Simulation survey techniques to assess consumer travel behavior under conditions of energy constraint: a phenomenological model of decision making

Kathleen Mae Waggoner
Iowa State University
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Simulation survey techniques to assess consumer travel behavior under conditions of energy constraint: A phenomenological model of decision making

by

Kathleen Mae Waggoner

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For the Graduate College

Iowa State University
Ames, Iowa
1983

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CHAPTER I. INTRODUCTION AND STATEMENT OF THE PROBLEM

Anyone who is older than ten can remember automobiles. They dwindled. At first the price of gasoline climbed. Finally only the well-to-do drove and that was too clear an indication that they were filthy rich, so any automobile that dared show itself on a city street was over-turned and burned. Rationing was introduced to "equalize sacrifice", but every three months the ration was reduced. Cars just vanished and became a part of the metal resource.

Isaac Asimov

If "crisis" is defined as a paralyzing catastrophe, then this country is not yet faced with an energy crisis of crippling dimensions; nor is such a crisis inevitable (Freeman, 1973:1). Nonetheless, at the rate gasoline is being used, it is only a matter of time before the United States begins to suffer the consequences associated with past energy policies which have consistently advocated "promotion, growth, and the lavish use of energy" (Freeman, 1973:1). Many consumers appear to believe they have an "inalienable, God-given right to travel when, where, and in whatever manner they please" (Henderson, 1978a:17). Some believe the threat of an energy crisis is merely an attempt by oil producing countries and oil companies to create an artificially scarce market which will drive up prices (Brunner and Bennett, 1978:240; Henderson, 1978a:129). Still others believe either that the problem will go away (Brunner and Bennett, 1978:240; Fusso, 1978:129) or that it will somehow be resolved within five to ten years (Murray et al., 1974:258; Brunner and Bennett, 1978:240).

Consistent with the consumer beliefs stated above, comes the
realization that Americans are continuing to consume gasoline at an alarming rate.

The average yearly increase in energy demand has been nearly five percent since the mid-sixties - that is a doubling of energy consumption in fourteen to fifteen years. (Freeman, 1973:15)

Consumers do not seem to realize, either out of ignorance or perversity, that gasoline, unlike a renewable resource, cannot be recycled or re-generated (Henderson, 1978 a:15). Many still maintain that American "know-how" will provide alternate energy sources within a decade (Murray et al., 1974; Moncrief et al., 1977; Brunner and Bennett, 1978; Fusso, 1978; Richman, 1979). For example, in a nationwide study by Richman (1979:581), it was found that eight-six percent of the American public was optimistic about the ability of this country to solve the energy problem by technological discoveries and developments (called the "technological fix").

Faith in science and technology coupled with a general mistrust of oil companies have led to a great deal of "public disbelief that the United States faces a severe energy shortage" (Richman, 1979:581). Research conducted since 1973 has yielded evidence that the majority of American consumers do not believe either in the reality of the present energy supply problems nor in future availability problems (Murray et al., 1974; Ball, 1977; Moncrief et al., 1977; Brunner and Bennett, 1978; Fusso, 1978; Richman, 1979; Shippee, 1981). As Shippee (1981:35) points out:

The frequency of disbelievers appears to be between sixty-three and seventy-seven percent. Note that such
polls sample a stratified, random sample of all Americans and not just a particular sub-population.

Misplaced faith in conjunction with the credibility problem are, according to Richman (1979:581) and Shippee (1981:35), the most pressing obstructions to a comprehensive national energy policy.

It is not difficult to understand why American consumers are not taking the energy crisis seriously. On the one hand, conservation slogans such as "Don't be fuelish", "SAVAGALLONOFGASADAY", and "Trim it to the limit", are made readily available for public acceptance. On the other hand, American businesses continue to promote "energy wasting goods from recreational vehicles to throwaway aluminum and plastic containers" (Henderson, 1978a:15). As Henderson (1978a:15) further points out:

Those in positions of leadership, from politicians to academicians still cannot agree - even within their own ranks - on whether an energy crisis exists and if so what can be done about it.

A number of researchers have also argued that much of the dilemma continues because the energy crisis is viewed largely in terms of supply and demand economics (Freeman, 1973; Brunner and Bennett, 1978, Henderson, 1978a; Shippee, 1981; Marbach et al., 1982). The assumption is made that the solution to the energy problem can be found in higher prices which will invariably lead to newfound supplies of oil. This assumption carries with it the probability of creating a dangerous imbalance in the American energy budget. Henderson (1978a:16) accusingly states that the American petroleum system itself, is, in large part, to blame for the public's disbelieving attitude toward the energy crisis.
because it will:

keep meeting demand as long as customers have money
to spend - no matter what the impact on the nation's
economic, international, or environmental well-being.
In effect, the petroleum system will survive by para-
sitically debilitating the larger national system.

The implication seems relatively clear. Until there is an attempt made
by researchers and policy makers to eliminate market-oriented solutions
to the energy crisis, the American public will refuse to see the severity
of the situation.

Disbelief in the energy crisis is further aggravated by worldwide
oil gluts which have appeared from time to time since 1973 (Henderson,
1978a; Shippee, 1981; Marbach et al., 1982). For example, in 1978 the
world experienced an oil glut which was "particularly attributed to the
1.2 million barrels of crude oil a day temporarily flowing from the
Alaskan North Slope" (Henderson, 1978a:15). As a result of this glut,
petroleum and gasoline were both plentiful and cheap. In 1982, the
world market has again been swamped with oil. This too has had an over-
all dramatic effect on the supply and price of gasoline. For example,
in some areas of the country there are signs in service stations adver-
tising gasoline wars and in Oklahoma gasoline is selling for as little
as eighty-nine cents a gallon (Marbach, et al., 1982:56).

