
504			1.00	.45	.60	.37	.40	.38	.31
507				1.00	.41	-.09	.16	.24	.19
501					1.00	.43	.49	.32	.35

Substantial correlations are thus obtained in respect of general environmental beliefs (501, 504-07)--beliefs regarding resource shortage, resource conservation, and society's control over resource use. They are also significantly correlated with a number of specific beliefs (502-03, 509, 512). For instance, the beliefs that resource shortage is serious and that consumer conservation would make a difference--both seem to play key roles in the hierarchical network. Consumers have to believe that society must control resource use if they are to favor container return requirements. They must also be willing to participate in resource conservation.

(c) Hierarchical strings

The hierarchical hypothesis would not only suggest that higher level concepts branch out on to different realms, but also that each branch or string of beliefs can be considered separately.

There are two distinct strings of environmental beliefs, one dealing with industry's role and the other dealing with the role of the consumer. The belief that industry will not act on its own (503) is correlated with the belief that society must control resource use (501), that industry is not doing its best (508), and that

beer companies prefer metal cans over glass bottles (511). Similarly, support for container return requirements (512) is correlated significantly with the beliefs that society must control resource use (501), that resources used in can containers are significant (509), the preference for glass over metal containers (510), and that certified bottles save resources (513). Those who support societal control of resource use favor container return requirements; reinforced by the beliefs that resource used in can container is significant, that certified bottles save resources, and that glass is preferable to metal for containers.

(d) The family of environmental beliefs

The hierarchical hypothesis asserts that all of the environmental beliefs belong to the same family. Hence all are causally linked, either directly or indirectly. This is confirmed by the path analysis.

(e) Hierarchical direction not reversible

The hierarchical model not only suggests that environmental beliefs are layered at different levels, but also that the causal linkages are unidirectional. All causal arrows in the path diagram of Figure 2 point from more general to less general beliefs. This path diagram is consistent with the hierarchical model assumption of top down causal flow. This path diagram fits the data and hence tends to confirm the hierarchical model.

Structuring of Environmental Beliefs from Most Abstract to Most Concrete

The network of environmental beliefs has general, abstract beliefs at the top. The prepotent concept is the belief that resource shortage is real. Immediately below are the following general beliefs:

505 Resource shortage is serious

504 Consumers must conserve

507 Consumers' conservation would help

501 Society must control resource use

At the lowest level are found the following most specific, concrete beliefs:

511 Beer companies prefer metal containers

513 Certified bottles conserve resources

As we come down from the top level we find gradually increasing specificity in the belief concepts. For instance, if we examine the string of beliefs on the role of beer companies, we have at the top the belief that beer industry will not act on its own, then the belief that beer industry is not doing its best, and terminating with the belief that beer companies prefer metal over glass containers.

Impact of General vs. Specific Environmental Attitudes on Environmental Behavior in the Context of Hierarchical Model

The hierarchical model predicts that attitude behavior correlations are highest if they are measured at an equivalent level

of generality. Specific behavior will be predicted best by specific beliefs.

Presented below are the first order correlations between container return behavior and a number of environmental beliefs.

	512	501		507	504		506	505
516	.39	.32	*	.18	.17	*	.08	.09

Container return behavior has its highest correlations of .32 and .39 with the belief that society must control resource use (501) and the consumers' disposition toward container return requirements (512). In the next level, container return behavior has intermediate level correlations of .18 and .17 with the beliefs that consumers must conserve (504) and that their conservation efforts would help (507). Finally, container return behavior has its lowest correlations of .09 and .08 with such general beliefs that resource shortage is real (505) and it is serious (506).

This data supports the prediction derived from the hierarchical model: specific behaviors will be best predicted by correspondingly specific beliefs.

Relation Between Present Findings and Prior Research

Dispoto (1970) assessed the belief that resource shortage is real. While the superordinate role of this belief in the environmental area is upheld in our study, our research shows that it is mediated by the belief that resource shortage is serious. Consumers not only have to agree that resource shortage is real but also

that such shortage is serious before they can be persuaded to become conservers.

Arbuthnot (1977) hypothesized that consumers' willingness to conserve resources is based on beliefs that resources have priority over jobs and that society must control resource use. The evidence in our study reverses this causal ordering. Our data suggest that consumers become conservers before they will support societal control of resources. We find here a reasoning consumer; if he believes that resource shortage is serious and that his action would make significant difference, then he will support societal control of resource use.

Arbuthnot (1977) has hypothesized that consumers conserve because the actions of large corporations are antiecological. Our data show that although many consumers criticize industry, industry's actions are not the basis for consumer conservation. Many conservers have considerable appreciation for the seriousness of the shortage and are concerned with the role they can play without waiting to see what industry might or might not do. Even the conservation minded consumers are not strident in their criticism of industry. The majority believe that industry is doing its best, though needing to be prodded all the time.

Bruvold (1973) suggested that conservation minded consumers recognize resources as more important than jobs, and hence are willing to conserve. Our path analysis suggests that consumers' willingness to conserve is not affected by their belief that jobs are more important than resources. Consumers will support resource

priority over jobs if they are conservation minded and if they believe that industry will not act on its own. Two observations may be made in this connection: (1) There is no widespread support for resource priority over jobs. Even the heavy conservers are extremely sensitive when it comes to jobs. Their avowed support for societal control of resources will not prompt them to give up jobs to save resources. (2) The environmental activities of large corporations are not going to make conservers conserve any less. Conservation by large corporation may supplement consumer conservation efforts.

Polling correlations (Business Week, February 21, 1977) have been interpreted to mean that consumers favor container return, because (1) they are willing to conserve and (2) the actions of large corporations are antiecological. Our data confirm the causal direction of the first interpretation but show the second correlation to be "spurious." Our data show that consumers who favor container return are those who believe society must control resource use, those who are willing to conserve, and those who believe that their own conservation efforts would be useful. On the other hand, as noted in the discussion of Arbuthnot (1977), consumers' commitment to container return does not depend on their belief about industry.

CHAPTER VI

SUMMARY OF CONCLUSIONS

Intensity, Direction, and Distribution of Environmental Beliefs and Container Return Behavior

Consumers agree that we are passing through a period of serious shortage but disagree whether such shortage is real. However, there is substantial agreement that consumers should conserve and that it would help if they did so. A significant conservationist sentiment seems to prevail in the population studied.

A majority of the consumers believe that both government and beer companies are doing what they can. They are not inclined to blame the resource shortage on either government or industry. Though consumers are somewhat more critical of the government than of the industry.

Consumers are divided when it comes to their job. While there is a significant minority of consumers who strongly believe that resource is more important than jobs, jobs are too important to be taken lightly even by conservationists. The emotional nature of jobs is revealed by the wide range of how consumers feel.

While a substantial majority believe that the resources used in containers are significant, there are many who disagree. Consumers are divided in their beliefs that certified bottles conserve resources, and also in their preference for two way containers and glass containers over metal containers.

Consumers seem to be returning empty containers with high frequency. Apparently, many of those who do not favor return containers return them anyway to get their deposit back.

Testing Mediation Hypotheses

Internal Influence of a Family of Beliefs Goes Down Only Along Hierarchical Channels

(1) Direct relationships between environmental beliefs are weaker than indirect relationships.

(2) This reflects the mediational nature of such beliefs. A number of mediating beliefs can be identified.

*Before consumers who understand that resource shortage is real become conservers, they must also appreciate the seriousness of the shortage.

*Even in the face of recognized serious shortage, only conservation minded consumers would agree that resources are more important than jobs.

*Even those who believe that they can and should help will favor refillables only if they agree that society must control resources.

(3) According to the hierarchical model, the causally prepotent belief should be the most general belief. In this inventory, the most general belief is the belief that the resource shortage is real. This belief is substantially correlated with a number of abstract and concrete environmental beliefs, and, in particular, is significantly related to the disposition toward container return requirements.

Influence of General Environmental Beliefs on Container Return Behavior is Indirect and Mediated by More Specific Beliefs

(1) Environmental behavior is substantially correlated only with the specific environmental beliefs at the bottom of the hierarchy. The highest correlation with frequency of container returns is with consumers' disposition toward container return requirements. The next highest is with the belief that society must control resource use.

Environmental behavior is correlated only minimally with environmental beliefs at the top of the hierarchy. For instance, the frequency of container returns has a very low correlation with the belief that resource shortage is real and serious and a low correlation with consumers' inclination to conserve resources.

(2) Such low correlations between specific environmental behavior and abstract environmental beliefs is explained by the presence of mediating concrete beliefs. For example, even consumers who believe they should and can help in conservation would not necessarily return beer containers unless they believe that society must control resource use. The longer the chain of mediating beliefs, the lower the correlation.

Environmental Beliefs are Logically Related

The path model shows that causal relationships follow logical relationships. For example, it is understandable that consumers who perceive shortage as real would come to consider it as serious.

Similarly, consumers who believe that societal control is necessary would come to favor container requirements.

Consumers' perceptions and preferences seem consistent. The fact that even conservation minded consumers give only lukewarm support for resource priority over jobs reflects the severe economic stress experienced by a large number of Michigan consumers.

Testing Network Hypotheses

Environmental Beliefs are Structured in a Set of Hierarchical Relations

(1) As predicted by the hierarchical model, the path analysis shows environmental beliefs to form one family.

(2) The prepotent belief is that resource shortage is real. This belief impacts on every other belief in the hierarchy. Specific environmental behavior and more specific beliefs can be logically traced all the way back to the prepotent belief.

(3) Abstract beliefs are highly correlated with each other and with beliefs at the next lower level.

(4) Environmental beliefs branch out into distinct hierarchical strings such that each string can be studied separately.

(5) The hierarchical direction is not reversible. This is shown by the fact that causal arrows are downward from more abstract to more concrete beliefs, confirming the prediction of top-down causal flows.

Environmental Beliefs are Structured from Most Abstract to Most Concrete

Environmental beliefs are arranged from most abstract and general to the most concrete and specific. This is shown by the fact that abstract beliefs (e.g. seriousness of resource shortage, need for societal control of resource use, etc.) are all found at the top. At the bottom, we have the more concrete beliefs regarding container return requirements, role of beer companies, etc. As we go down the hierarchy, we find gradually increasing concreteness in beliefs.

General vs. Specific Attitudes in the Context of the Hierarchical Model

The hierarchical model would predict that attitude-behavior correlations will be highest if both are measured at an equivalent level of specificity, and that correlations with specific behaviors are smaller if the attitude is more abstract. This is shown by the fact that container return behavior has the highest first order correlation with consumers' disposition toward container return requirements, has intermediate correlations with beliefs that consumers must conserve resources and that it would help if they conserved, and has its lowest level of correlations with beliefs that resource shortage is real and serious.

Comparison with Prior Studies

Compared with prior environmental studies, our path model suggests the need to not only know whether a person believes that the resources shortage is real, but also whether they believe the

resource shortage is serious, before they can be persuaded to become conservers. Not only must the consumers be willing to conserve, but he must believe it would help before he can be persuaded to support societal control of resource use.

Whereas prior studies hypothesized that consumers are inclined to conserve because they recognize the need for societal control over resource use, our study suggests the causal order to be the reverse. A consumer first becomes a conserver, and then because of their conservation mindedness they come to support societal control of resource use.

Contrary to the findings from prior studies, our consumers are not cynical. They do not blame either industry or government for the current resource shortage. Those who are conservers are concerned with what they themselves can do.

The Hierarchy Model and Container Return Behavior

Our study shows that there is a hierarchy of environmental attitudes which mediates the environmental attitude behavior relationship. General environmental beliefs are connected to specific environmental behaviors through causal chains leading first to more specific beliefs and then to behaviors. In such a structure, general beliefs play the dominant role in determining behavioral choice over the long run. Such general attitudes can counteract the effects of external messages on specific beliefs.

The hierarchical model is a theory of the relationship between general and specific beliefs, and between beliefs and

behavior. We need to understand this hierarchy of general and specific beliefs if we wish to understand or explain how behavior choice occurs. By recognizing the mediational effect of intervening beliefs, one could avoid misreading attitude behavior correlations.

CHAPTER VII

IMPLICATIONS AND RECOMMENDATIONS

Implications for Container Recycling

The results show that consumers in Michigan are conservation oriented. They are prepared to make reasonable adjustments in their lifestyle so long as their jobs are secure. In the background of current economic distress, strong concern is expressed over jobs. The majority of consumers are not dogmatic critics of either government or industry. They just want to help.