Energy Secretary James B. Edwards has warned that this most recent
oil glut has:

lulled the United States into a false sense of secur-
ity. With energy prices dropping there may not be
the driving incentive to develop new sources of energy.
(Marbach et al., 1982:64)
This false sense of security might well lead to an American economy hooked on an ever-increasing need for oil and consequently a rising dependence on foreign imports. The danger in this has been pointed out by Cook et al., 1982:56). They indicate that the reasons for the oil glut are unclear:

Dark motive? Some analysts suggest that the "kingdom" may be overproducing to punish OPEC price hawks - as Kaddafi charges - and, as a consequence, impose a harsh discipline on an unruly cartel. They can certainly afford it. Unlike some of their OPEC partners, such as Nigeria, the Saudis have been able to make their high prices stick. "Their losses are zero," says Theodore R. Eck, chief economist for Standard Oil of Indiana. But the Saudis may also have a darker motive. With huge reserves, they may be allowing prices to erode to keep the world economy hooked on oil. If so, the strategy may already be working. Refiners have sharply drawn down crude-oil-inventories, leaving consuming nations more dependent on Saudi supplies. At the same time, U.S. oil exploration has begun to level off. Declining oil prices may bring some immediate relief to a depressed world economy, but the Saudi-enforced cheaper crude may set up the world for another oil shock.

It appears that American consumers have two basic choices. As Marbach et al. (1982:56) ask:

Will Americans fire up the gas guzzlers again and go for another oil-fueled joyride? Or can they reap the benefits of lower prices - and yet not get hooked again on cheap oil?

The answers to the questions posed above are important. The use of energy touches every aspect of American life. Because of this, any constraint inflicted by energy shortages (e.g., conservation measures or rationing) is liable to bring about negative public sentiments. These sentiments may take a number of forms such as "public resistance, opposition, political pressure, or conflicts of interest" (Cetron and Coates,
1974:37). Past evidence also indicates a general reluctance on the part of the American people to alter travel behavior in response to the energy crisis (Murray et al., 1974; Brunner and Bennett, 1978; Fusso, 1978; Richman, 1979). Past and present levels of gasoline consumption and consumer travel behavior consistently reflect strongly-held preferences for modes of travel which provide flexibility, mobility, and individual freedom (Freeman, 1973; Richman, 1979; Martin, 1981). As Shippee (1981:35) has found, consumers are neither convinced of the seriousness of the problem nor do they appear to be willing to voluntarily alter their travel behavior patterns. Brunner and Bennett (1978:240) point out the critical nature of this situation as follows:

Since the Mideast oil embargo in 1973, American consumers have been subjected to a multi-faceted program to cope with the energy crisis. Early in 1977, President Carter presented to Congress his proposed solution to deal with the energy problems, asserting that the challenge was the moral equivalent of war. Consumers have been warned that the energy problem is so serious that it contains the seeds of depression, revolution, and even world war if it is not dealt with successfully. Unfortunately, history clearly indicates that if consumers are not convinced of the seriousness of the problem, and are not willing to work effectively under a program designed to alleviate its hardships, any program is doomed to failure.

Public sentiment appears to be one of reluctance to voluntarily conserve gasoline, disbelief, and skepticism. Thus, it appears essential that transportation researchers and policy makers discover the appropriate blend of inducements needed to ingrain a conservation ethic into the American consumer. This need is critical because in the event of a sudden cutback in the supply of gasoline, the need for rationing might well
become a reality. The American way of life would undoubtedly change drastically (Brunner and Bennett, 1978; Henderson, 1978a). Americans might be forced to rearrange their travel priorities. They may find themselves leading a relatively inflexible style of life because of travel constraints. They may even find the need to redefine some degree of their individuality and lower their standards of living.

It was found by Brunner and Bennett (1978), Fusso (1978), and Richman (1979) that a majority of people felt any mandatory conservation measure would impose too much of a personal hardship on the American public. Consequently, "it was concluded that there was little reason to believe the American public would support gasoline rationing" (Murray et al., 1974; Brunner and Bennett, 1978; Fusso, 1978; Richman, 1979).

Nonetheless, Henderson (1978a:17) indicates that:

To end the energy crisis, the United States must abandon its near total reliance on high oil prices and turn to noneconomic strategies of which the most effective, equitable, and noninflationary is gasoline rationing.

They further argue (Henderson, 1978a:17) that rationing is the only strategy which would give the United States instant regulation over:

the consumption factor of the petroleum equation while alerting the American people to the reality of the energy crisis, as the "rationing by price" efforts have completely failed.

Rationing would, in addition, provide the federal government with the power needed to decelerate, arrest, and redirect the gluttonous and destructive expansion of United States energy consumption (Murray et al., 1974; Brunner and Bennett, 1978; Henderson, 1978a; Shippee, 1981;
Marbach et al., cited in Newsweek, 1982). Further, it would provide consumers with the freedom to end gasoline waste by allowing them to establish their own travel priorities. For example, as Henderson (1978a:17) suggests:

Gasoline rationing would give the country the flexibility to slash its consumption of foreign oil by simply eliminating the more outrageous forms of waste such as our ubiquitous national pastime of driving around looking for something to do.

This form of energy conservation should encourage American consumers to save their gasoline rations for trips they feel are of the highest priority whether they are driving to work, transporting children to and from school activities, vacation driving, or social activities.