The lower means for specific (compared with general) environmental beliefs may indicate the need to educate consumers regarding specific environment-related issues, like bottle vs. can containers, certified vs. uncertified bottles, etc. Consumers need to be more concretely educated regarding what beer containers, certified bottles, etc. entail in terms of environment and ways in which consumers can help conservation.

The lower means may also stem from the lag in time as environmental logic works its way down the hierarchy. It is likely then that beliefs would be adopted in logical order, i.e. from the top down. Adoption of an implied belief will lag the adoption of a given belief by the time interval required for logic to work down one step.

Given the substantial conservationist sentiment found in the consumers, we ought to develop environmental programs which will help consumers along in finding concrete ways in which they can conserve resources.

Optimal Environmental Education Campaigns

Campaign Objective

Causal influence among environmental beliefs goes from top down. An optimal campaign must adapt to this logic. Permanent belief change can occur only at the top of the hierarchy. Hence the first thrust of a campaign should be aimed at achieving adoption of the most general beliefs. Once part of the population has adopted this belief, then messages can be aimed at lower beliefs. However, messages aimed at the top of the hierarchy must be continued until all those who can be persuaded at the most general level have been reached. It is the general environmental beliefs that form the basis for more specific beliefs which in turn determine behaviors.

Over time, the campaign should become more and more broadly based as more and more specific beliefs and specific behaviors are added to the growing base of the hierarchy as developed in the campaign message. As the program approaches time for specific behaviors to be stressed, consumers should be provided with concrete illustrations of how they could act to conserve resources.

Mediating Messages

The presence of mediating beliefs must be recognized in designing the message for any environmental education program.

Campaign messages must incorporate the mediating beliefs which will enable change at the higher level to induce change at the lower level. Consumers will work through such logical chains by themselves, but only slowly. If education campaign lays out the mediating steps explicitly, then consumers might change more quickly.

Failure of Direct Behavioral Campaigns

Much of advertising theory is behaviorist in orientation. These theories would argue that if you want to change a given behavior, then aim your ads at that behavior. The hierarchical model suggests that in the environmental area this strategy will fail.

Short lived promotional programs aimed at isolated behaviors will not lead to durable results. An environmental campaign aimed at a specific behavior will only temporarily modify that behavior if it leaves superordinate beliefs unchanged. Once the campaign is over, the behavior will drift back to match these unchanged beliefs.

Charting the Campaign

The planning of an optimal campaign requires knowledge of the hierarchy in which desired behaviors are embedded. The determination of this hierarchy is in part a matter of logic: the deduction of the list of beliefs which are logically antecedent to the desired beliefs. However, once a portion of the hierarchy has been mapped out, then it should be fleshed out by talking to people in the population under consideration who are most likely

to have developed hierarchies of their own, i.e. people who have had considerable experience with the relevant things, processes, or events. In this research, there was a lot of information gained by talking to beer distributors, managers of liquor departments, etc. A partial hierarchy can be used to make part of this interview a structured interview to flesh out the part of hierarchy already known and to begin the process of identifying the terminology used by that population.

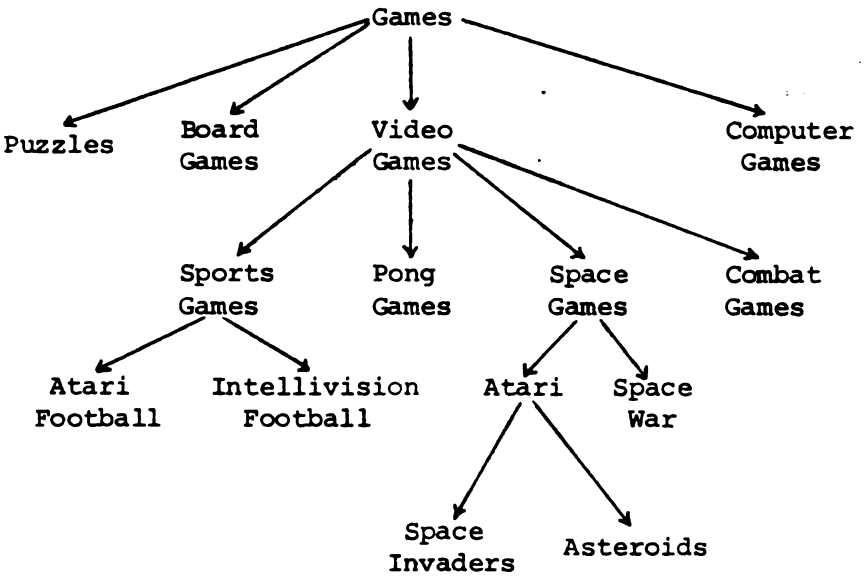
The timing of messages depends on how many persons in the population have adopted the top beliefs or the intermediate beliefs, etc. While the order of adoption of beliefs can be predicted from the model, the exact timing can not. Thus the campaign should include plans for successive polling to chart the hierarchy prior to decision points.

In charting such a program, two factors must be kept in mind: time involved in achieving visible results and differences between individuals who we are trying to influence. Environmental education takes time to yield visible results. A prepotent belief once modified takes time to filter through hierarchy of beliefs and to be translated into meaningful environmentally-oriented activities. Patience and persistence are called for. Hierarchies of environmental beliefs may also differ between individuals--in terms of differences in beliefs, in how they are related, and the strengths of such relationships.

Implications for Marketing Decisions

Study suggests need to create goodwill for the product as a whole rather than seek preference for one particular brand.

Consider the following hierarchy of Games



The market for games is limited because many adults reject games as entertainment (they are too "childish"). Here ads directed at the top might break down resistance and greatly increase the customer base. After all ads at bottom compete for fixed customer base, whereas ads at top increase customer base. Such an approach may be appropriate for companies in slow-growth industries, e.g. tobacco, tire, coffee, etc. This will especially appeal to the industry leader who is likely to benefit first from any expansion in industry demand. General Foods has shifted its advertising from building market share to building the size of the overall coffee market.

In such an effort, companies may join together to promote the industry product as a whole rather than indulge in brand-level competition in a stagnant industry. Industry level promotion is already done, for instance, in the case of cotton, milk, commercial banks, etc.

Similar arguments can be made regarding company wide advertising rather than product advertising. If the causally prepotent belief is at the level of company as a whole, then institutional advertising or image advertising may go a long way in laying ground for general goodwill. Once such a base is established, the company would use messages that link the company to lower level products. In building store loyalty, retailers realize that economic and other specific appeals become important to customers only after they perceive an initially acceptable image. A number of retailers tend to promote an overall theme rather than any one or more identifiable product line, e.g. Sears promoting price image, K-Mart promoting quality image, Macy's promoting "middle-priced department store" image, etc. Institutional advertising of the type launched by Mobil, Exxon, etc. is also aimed at building corporate goodwill and later product loyalties.

APPENDICES

APPENDIX A

QUESTIONNAIRE

SUBJECT: Survey of Environmental Attitudes and Consumption Behavior

The purpose of this survey is to describe consumers' feelings about several issues, their purchasing choices and consumption behaviors. Some people believe that the environment is in serious state and requires early action, while others say that the environmental issues such as energy are overplayed, and that there are more important public issues. Here, we seek to determine where people stand on several issues, their purchasing and consumption behaviors.

The survey consists of a set of questionnaires on the topics of natural resources, energy, beer containers, and beer purchase behavior. The instructions for filling out the pages are found at the top of each page. There are no right or wrong answers to the questionnaire statements; only your opinion is desired. Please respond to all the items.

Sometimes you may feel as though you have seen the item before. This will not be the case, so please do not look back and forth through the items. Also do not try to remember how you checked similar items earlier. Please make separate and independent judgement for each item.

Thank you very much for your cooperation.

INSTRUCTIONS: Below you will find a list of statements about Natural Resources. By "natural resources," we mean forests, metal deposits, oil, coal, etc. We would like to know your opinions in that area. Against each statement, circle the response that is closest to your own opinion:

SA = Strongly Agree D = Disagree

A = Agree SD = Strongly Disagree

N = Neither Agree nor Disagree

C 1.	We are entering a period of scarcity and shortage of most natural resources.	SA	A	N	D	SD
C 2.	Industry is largely responsible for the natural resource problem.	SA	A	N	D	SD
C 3.	Where natural resources are privately owned, society should have no control over what the owner does with them.	SA	A	N	D	SD
C 4.	Industry will act in the public interest if the government will let them.	SA	A	N	D	SD
C 5.	More emphasis should be placed on individual's economic rights than on society's natural resource rights.	SA	A	N	D	SD
C 6.	Society must ultimately control what citizens do with the nation's natural resources.	SA	A	N	D	SD
C 7.	We must enjoy life with the natural resources we now have, and let the future take care of itself.	SA	A	N	D	SD
C 8.	Government is doing nothing to alleviate the nation's natural resource shortage.	SA	A	N	D	SD
C 9.	We will have plenty of natural resources, if we just invent new processes for finding and developing them.	SA	A	N	D	SD
C 10.	If an industry is to provide jobs in certain areas, we must be ready to put up with some natural resource wastage.	SA	A	N	D	SD

C 11.	Industry will <u>never</u> do anything in the society's interest if it reduces their profits.	SA	A	N	D	SD
C 12.	The "scarcity of natural resources" is just a hoax played on the consumers.	SA	A	N	D	SD
C 13.	Consumers can do much to alleviate the natural resource shortage.	SA	A	N	D	SD
C 14.	We should turn to conserving natural resources <u>only</u> if it does <u>not</u> change our life style.	SA	A	N	D	SD
C 15.	Fear of natural resources shortage should not discourage us from using natural resources and enjoying life today.	SA	A	N	D	SD
C 16.	Many companies are working together to conserve natural resources.	SA	A	N	D	SD

INSTRUCTIONS: Below you will find a list of statements about Energy. By "energy" we mean oil, coal, natural gas, etc. We would like to know your opinions in that area. Against each statement, circle the response that is closest to your own opinion:

SA = Strongly Agree
A = Agree
N = Neither Agree nor Disagree
D = Disagree
SD = Strongly Disagree

C 17.	Many companies are working together to conserve energy resources.	SA	A	N	D	SD
C 18.	If we continue our high levels of energy use, future generations will not be able to have a level of living like ours.	SA	A	N	D	SD
C 19.	Consumers should make every effort to conserve on energy use.	SA	A	N	D	SD
C 20.	Consumers are largely responsible for the current energy shortage.	SA	A	N	D	SD
C 21.	We will have plenty of energy sources, if we just invent new processes for finding and developing them.	SA	A	N	D	SD
C 22.	The "energy crisis" is just a hoax produced by the oil companies.	SA	A	N	D	SD
C 23.	If an industry is to provide jobs in certain areas, we must be ready to put up with some energy wastage.	SA	A	N	D	SD
C 24.	We are in an "energy crisis."	SA	A	N	D	SD
C 25.	Government is doing nothing to alleviate the nation's energy problem.	SA	A	N	D	SD
C 26.	If the consumers tried to conserve energy, it would really make a difference.	SA	A	N	D	SD

C 27.	Society must ultimately control what citizens do with the nation's energy resources.	SA	A	N	D	SD
C 28.	More emphasis should be placed on individual's economic rights than on society's energy rights.	SA	A	N	D	SD
C 29.	Industry will act in the society's energy interest, if the government will let them.	SA	A	N	D	SD
C 30.	Where energy sources are privately owned, the society should have no control over what the owner does with them.	SA	A	N	D	SD
C 31.	Most energy wastage is caused by business.	SA	A	N	D	SD
C 32.	If we do nothing about it now, energy shortage will soon become the major national problem.	SA	A	N	D	SD

INSTRUCTIONS: Below you will find a list of statements about Beer Containers. We would like to know your opinions in that area. Against each statement, circle the response that is closest to your own opinion:

SA = Strongly Agree D = Disagree

A = Agree SD = Strongly Disagree

N = Neither Agree nor Disagree

C 33.	The production of metal containers uses much more energy than the production of glass containers.	SA	A	N	D	SD
C 34.	"Certified bottles" (on which we pay a cash deposit of 5¢ each) use much more energy than "uncertified bottles" (on which we pay a cash deposit of 10¢ each).	SA	A	N	D	SD
C 35.	Metal containers should be replaced by glass containers wherever possible.	SA	A	N	D	SD
C 36.	Beer companies will not promote glass containers unless the government forces them to.	SA	A	N	D	SD
C 37.	Beer companies would rather promote metal cans than glass bottles, so they can make more profit.	SA	A	N	D	SD
C 38.	I would not buy beer in metal containers if glass containers are available.	SA	A	N	D	SD
C 39.	Too much of my money is locked up in container deposits.	SA	A	N	D	SD
C 40.	Forced deposit has resulted in needless disruptions all around.	SA	A	N	D	SD
C 41.	The amount of metal used in making beer cans is so insignificant that I would not worry about it.	SA	A	N	D	SD
C 42.	The production of metal containers uses scarcer raw materials than the production of glass containers.	SA	A	N	D	SD

C 43.	The amount of energy resources used in beer cans is so insignificant that I would not worry about it.	SA	A	N	D	SD
C 44.	I should have the freedom to buy the beer container I like.	SA	A	N	D	SD
C 45.	I hate the thought of returning empty beer containers to the store.	SA	A	N	D	SD
C 46.	"Certified bottles" (on which we pay a cash deposit of 5¢ each) use much more natural resources than "uncertified bottles" (on which we pay a cash deposit of 10¢ each).	SA	A	N	D	SD

BEER PURCHASE BEHAVIOR

In this section are listed a number of questions regarding yourself as beer purchase/consumer.