Statement of the Problem

In an attempt to address the types of energy policies which may be designed, evaluated, and disseminated to encourage consumer belief in and acceptance of gasoline rationing, the goals of this study will be:

1. To develop a model of decision making which will permit an accurate understanding of consumer travel behavior under conditions of energy constraint.

2. To attempt to understand ways in which individuals perceive and interpret consequences associated with constraints in mobility and transportation resources.

3. To assess the impact of these consequences on consumer attitude toward gasoline rationing.

The problem addressed focuses on the need for a methodology yielding new insights into:

1. The impact of energy scarcity upon the individual's decision-making process.
2. The impact of energy scarcity upon consumer travel behavior.

It is believed there is a need for answers to specific questions about the effects of future energy shortages upon consumer attitude and travel behavior. Two questions believed to be the most critical are:

1. At what point will American consumers cut back on their current levels of transportation mobility?

2. At what point will American consumers reduce their mobility at the cost of altering their styles of living?

Limitations of Existing Research into Consumer Response to the Energy Crisis

Previous attempts to answer the questions stated above have been severely restricted. The reason for this is that, for the most part, methods of assessing the wide range of possible consumer responses to an energy shortage of unknown boundaries have tended to focus primarily on "attitude evaluations" about:

1. The seriousness of the problem (Murray et al., 1974; Fusso, 1978; Richman, 1979).


3. Consumer belief in the reality of the problem (Brunner and Bennett, 1978; Richman, 1979).

The inadequacies associated with these attitude evaluations used to predict future behavior are readily apparent. As it has been pointed out by Allen et al. (1980),

The body of research that has sought to link attitudes and behavior has been notoriously unsuccessful. Either there exists little relationship at all between people's
professed attitudes and their behavior or, if there is a relationship, in many instances it is negative.

One of the most critical problems is that the term "attitude" itself has been defined in no less than thirty different ways. In addition, many of the definitions which have been developed over the years have a relatively static view of human behavior. For example, in 1918 Thomas and Znaniecki defined attitude as:

A process of individual consciousness which determines real or possible activities of the individual in the social world.

In 1934, LaPierre offered the following definition:

An attitude is a behavior pattern, anticipatory set or tendency, predisposition to specific adjustment to designated social situations, or more simply stated, a conditioned response to social stimuli.

In 1975, Fishbein and Azjen maintained that most social scientists would agree that:

Attitude can be described as a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object.

None of these definitions addresses the multiple perceptions used by different individuals in interpreting a situation. Each appears to assume an attitude is a call to respond to a stimulus, a determinant of behavior which encourages consistent reactions by individuals. To know what an individual believes about a situation may, in fact, be irrelevant when he actually encounters that situation. It could perhaps be argued that perceptions are not predispositional qualities determining actual responses. Rather they are guides to understanding human behavior (Bogdan and Biklen, 1982:32). Consequently, if an attitude evaluation
is to be used to predict behavior, it will first be critical to understand how an individual's perception will be applied in any given situation (Bogdan and Biklen, 1982:32).

Rosenberg and Hovland's (1960) schematic representation of attitude at least begins to address the issues discussed above. It involves the following three components and is shown in model form in Figure 1:

1. The **cognitive component** which pertains to the individual's degree of knowledge about an issue.

2. The **affective component** which pertains to the emotional dimension attached to an attitude.

3. The **behavioral component** which refers to the acts which an individual performs, advocates, or facilitates with regard to an issue.

Figure 1. Three-component view of attitude (From Rosenberg and Hovland, "Cognitive, affective, and behavioral components of attitude." Pp. 1-14 in C. I. Hovland and M. J. Rosenberg (Eds.), Attitude, Organization, and Change. New Haven, Connecticut: Yale University Press.)
Implicit in the Rosenberg and Hovland (1960) model is the assumption that an adequate understanding of the relationship between attitude and behavior requires an assessment of all three response classes (Fishbein and Azjen, 1980:20). The repeated findings of a low or negative relationship between attitude and behavior have been accounted for by arguing that the primary emphasis on attitude had merely been an assessment of its affective component (Allen et al., 1980; Fishbein and Azjen, 1980; Bridge, 1981). Fishbein and Azjen (1980:20) further point out that:

It has not been made clear whether the prediction of behavior required assessment of all three components or whether it would be sufficient to obtain an index of the cognitive or behavioral components.

It is argued, however, by the author that even if attempts were made to consider the interplay between the cognitive, affective, and behavioral components of attitude, it is doubtful that a more accurate prediction of consumer travel behavior would result. There are a number of reasons for this assertion. For example, an adequate understanding of the decision-making process must include an emphasis on the dynamic social processes which produce behavior. The research process must include more than the "What if . . . ?" and "What do you think . . . ?" survey techniques traditionally used in attitude evaluation surveys such as those conducted by Fusso (1978) and Richman (1979). These kinds of questions generally include fixed, categorical responses. For example:

If you could get only ten gallons of gas a week and this meant you had to cut down on your driving, how serious would this be as far as you are concerned - very serious, somewhat serious, or not too serious at all?
It could be assumed that a response to this type of question necessarily includes a consideration of each of the three components of attitude found in the Rosenberg and Hovland (1960) model (see Figure 1). For example (see Figure 2), the stimulus involves the cutback in the supply of gasoline which the respondent will be able to purchase. The affective component of his attitude includes the sum total of the respondent's feelings about the energy crisis in general, and his feelings about a mandatory cutback in the supply of gasoline which may constrain his mobility. The cognitive component refers to the knowledge the respondent has about the energy crisis and of his perceptions and interpretations of that knowledge. For example, how has the respondent reconciled the apparent contradiction between a serious energy crisis and an oil glut which have made supplies of gasoline plentiful and prices drop drastically. The behavioral component, the "predisposition to respond" (Shaver, 1981:155) reflects both the respondent's perceptions and interpretations of the energy crisis and the evaluative judgments he has made. This latter component brings to light other serious problems associated with traditional survey research techniques.

The respondent has been asked to project himself into a future time period. He had been asked to create, in his thoughts, a situation which may not yet have been incorporated into his experiences. Assume for example, at the time of the survey, the respondent did not believe there was a possibility of an energy shortage. He might well have responded to the question asked (Fusso 1978:131) by indicating the ten-gallon ration would not seriously affect him. His choice would have been made without
Stimulus: (cut-back in supply of gasoline)  

- **Affect**  
  Refers to respondent's feelings about the energy crisis (e.g., how he feels about the constraint in mobility associated with the cutback in gasoline supply).

- **Cognition**  
  Respondent's perceptions and interpretations of the energy crisis (e.g., reconciliation of conflicting reports of an energy crisis and a world oil glut).

- **Behavior**  
  Predisposition to respond. Respondent's evaluation of the energy crisis based on his own experiences. May be based on the belief in the validity of knowledge to which he has been exposed.

**Figure 2:** Three-component view of attitude (From Rosenberg and Hovland, "Cognitive, affective, and behavioral components of attitude." Pp. 1-14 in C. I. Hovland and M. J. Rosenberg (Eds.), Attitude, Organization, and Change. New Haven, Connecticut: Yale University Press.)

Knowledge or consideration of the ramifications it may have upon critical factors such as time, privacy, weather conditions, and/or activity patterns such as leisure driving. Consequently, his response may have in no way reflected his actual behavior should his ten-gallon weekly ration become a reality. This problem has further manifested itself in the frustrations of transportation researchers' experiences. They have come face-to-face with confusing discrepancies between eager consumer
responses to questions such as, "If a bus came to your door would you ride it?" and the disinterest on the part of the consumer when these services have been provided. The difficulty with these kinds of questions, according to Brewer and Woodman (1978:1) exists because:

When confronted with conventional survey questions intended to tap consumer attitudes, a respondent may state in good faith that certain changes in his transportation behavior are acceptable. However, that statement is made without sufficient foreknowledge of the personal consequences in terms of time, money, household budgets, and familial and work interaction patterns.

It could be suggested that, given that foreknowledge, the respondent may have made different, and possibly more valid statements.

An important conclusion which may be drawn from the awareness of this problem is that attitude evaluation surveys which present fixed choices to respondents may be limited to situations in which clear interpretations of choice consequences can be made. An example comes from the Fusso study (1978:131) in which the following questions were asked (see Table 1). However, researchers may be hard pressed to understand the varied and numerous factors which may have influenced the reduction in number of miles driven. Actual concessions to changing mobility opportunities are made in terms of a complicated mixture of situational and attitudinal factors which the Rosenberg and Hovland (1960) model simply does not consider. Attitudes alone are not simplistic determinants of transportation behavior (Brewer and Woodman, 1977:2).

Transportation researchers such as Ball (1977), Brunner and Bennett (1978), and Shippee (1981), on the other hand, have addressed the need
Table 1. Questions taken from the nationwide survey done by Fusso (1978)

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<th>Respondents' answers (%)</th>
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<td>During the last thirty days, have you been able to cut down on the amount of driving you normally do?</td>
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<tr>
<td>Yes, have cut down</td>
<td>37</td>
</tr>
<tr>
<td>No, have not cut down</td>
<td>62</td>
</tr>
<tr>
<td>Undecided</td>
<td>1</td>
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They were then asked: If "yes", then: how much have you cut down - a little, some, a lot, undecided?

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<th>Their responses were again listed in percentages as follows:</th>
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<tr>
<td>A little</td>
</tr>
<tr>
<td>Some</td>
</tr>
<tr>
<td>A lot</td>
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<td>Undecided</td>
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to include both attitudinal and situational factors in their development of attitude-behavior models of consumer travel behavior. Brunner and Bennett (1978), for example, in a random telephone poll of four hundred sixty-four households focused on:

consumer perception of and responsibility for the energy crisis, its seriousness and consequences, and the effects that consumers perceived it would have on their lifestyles. (1978:241)

They focused on the possibility of a standby gasoline tax (1978:243), the effect of price increases on gasoline consumption (1978:244), and their possible effect on the standard of living of American consumers (1978:245). While these may well be critical factors to consider, Brunner
and Bennett (1978), Fusso (1978), Richman (1979), and Martin (1981) all appear to focus much too heavily on "crystallized" attitudes toward transportation resource availability and constraint in their assessment of consumer travel behavior. As it was pointed out earlier in the Henderson (1978a:17) argument:

To end the energy crisis, the United States must abandon its near total reliance on high oil prices and turn to noneconomic strategies of which the most effective, equitable, and noninflationary is gasoline rationing.

In order to encourage the American public to view rationing as a fair and equitable solution to the energy crisis, researchers must stop relying on the use of survey research techniques which tend to zero in on rigid and often unrealistic attitude evaluations. In illustration, the propensity of a respondent to believe he has "an inalienable, God-given right to travel when, where, and in whatever manner he pleases" (Henderson, 1978a:17) represents a crystallized attitude insofar as it will, in all probability, guide his behavior until some outside force such as rationing intervenes. This crystallized attitude may distort any additional questions to which he is asked to respond. The result may be a severe drop in the predictive power of the model, even if that model does contain both attitudinal and situational factors.