Please respond to them as asked.

C 47. Do you drink beer?

_____ YES

_____ NO

C 48. Do you buy beer?

_____ YES

_____ NO

If YES to Question 48 and NO to Question 47, answer Question 49-55 and then STOP.

If YES to Question 47 and NO to Question 48, SKIP Questions 49-55. GO to Question 56 and continue.

If YES to BOTH Questions 47 and 48, please GO right AHEAD and complete all the questions.

C 49-54. Listed below are the features generally considered in purchasing beer. Rank order them in terms of their importance to you.

(1 = Most Important . . . . . 6 = Least Important)

_____ Price of beer

_____ Brand name

_____ Taste

_____ Package type (glass or can)

_____ Package size

_____ Container deposit

C 55. Check one of the following:

_____ I would buy any brand if it were the cheapest

_____ I would buy only certain brand(s)

_____ I would buy that beer which has the taste I like

_____ None of the above

C 56-86. For <u>each</u> brand below, mark 1 beside those that are <u>your favorites</u>; 2 beside those you have tried and <u>liked</u>; 3 beside those you have either <u>not tried</u> or <u>indifferent to</u>; 4 beside those you have tried and <u>disliked</u>; and 5 beside those you have tried and <u>really hate</u>.

____ Blatz
____ Braumeister
____ Budweiser
____ Busch
____ Colt 45
____ Coors
____ Falstaff
____ Guiness
____ Heineken Light
____ Heineken Dark
____ Labatts
____ Lite
____ Michelob
____ Michelob Light
____ Miller
____ Molson
____ Natural Light
____ Old Milwaukee
____ Olympia
____ Pabst
____ Pabst Light
____ Schlitz
____ Schlitz Malt
____ Stroh
____ Stroh Light

Any brand left out? Please specify.

....

....

C 87-117. For each brand below, mark 1 beside those you would always buy if available in the store and you could afford it; 2 beside those that you would also buy; 3 beside those you are indifferent to; 4 beside those you would buy only if you had to; and 5 beside those you would never buy.

____ Blatz
____ Braumeister
____ Budweiser
____ Busch
____ Colt 45
____ Coors
____ Falstaff
____ Guiness
____ Heineken Light
____ Heineken Dark
____ Labatts
____ Lite
____ Michelob
____ Michelob Light
____ Miller
____ Molson
____ Natural Light
____ Old Milwaukee
____ Olympia
____ Pabst
____ Pabst Light
____ Schlitz
____ Schlitz Malt
____ Stroh
____ Stroh Light

Any brand left out? Please specify.

....

....

C 118. How often do you generally return beer containers to the store?

_____ Almost always
_____ Generally
_____ Infrequently
_____ Almost never

C 119-121. After consuming the beer you buy, how often do you return the empty containers to the store? Check for each use condition separately.

A. Small Indoor Parties:

____ Almost always
____ About three-quarters of the time
____ About half of the time
____ About one-quarter of the time
____ Almost never

B. Large Indoor Parties:

____ Almost always
____ About three-quarters of the time
____ About half of the time
____ About one-quarter of the time
____ Almost never

C. Picnics or Other Outdoor Parties:

____ Almost always
____ About three-quarters of the time
____ About half of the time
____ About one-quarter of the time
____ Almost never

APPENDIX B

GROUPING OF QUESTIONNAIRE ITEMS

The questionnaire items were grouped into environmental belief and behavior scales as follows:

Scale 501, Society Must Control Resource Use

5. More emphasis should be placed on individual's economic rights than on society's natural resource rights.

28. More emphasis should be placed on individual's economic rights than on society's energy rights.

30. Where energy sources are privately owned, the society should have no control over what the owner does with them.

3. Where natural resources are privately owned, the society should have no control over what the owner does with them.

6. Society must ultimately control what citizens do with the nation's natural resources.

27. Society must ultimately control what citizens do with the nation's energy resources.

Scale 502, Resources More Important than Jobs

23. If an industry is to provide jobs in certain areas, we must be ready to put up with some energy wastage.

10. If an industry is to provide jobs in certain areas, we must be ready to put up with some natural resource wastage.

Scale 503, Industry Will Not Act on Their Own

4. Industry will act in the public interest if the government will let them. (Re: Natural Resources)

29. Industry will act in the society's energy interest, if the government will let them.

Scale 504, Consumers Must Conserve Resources

7. We must enjoy life with the natural resources we now have, and let the future take care of itself.

15. Fear of natural resources shortage should not discourage us from using natural resources and enjoying life today.

14. We should turn to conserving natural resources only if it does not change our life style.

Scale 505, Resource Shortage is Real

12. The "scarcity of natural resources" is just a hoax played on the consumers.

22. The "energy crisis" is just a hoax produced by the oil companies.

9. We will have plenty of natural resources, if we just invent new processes for finding and developing them.

21. We will have plenty of energy sources, if we just invent new processes for finding and developing them.

Scale 506, Resource Shortage is Serious

1. We are entering a period of scarcity and shortage of most natural resources.

18. If we continue our high levels of energy use, future generations will not be able to have a level of living like ours.