It is a basic assertion of this study that the limitations of existing models of consumer travel behavior will not be eliminated as long as traditional survey research techniques are used which:

1. Involve fixed, categorical responses to questions which ask the respondent to project himself into a future time period.
2. Force the respondent to create, in his thoughts, a situation which he has not yet incorporated into his experiences.

3. Assume the respondent has sufficient and adequate foreknowledge of the situation which will help him provide valid responses to the questions asked.

4. Do not acknowledge the dynamic social processes which produce behavior.

5. Do not focus on the interplay of attitudinal and situational variables which work together to produce actual behavior.

Justification of the Problem

The objective of this research is to provide an accurate assessment of consumer travel behavior under conditions of energy constraint. An attempt will be made to explain why consumers make various kinds of decisions given certain transportation resources, alternatives, and constraints. Rather than limiting the choices available to consumers, the intent will be to construct a model of decision making which discards many of the theoretical and methodological assumptions which have become accepted and reified over the years in social science research.

This study does involve the use of a questionnaire which has been designed to assess consumer attitude toward the energy crisis. However, in addition, it includes the development of a carefully constructed and realistic simulation of a "real world" gasoline rationing situation (hereafter referred to as SHORTAGE). It is suggested that the methodological flexibility of computer simulation techniques in combination with an attitude survey may permit a more adequate analysis of the multiplicity of factors which work together to produce actual behavior.
This approach should provide the researcher with an adequate understanding of the nature of social structural constraints, flexibility of choices, and attitudinal factors which may influence the decision making process. As a result, a model of decision making will be developed which differs fundamentally from existing models.

Computer Simulation Research

Simulation refers to any model a researcher builds to convey his preconception of how variables interrelate. He uses this model to make predictions. The scientist employing simulation posits a set of decision rules that he believes represent reality. (Encyclopedia of Sociology, 1981:254-255)

The elements of simulations comprise a more or less accurate representation or model of some external reality with which the players interact in much the same way they would interact with the actual reality. (Horn and Cleaves, 1980:7)

Computer simulation research has, since the 1950s gained increasing importance in the social sciences both as a learning and a data-gathering device (Bailey, 1978:292; Nachmias and Nachmias, 1976:86; Dodge, 1980:47; Finsterbusch and Motz, 1980:16; Smith, 1981:234). Unlike traditional social science "models" which may be static and reflect only limited dimensions of social reality (Encyclopedia of Sociology, 1981:185), simulations are special kinds of models - models in motion.

Simulations operate over a period of time to show not only the structure of the system, but also the way change in one variable or component affects changes in the values of the other variables or components. (Bailey, 1978:293)

It has been suggested by Horn and Cleaves (1980:11) that:
Beyond providing a common experience that individuals can use as a basis of study, this experience-based method may provide an opportunity to bridge the troublesome gap which exists between theory and practice in fields where both are crucial.

As a practice, the researcher may be better able to sensitize himself to the dynamic social processes which produce behavior.

Simulation Research: Methodological Considerations

Kaufmann (1968:205) and Raser (1969:151) have argued that the record of simulation research in predicting future events has not been impressive. In a summary of findings on the validity of simulations, the following conclusions were drawn:

What do these assessments of simulation validity for research yield? I suggest that, as realistic laboratories, simulations appear to rate very well, certainly better than the available alternatives. Their structural isomorphism with the reference system is difficult to ascertain, and where ascertainable, not very impressive, particularly when first designed; but this is an aspect that can be changed as theory and data improve. The process of isomorphism is perhaps better, though in this respect it is often difficult to compare their validity with that of other research techniques, for almost no techniques generate comparable processes. Finally, in post-dictive and predictive power, simulations are no worse than other methods, but whether they are better is uncertain; the experimental results are too ambiguous and contradictory. (Raser, 1969:153)

Bailey (1978:295; 1982:333), in later evaluations of simulation research, argued in support of Raser's findings. He indicated, for example, that the primary drawback of simulations is their artificiality.

By its very definition, a simulation is merely an imitation or copy of the real thing. There is always the possibility that the simulation is so inaccurate or incomplete that conclusions gained from it are not
applicable to the phenomenon being modeled, and thus the findings will be invalid.

Obviously, the validity and utility of the simulation are dependent upon the accuracy of the investigator's theoretical preconceptions concerning interrelations among components of the system he had constructed (Nachmias and Nachmias, 1976:90).

There is always the danger that all the salient components have not been entered into the system. There is further danger that all the relationships between components are not designed correctly. (Bailey, 1982:333)

Realistically, however, whether the researcher has developed a model which is viewed as a static, cross-sectional representation of a system or a simulation viewed as a model in motion, he must address two basic issues: 1) his model is an imperfect representation of reality and 2) because of this it will not be isomorphic with that reality. This point of view has been reinforced by Watkins and Meador (1979:119) who point out that:

Social scientists' predictions of human behavior are only as reliable as the stability and accuracy of their models. The introduction of human variables causes models to become imperfect representations; and dangers appear when they and the humans involved are treated as perfect replicas of reality.

Consequently, the validity of the simulation cannot be "absolutely" insured. As Dutton and Starbuck (1971:14) have indicated:

A model is built in order to achieve understanding of an observed causal process, and the model is stated as a simulation in order that the assumptions and functional relations may be as complex and realistic as possible. The resulting program produces outputs resembling those observed in the real world, and inspires confidence that the real causal
process has been accurately represented. However, because the assumptions incorporated in the model are complex and their mutual interdependencies may be obscure, the simulation program may be no easier to understand than the real process.