24. We are in an "energy crisis".

32. If we do nothing about it now, energy shortage will soon become the major national problem.

Scale 507, Consumers Can Help

19. Consumers should make every effort to conserve on energy use.

26. If the consumers tried to conserve energy, it would really make a difference.

20. Consumers are largely responsible for the current energy shortage.

13. Consumers can do much to alleviate the natural resource shortage.

Scale 508, Industry Not Doing Their Best

16. Many companies are working together to conserve natural resources.

17. Many companies are working together to conserve energy resources.

31. Most energy wastage is caused by business.

2. Industry is largely responsible for the natural resource problem.

11. Industry will never do anything in the society's interest if it reduces their profits.

Scale 509, Resources Used in Cans Significant

41. The amount of metal used in making beer cans is so insignificant that I would not worry about it.

43. The amount of energy resources used in beer cans is so insignificant that I would not worry about it.

Scale 510, Prefer Glass Over Metal Containers

35. Metal containers should be replaced by glass containers wherever possible.

33. The production of metal containers uses much more energy than the production of glass containers.

38. I would not buy beer in metal containers if glass containers are available.

42. The production of metal containers uses scarcer raw materials than the production of glass containers.

Scale 511, Beer Companies Prefer Can Containers

36. Beer companies will not promote glass containers unless the government forces them to.

37. Beer companies would rather promote metal cans than glass bottles, so they can make more profit.

Scale 512, Favor Container Return

40. Forced deposit has resulted in needless disruptions all around.

39. Too much of my money is locked up in container deposits.

45. I hate the thought of returning empty beer containers to the store.

44. I should have the freedom to buy the beer container I like.

Scale 513, Certified Bottles Conserve Resources

34. "Certified bottles" (on which we pay a cash deposit of 5¢ each) use much more energy than "uncertified bottles" (on which we pay a cash deposit of 10¢ each).

46. "Certified bottles" (on which we pay a cash deposit of 5¢ each) use much more natural resources than "uncertified bottles" (on which we pay a cash deposit of 10¢ each).

Scale 514, Government is Doing Nothing

8. Government is doing nothing to alleviate the nation's natural resources.

25. Government is doing nothing to alleviate the nation's energy problem.

Scale 516, Frequency of Container Return

118. Frequency with which beer containers are returned to the store.

119. Frequency with which empty beer containers are returned to the store after small indoor parties.

120. Frequency with which empty beer containers are returned to the store after large indoor parties.

121. Frequency with which empty beer containers are returned to the store after picnics or other outdoor parties.

APPENDIX C

FACTOR INTERCORRELATIONS AND LOADING MATRIX

	5	28	30	3	6	27	23	10	4	29	7	15	14	12	22	9
5	36	51	32	40	28	24	32	29	29	25	27	14	26	19	11	24
28	51	32	36	39	20	21	27	29	22	25	32	22	30	16	17	17
30	32	36	38	51	29	30	20	12	23	24	27	20	30	23	16	16
3	40	39	51	41	31	23	18	13	16	21	28	17	28	27	13	20
6	28	20	29	31	32	57	7	6	14	22	23	8	12	12	-6	12
27	24	21	30	23	57	27	8	7	4	7	14	-4	17	14	12	11
23	32	27	20	18	7	8	73	71	20	20	18	14	21	19	7	6
10	29	29	12	13	6	7	71	73	19	18	18	10	15	18	-2	11
4	29	22	23	16	14	4	20	19	61	58	24	12	17	5	-9	12
29	25	25	24	21	22	7	20	18	58	61	15	14	20	2	1	18
7	27	32	27	28	23	14	18	18	24	15	46	32	42	27	11	17
15	14	22	20	17	8	-4	14	10	12	14	32	24	27	15	11	13
14	26	30	30	28	12	17	21	15	17	20	42	27	37	33	23	18
12	19	16	23	27	12	14	19	18	5	2	27	15	33	36	53	33
22	11	17	16	13	-6	12	7	-2	-9	1	11	11	23	53	41	32
9	24	17	16	20	12	11	6	11	12	18	17	13	18	33	32	43
21	10	16	5	15	10	22	-2	5	-1	1	1	4	1	22	28	50
1	19	7	16	12	17	20	1	0	4	14	11	13	17	39	33	25
18	31	25	25	27	26	30	11	7	10	21	19	24	36	29	26	31
24	12	14	21	4	-1	16	11	4	8	10	19	21	29	38	45	23
32	19	21	23	9	9	23	15	15	2	15	19	16	38	26	32	16
19	21	23	17	19	16	27	18	12	-3	2	23	15	39	21	23	16
26	7	13	22	8	0	18	10	7	-3	-10	10	10	22	22	20	10
20	9	9	8	8	12	23	7	0	-11	-9	3	3	10	7	19	7

*Communality in the Diagonal

	5	28	30	3	6	27	23	10	4	29	7	15	14	12	23	9
13	20	10	4	8	7	13	12	6	3	-4	19	5	19	23	13	3
16	4	8	13	12	15	8	10	13	22	28	6	13	-7	7	-5	12
17	12	14	15	5	18	8	11	7	27	31	3	12	-2	2	1	18
31	2	9	0	1	5	0	-3	5	26	28	0	5	-12	-7	-4	13
2	12	5	4	5	14	8	-1	9	22	23	3	6	-7	-3	-8	7
11	3	7	10	4	7	8	7	8	18	24	0	0	-6	-2	-8	0
41	10	20	19	17	17	11	9	12	10	16	20	8	24	9	7	20
43	14	17	20	19	9	8	9	12	13	19	21	9	29	12	12	23
35	7	0	9	6	13	17	3	5	13	14	1	-5	7	1	-2	13
33	0	1	0	-1	-1	-1	0	5	15	7	4	-1	-2	2	1	17
38	-4	1	1	0	8	9	-1	9	9	9	-2	0	4	-3	-8	6
42	6	3	11	9	3	5	9	0	20	17	9	0	10	7	4	9
36	6	9	7	2	17	20	5	8	14	17	5	-2	-2	-4	-3	11
37	7	9	7	0	11	12	1	-1	11	8	5	-2	5	-3	-3	7
40	19	21	28	28	23	14	13	12	16	20	27	20	20	26	21	34
39	14	18	28	27	23	24	7	2	13	13	18	6	14	18	14	29
45	14	15	17	21	14	17	12	8	6	7	12	20	12	18	15	27
44	13	19	23	20	6	10	19	19	15	12	18	13	8	14	11	19
34	7	6	8	0	0	4	13	10	-1	7	0	0	-3	1	6	-3
46	3	6	12	3	2	9	7	5	3	1	8	-9	-3	8	10	9
8	-7	-1	-2	-4	9	-2	2	8	9	11	-15	-3	-10	-17	-14	-7
25	-11	2	-2	-10	-6	9	2	1	9	11	-9	-5	-7	-25	-23	-8
49	-10	-6	0	3	-5	-4	-8	-6	-12	-8	-3	5	-6	-6	-1	-6
50	8	19	4	-1	-9	-4	6	7	8	3	-3	1	-3	7	3	-8

	5	28	30	3	6	27	23	10	4	29	7	15	14	12	23	9
51	-5	-7	2	-8	1	2	-3	-5	-10	-7	6	-5	-3	-1	0	3
52	0	0	6	2	-2	-5	2	4	0	-4	-2	0	-1	-6	-4	4
53	2	0	3	2	-11	-10	8	10	2	-1	14	5	7	12	0	6
54	1	13	2	1	-14	-9	6	11	7	-1	6	8	9	-2	1	-9
119	17	9	19	18	14	3	11	8	13	7	8	1	12	5	-3	8
120	8	4	12	15	10	0	-2	-2	5	-2	6	4	11	6	-2	7
121	12	10	16	19	18	13	3	3	0	-4	10	-2	16	11	3	3
122	1	-1	-3	0	-4	-4	-14	-12	-5	0	-9	-2	-5	-2	4	-5
123	-4	-3	-2	-3	-7	-5	-8	-7	0	5	-12	2	-3	5	9	2
124	1	-4	-3	-1	10	4	-9	-5	3	13	1	2	7	3	3	3
118	11	17	14	9	18	8	7	3	6	2	5	4	8	7	7	6
501	60	57	61	64	56	52	32	27	31	35	43	22	41	32	18	29
502	36	33	18	18	8	9	85	85	23	22	21	14	21	22	3	10
503	35	31	30	24	23	8	26	24	77	77	25	17	24	5	-5	20
504	38	48	43	41	24	16	29	24	30	28	68	47	60	42	25	28
505	26	27	25	31	12	24	12	13	3	9	23	18	31	60	64	65
506	32	27	33	20	20	35	15	10	9	23	27	29	47	52	54	38
507	25	24	23	19	15	36	21	11	-6	-9	25	14	40	32	34	16
508	13	16	16	10	22	12	9	16	44	51	5	14	-13	-1	-9	19
509	15	23	24	22	16	12	11	14	14	21	25	11	32	12	11	26
510	4	2	11	7	11	15	1	10	29	23	5	-3	9	9	-3	-3
511	9	12	10	1	19	21	4	4	17	16	7	-3	2	-5	-4	12
512	23	27	36	36	25	24	19	15	19	20	28	22	20	28	23	41
513	6	8	13	2	1	8	12	9	2	5	5	-6	-4	6	10	4

	5	28	30	3	6	27	23	10	4	29	7	15	14	12	23	9
514	-11	1	-3	-9	-4	-1	2	6	11	14	-15	-5	-11	-27	-24	-10
515	-2	8	7	-1	-17	-12	5	9	-2	-7	7	6	1	1	0	-5
516	15	9	19	21	17	7	5	4	7	1	10	2	16	8	-1	7
517	0	-4	-4	-2	-1	-3	-16	-12	-1	9	-10	1	-1	3	8	0
518	11	17	14	9	18	8	7	3	6	2	5	4	8	7	7	6
	21	1	18	24	32	19	26	20	13	16	17	31	2	11	41	43
5	10	19	31	12	19	21	7	9	20	4	12	2	12	3	10	14
28	16	7	25	14	21	23	13	9	10	8	14	9	5	7	20	17
30	5	16	25	21	23	17	22	8	4	13	15	0	4	10	19	20
3	15	12	27	4	9	19	8	8	8	12	5	1	5	4	17	19
6	10	17	26	-1	9	16	0	12	7	15	18	5	14	7	17	9
27	22	20	30	16	23	27	18	23	13	8	8	0	8	8	11	8
23	-2	1	11	11	15	18	10	7	12	10	11	-3	-1	7	9	9
10	5	0	7	4	15	12	7	0	6	13	7	5	9	8	12	12
4	-1	4	10	8	2	-3	-3	-11	3	22	27	26	22	18	10	13
29	1	14	21	10	15	2	-10	-9	-4	28	31	28	23	24	16	19
7	1	11	19	19	19	23	10	3	19	6	3	0	3	0	20	21
15	4	13	24	21	16	15	10	3	5	13	12	5	6	0	8	9
14	1	17	36	29	38	39	22	10	19	-7	-2	-12	-7	-6	24	29
12	22	39	29	38	26	21	22	7	23	7	2	-7	-3	-2	9	12
22	28	33	26	45	32	23	20	19	13	-5	1	-4	-8	-8	7	12
9	50	25	31	23	16	16	10	7	3	12	18	13	7	0	20	23
21	29	20	23	15	9	12	16	13	-7	12	8	1	1	-2	-1	-2

	21	1	18	24	32	19	26	20	13	16	17	31	2	11	41	43
1	20	37	44	42	31	21	3	20	12	11	9	16	23	10	9	5
18	23	44	42	41	37	44	18	19	13	3	11	13	8	16	14	19
24	15	42	41	49	46	32	24	18	19	-1	3	2	2	1	13	17
32	9	31	37	46	35	38	16	17	15	-1	3	7	-5	9	20	18
19	12	21	44	32	38	37	34	35	31	-12	-3	-5	-3	0	19	20
26	16	3	18	24	16	34	42	38	32	-17	-13	-22	-8	-11	8	16
20	13	20	19	18	17	35	38	29	19	0	-4	-11	9	-6	2	3
13	-7	12	13	19	15	31	32	19	22	-16	-10	-12	0	-1	2	3
16	12	11	3	-1	-1	-12	-12	0	-16	29	56	13	21	23	1	7
17	8	9	11	3	3	-3	-13	-4	-10	56	44	23	24	29	7	0
31	1	16	13	2	7	-5	-22	-11	-12	13	23	23	45	21	8	10
2	1	23	8	2	-5	-3	-8	9	0	21	24	45	27	19	2	-3
11	-2	10	16	1	9	0	-11	-6	-1	23	29	21	19	17	-3	-5
41	-1	9	14	13	20	19	8	2	8	1	7	8	2	-3	69	66
43	-2	5	19	17	18	20	16	3	10	-7	0	10	-3	-5	66	69
35	4	11	16	13	20	12	7	7	3	5	7	18	3	20	22	17
33	9	2	3	8	2	-10	-8	-4	-2	10	7	12	4	9	16	13
38	4	1	3	2	6	6	7	-1	0	14	11	10	10	12	22	18
42	-3	7	9	10	10	2	-3	-3	-2	2	3	9	9	2	25	20
36	5	17	15	11	14	2	-9	4	-3	13	14	10	10	19	18	9
37	1	5	9	10	15	5	-3	8	-9	11	9	6	6	17	11	4
40	16	16	20	10	13	12	9	2	9	6	7	5	0	-2	31	29
39	14	15	13	7	9	15	10	5	5	-2	2	-2	-4	0	24	24
45	9	14	19	15	14	15	2	1	5	6	4	3	-2	-1	18	19