Raser, in opposition to his previous argument (1969), convincingly states that players do become deeply engrossed in simulations and take them quite seriously. Persons in "real life" situations often tend to isolate themselves from reality and be even less involved in real events than are players in simulations. The conclusion drawn is that simulations seem capable of or at least, have the potential of creating a sense of realism by bringing "real world problems" together in a setting in which respondents can practice making "real world decisions" (Nachmias and Nachmias, 1976).

Simulation Research: Theoretical Considerations

It is "generally accepted" within the social sciences that theory and method are interrelated (Hage, 1973; Zeitlin, 1973; Ritzer, 1975, 1981; Dubin, 1978; Schwartz and Jacobs, 1979; Skidmore, 1979; Johnson, 1981; Bailey, 1982; Bogdan and Biklen, 1982; Smith, 1981). Thus, it seems critical to consider why it is that mainstream sociological theories make it difficult to adequately consider the dynamic social processes which produce behavior. This assertion seems justifiable in light of the realization that most sociological theory assumes that reality itself exists apart from individuals; once individuals come into interaction, they form social structures which constrain future interaction (Turner, 1978:393). The primary emphasis is on constraints which appear external
to and coercive on the individual to the extent that it may be assumed:

society controls, shapes, and directs individual behavior, leading to the conclusion that whatever society wishes to make of us it can. (Skidmore, 1979:27)

As a result, this might tend to limit researchers in terms of what they believe should be studied, what questions should be asked, how they should be asked, and what rules should be followed in interpreting the answers obtained (Ritzer, 1981:7).

The statements above are critical in light of the following assertion by Bailey (1978; 1982) and Smith (1981). The value of the results of a simulation depends completely upon the quality of the components included and on the realistic nature of the interrelations of those components. It is imperative that the simulation resemble real life as closely as possible (Bailey, 1982; Smith, 1981). However, as long as researchers' dominant theoretical emphases are on order and stability to the exclusion of their antitheses or the wide range of possible behaviors on the continuum, this appears to be an unattainable goal.

Because many people do the expected thing, the social scientist has perhaps not found it necessary to search beneath the macroscopic sense of order studied (Perrow, 1981:5). Nonetheless, there are innumerable microscopic irregularities or nonrational forms of behavior which the researcher often attempts to alleviate or eliminate with "rationally" designed models which advocate:

1. The enactment of more laws.
2. Stiffer penalties for those who break the law.
3. Rewards for those who follow the law.
Underlying these rationally designed models is the postulate that "rational calculation, on the motivational or behavioral levels and the need for social acceptance are the prime movers of social conduct (Brown, 1978:160).

Rationality involves human beings choosing between alternative courses of action by evaluating the experiences with each in terms of a preference ranking and then selecting the "best" alternative. (Wallace, 1969:190)

The social scientist may, knowingly or unknowingly, reaffirm this mode of thought. He may, for example, emphasize rational choices such as the maximization of profit (or "best" choice) in his evaluation of behavior to the exclusion of nonrational choices such as fun, politics, safety, and tradition. "In so doing his model may contain problems of internal clarity and consistency" (Brown, 1978). Still researchers continue to underplay or largely ignore the nonrational aspects of social conduct (Zeitlin, 1972; Ritzer, 1981). There is danger in this, as Perrow (1981:2) points out:

Neither social scientists nor people in general are as smart and rational as we think they are. Social scientists mask this reality by desperately trying to make sense of many things that are really quite senseless when examined closely. Yet they convey the impression of lawful, even rational behavior because of research techniques that are largely self-serving.

It would appear there is a need to move beyond traditional theoretical assumptions about human behavior which emphasize the macroscopic social order and rationality while deemphasizing the microscopic individual perception of what that order is which may well contain nonrational aspects of behavior. If simulations are to be developed which assure the
inclusion of essential components and adequate and accurate specifica-
tions of interrelations between components (Bailey, 1978; 1982), then
many of the traditional theoretical assumptions held by social scien-
tists must be reexamined. Most existing simulations, for example, have
tended to focus on:

calculating the optimal move or choice among alter-
native means for achieving a given end, and on the
development of formulas for weighing risks, costs,
and potential benefits in which 1) options have been
arrayed and then 2) the "rationally best choice" has
been determined. (Brown, 1978:160)

This approach severely restricts the components which may be needed to
develop a simulation which closely resembles the "real world".

There is a need as well to move beyond the view of what individuals
"should do" as they go about interacting in everyday life, to what they
"actually do". As Zeitlin (1973:180) has indicated:

The social scientist creates puppets to manipulate
them for his purpose. These puppets have no life,
no anxiety, no freedom, and no consciousness; they
cannot under any circumstances act otherwise than
was predestined by their creator.

Perrow (1981:3) agrees with Zeitlin (1973) as he suggests that social
scientists appear to have constructed their theoretical orientations in
a manner which permits them to "hide the disorder of our everyday exist-
ence and the unpredictable nature of social conduct." This seems quite
"rational" when it is recognized that, to many social scientists, "unless
a component of the social world can be studied objectively or impar-
tially, using strict scientific techniques, it may not be considered a
legitimate part of the field of social science" (Ritzer, 1981:211). This
mode of thought appears to have led to a commitment to a "narrow sense
of science" (Ritzer, 1981:211).

It is suggested by the author that an emphasis must be placed on the socially constructed and socially negotiated nature of reality. As Zeitlin (1973), Johnson (1981), and Ritzer (1981) argue, it cannot be denied that subjective meaning and individual perception play a critical role in the decision-making process. Perhaps such components cannot be studied scientifically in the strict sense of the term. However, the fact remains. Subjective meaning and individual perception are critical components of the social world. To underplay or ignore them altogether may create an unnecessary source of unexplained variance in social science research (Zeitlin, 1973; Morris, 1977; Ritzer, 1981). Assuming this is so, Perrow argues (1981:3) that:

nonrational, changeable, multifaceted people be put back at the center of the social sciences so that researchers can better tolerate disorder, even appreciate its virtues, and learn to cope with human limits.

Addressing this issue head on may well:

guide the social scientist in the construction of models that will enable him to deal objectively with human actions and subjective meaning. (Zeitlin, 1973:180)

It is suggested by the author that the conceptual versatility of phenomenology in conjunction with the methodological flexibility of computer simulation techniques might offer a solution to the problems which have been presented.
Beyond Tradition: The Phenomenological Alternative

Facts are not something we can take for granted or think of as the solid rock upon which knowledge is built. Actually their nature is rather problematic.

Karen Cetina-Knorr (1981:17)

My lord, facts are like cows, if you look them in the face hard enough, they generally run away.

Dorothy Sayers (cited in Cetina-Knorr, 1981:17)

Phenomenology is a theoretical orientation which stresses the ongoing dialectical relationships between the individual and society. It is characterized by its concern for the process by which social phenomena are created, recreated, maintained, and/or altered in the course of everyday interaction (Berger and Luckmann, 1966; Johnson, 1981; Ritzer, 1981). Those who follow its tradition hold to the idea that individuals experience and share the social world with others as a phenomenon that is both objectively factual and subjectively meaningful (Johnson, 1981:59).

All knowledge of objective facts in the real world is conditioned or colored by the social matrix in which it is acquired, transmitted, or learned. (Johnson, 1981:60)

While the phenomenologist readily accepts the reality of an external factual social world, he also emphasizes the subjective meaning attached to phenomena as that which influences social conduct, not the phenomena themselves. Within the context of "conditions of energy constraint," consider a focus on an evaluation of individual responses to the fifty-five mile per hour speed limit. One of the reasons the lowered speed limit was enacted into law was to conserve gasoline (Fusso, 1978). It has also been found to be correlated with a decrease in the number of
automobile deaths on the highway. Some consumers, of course, have abided by the law. Others have not. There are American consumers, for example, who have purchased Citizens Band radios in their attempts to bypass the speed limit without paying a penalty. Some have continued to take their chances and have exceeded the speed limit when it appeared the "line of traffic" was constant at sixty or sixty-five miles per hour. Still others who have been ticketed for speeding have expressed their displeasure at an unfair, reduced speed limit which they may argue wastes more gasoline than it purports to save (Brunner and Bennett, 1978).

There are some conclusions which may possibly be drawn from these examples. Consumer travel behavior may not be identical or even similar among individuals. Externally imposed structural constraints such as the fifty-five mile per hour speed limit, by definition, mean different things to different people. As a result, actual behavior may be dependent on the point of reference of the individuals who encounter the ramifications associated with breaking or not breaking the law. It would seem critical, for example, to recognize that those who do not conform are not always exhibiting nonrational behavior, nor are they necessarily acting out of ignorance. In fact, their primary concern may be, for any number of reasons, how to get from point A to point B in the least amount of time. As Wrong (1982) and Perrow (1981) state, though, when the social scientist attempts to account for these varying and diverse behaviors the following is likely to count as an explanation:

We social scientists do not explain these phenomena on the grounds that most human actors are less than brilliant, or that they have not developed adequate
cognitive skills, or because of failures in information processing. Aberrations, we say, are due to such things as inadequate internalization of norms, values, culture, tradition, and unrealized consequences. (Perrow, 1981:2)

It appears to be ludicrous to maintain a theoretical need for unvarying orderly, and rational explanations of consumer travel behavior. Within the "real world" consumers clearly have the conscious capacity to create, recreate, and/or socially negotiate situations such as the one involving the decision to abide by the fifty-five mile per hour speed limit or to break that limit.

The author suggests that the phenomenological alternative may permit more than a detached observation of social structural constraints believed to determine social conduct. It may enable the researcher to place a stronger emphasis on the subjective world of the respondent, which is itself a reality.

Theory should not be about what is outside consciousness, but it should be about how and in what ways the subjective states of the actors are created, recreated, and maintained. (Turner, 1978:393)

This criterion might permit a more unified, holistic approach (Switzer, 1981) to understanding the decision-making process. As a result, an adequate understanding and evaluation of the response of the American public to a future energy shortage may become possible. In turn, this may enable the researcher to develop a more adequate understanding of the motivational components included in the decision-making process. Researchers must begin to address more than individual's views on the energy crisis. It would be helpful to policy makers, for example, as was stated earlier, if researchers were able to determine at what point
American consumers would actually curtail their mobility, change their value systems, or redefine the degree of individuality they feel they "must" have.

In summary of this section, the application of phenomenology may provide a more accurate description of the dynamics of social interaction than traditional sociological theories. It may allow the researcher the flexibility to consider any and all social phenomena within an individual's surroundings, of which that individual is cognizant, in an analysis of the decision-making process. It permits an emphasis on the socially constructed nature of social reality itself. Finally, through the development of a phenomenologically grounded computer simulation, it is believed that the construction and amplification of an adequate model of decision making may be possible.