	21	1	18	24	32	19	26	20	13	16	17	31	2	11	41	43
44	13	0	11	3	12	8	4	-9	3	9	8	2	-3	13	21	22
34	-7	-1	1	7	-4	-5	13	0	1	-5	-5	-4	-5	-1	13	23
46	3	5	4	9	0	-1	0	-3	4	0	0	7	-3	1	18	19
8	-7	4	6	-5	2	1	-15	-3	-4	14	19	16	5	25	0	-2
25	-11	-9	-5	-10	-4	-2	-11	-11	-4	20	26	8	-3	19	5	-5
49	-9	6	3	0	7	-3	4	6	-6	-4	-8	5	-1	-3	-9	-2
50	-3	-6	-4	7	-5	-5	-2	-7	-1	4	6	-1	4	3	-9	-14
51	1	7	8	8	11	3	-12	-6	-8	3	1	2	-3	7	-6	-6
52	5	-10	-4	-5	-6	2	10	0	6	-9	-6	-10	-9	-3	2	1
53	-7	-4	-2	6	-1	4	8	-9	3	1	-2	-4	1	2	6	5
54	-12	-5	5	1	5	10	2	1	7	-1	6	-6	-2	14	-10	-9
119	-1	2	19	-5	-1	14	7	-2	8	3	8	2	9	7	10	15
120	0	5	14	1	0	14	1	-5	5	-1	0	-4	2	4	7	10
121	-6	3	14	4	6	22	5	-2	14	-3	0	-9	1	0	14	14
122	0	6	-4	-5	-3	-12	-3	2	-10	-2	2	12	8	-3	1	6
123	-1	5	-9	-6	-1	-14	-5	0	-10	-3	8	12	5	-7	-2	0
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33	0	12	6	-11	16	17	54	32	17	11	1	-3	-8	1	-5
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42	11	7	15	-3	10	27	34	11	14	19	-2	-4	2	8	-10
36	0	4	22	-3	25	16	37	75	16	2	18	2	5	-3	7
37	5	1	16	0	19	9	37	75	15	-10	9	6	5	-4	-3
40	38	40	23	15	6	37	17	12	79	13	-7	-6	14	2	9
39	22	31	18	15	-2	30	18	10	82	16	-4	-3	22	6	22
45	25	28	24	10	4	23	13	8	69	8	-5	-3	24	9	28

	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518
44	22	24	10	3	12	26	25	25	36	3	1	4	18	-12	14
34	-2	-1	1	4	-8	22	18	-8	9	79	-10	0	-3	2	6
46	-2	10	7	0	2	23	22	-1	15	79	-3	-4	1	1	3
8	-15	-19	3	-9	30	-1	12	13	-3	-6	77	1	6	-7	-2
25	-12	-28	-11	-12	27	0	3	14	-5	-7	77	-1	0	-4	-1
49	-2	-9	1	0	-4	-6	-8	3	-11	-6	-4	38	-7	-6	-5
50	-3	0	-3	-7	6	-14	-15	1	-2	1	1	32	4	-5	1
51	-1	1	13	-10	4	-7	-5	13	8	-5	4	27	4	4	-2
52	-2	0	-10	8	-14	1	4	-11	4	2	-8	32	0	8	2
53	15	4	0	3	-1	7	5	4	5	12	-7	51	6	-13	2
54	13	-9	3	9	4	-12	-9	3	-11	-10	14	62	3	-16	1
119	12	4	6	12	11	15	2	10	28	-1	4	2	84	-9	51
120	12	4	8	7	1	10	-2	6	19	-3	4	5	87	-11	34
121	14	5	11	17	-4	17	-2	0	25	0	2	3	79	-8	48
122	-9	-1	-3	-10	7	4	4	-14	-8	2	0	-9	-15	78	-5
123	-8	6	-5	-13	5	-1	6	-9	-2	2	-12	-11	-17	83	-10
124	6	4	8	-1	11	16	24	15	14	0	-1	-3	10	37	12
118	10	8	3	13	10	15	-9	2	28	6	-2	-1	53	-1	100
501	60	42	48	41	26	32	14	21	49	11	-8	-4	25	-4	22
502	31	15	15	19	15	15	6	5	20	13	5	8	5	-16	6
503	37	8	21	-10	62	23	33	22	25	4	17	-6	5	5	5
504	100	41	59	45	3	38	7	4	40	-2	-18	8	15	-5	10
505	41	100	70	40	7	20	13	3	47	6	-30	-6	5	4	8
506	59	70	100	58	21	28	24	25	28	5	-5	1	10	0	3

	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518
507	45	40	58	100	-25	24	2	-2	16	3	-14	1	14	-12	13
508	3	7	21	-25	100	2	34	30	7	-4	37	-2	3	12	10
509	38	20	28	24	2	100	46	17	43	28	-1	-13	17	10	15
510	7	13	24	2	34	46	100	59	27	25	10	-12	-1	17	-9
511	4	3	25	-2	30	17	50	100	21	-6	18	5	6	-4	2
512	40	47	28	16	7	43	27	21	100	15	-5	-3	29	2	28
513	-2	6	5	3	-4	28	25	-6	15	100	-8	-2	-2	2	6
514	-18	-30	-5	-14	-37	-1	10	18	-5	-8	100	0	4	-7	-2
515	8	-6	1	1	-2	-13	-12	5	-3	-2	0	100	4	-12	-1
516	15	5	10	14	3	17	-1	6	29	-2	4	4	100	-11	53
617	-5	4	0	-12	12	10	17	-4	2	2	-7	-12	-11	100	-1
518	10	8	3	13	10	15	-9	2	28	6	-2	-1	53	-1	100

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