SHORTAGE: A Gasoline Rationing Simulation

SHORTAGE was developed in an attempt to enhance respondent ability to make travel decisions under conditions of energy constraint with some knowledge of the kinds of "real world" consequences he might face if rationing became a reality. The assumption has been made that the "decision tree format" (Trueman, 1977:125) used in its construction will have created a scenario which may well illuminate the "real world".

Unlike the problem of making a single optimal decision, involving probabilistic outcomes, at a given point in time (Trueman, 1977:125), SHORTAGE exposes respondents to the problem of making a sequence of decisions over a period of time. As it has been stated by Trueman (1977:
decisions made by the respondent may depend on previous decisions and thus may lead to a set of probabilistic outcomes. An attempt is made to cover all contingencies. A graphically oriented approach to the solution of such multistage decision problems is called decision tree analysis.

SHORTAGE should provide an opportunity for respondents to assess both the social and economic expenses associated with the choices they make (see Appendix A). An emphasis will be placed on the diversity of components incorporated into and interpreted by the respondent in his attempts to make some intuitive sense out of the social world presented to him. It is believed that this may encourage him to act in a manner which may most profitably benefit him.

To accomplish the goals of this study, it will be accepted that the respondent's travel decisions may not always follow a rational path in Wallace's (1969:190) sense of the term (see page 24). Rationality will be considered then, for purposes of this study, to be a multifaceted, multidimensional construct defined in accordance with the subjective meaning and consequences it may have for the respondent as he attempts to cope with conditions of energy constraint.

Purpose of the Survey Questionnaire

A survey questionnaire was administered to each respondent prior to his participation in SHORTAGE (see Appendix C). This was done in an attempt to determine the respondent's initial perception of the energy crisis. The questions asked were similar to those used in studies by
Murray et al. (1974), Brunner and Bennett (1978), Fusso (1978), Richman (1979), Martin (1981), and Orr (1981). The questionnaire was constructed in a manner which asked each respondent for the following information:

1. Attribution of responsibility for the energy crisis.
2. Evaluation of the severity of the energy crisis.
3. Whether or not the respondent believed the crisis was "real".
4. Determination of the degree of personal hardship in the event of another energy shortage.
5. Consideration of the respondent's attitude toward gasoline rationing.
6. Suggested resolutions to the energy crisis.

Following completion of the questionnaire, the respondent was exposed to SHORTAGE, which presented him with:

1. A standby gasoline rationing plan which provided him with 120 gallons of gasoline which he could use as he chose over a 90-day period of time. The respondent determined the rate of usage by the number of miles per gallon his care received.

2. A list of five strategies by which it was suggested he could move through the simulation in a way that would most profitably benefit him.

3. A series of alternatives and consequences, contained within each strategy, which he may or may not have decided to try.

4. An awareness that the decisions he made may or may not be profitable, that some were even illegal.

5. The realization that, as he was making his decisions, the clock in the simulation continued to tick away his time, and the fuel supply allotted to him continued to dwindle.

SHORTAGE may well have provided the respondent with a set of realistic transportation resources, alternatives, and constraints that could conceivably impact his attitude toward gasoline rationing as the most
effective, equitable, and noninflationary resolution to the energy crisis.

Upon completion of the participation in SHORTAGE, the respondent was given the opportunity to reassess his presimulation questionnaire answers. This was done because this author believes that the knowledge and experience gained from participation in SHORTAGE may have enhanced respondent awareness of the critical nature of the energy crisis and of the "actual" changes in transportation resources, alternatives, and constraints that may become a reality if gasoline rationing is implemented. Finally, it is believed that SHORTAGE will yield new insights into the point at which American consumers will:

1. Adjust to using less fuel.

2. Make better use of the fuel that is available to them.

3. Consider altering their styles of living to accommodate a drastic reduction in gasoline supply.
Our "energy problem" does not have a solution in the sense that we can win a war or put a man on the moon; rather ours is a brand new, long-term situation in which we must learn to live. And it raises a whole new set of issues with which we are poorly equipped to deal. Our first need in dealing with our new energy situation is to understand that it is authentic and long-term in nature; otherwise our decisions will be inappropriate and their urgency will be underestimated. (Ball, 1977:48)

One goal of this chapter will be to show that most existing studies of consumer responses to the energy crisis have not adequately realized that:

Nothing we can do will restore the conditions which prevailed in the second and third quarters of this century; our energy "situation" in the future will forever be fundamentally different from that which has prevailed in the past. (Ball, 1977:48)

Researchers have traditionally focused largely on the energy "situation" as an energy "problem" (Murray et al., 1974; Bearden et al., 1977; Brunner and Bennett, 1978; Fusso, 1978; Richman, 1979). There is a dangerous risk involved with this approach. The word problem "implies there is a solution and a cure when applied, will permit a return to conditions essentially the same as they have been" (Ball, 1977:48).

Realistically, however, the direction which may most effectively serve the important goals of energy policy is one that will attack the waste in energy consumption, slow it down, and, ultimately, reverse its growth (Freeman, 1973; Ball, 1977; Henderson, 1978a; Marbach et al., 1982).
As a result of the perceived problems inherent within existing studies, this chapter will include a review and an evaluation of the literature which demonstrates that: 1) while the energy crisis has not yet overwhelmed the United States, it will continue to worsen because American consumers continue to waste energy; 2) the American public has only minimally accepted and/or adjusted to the energy crisis; 3) there has been only minimal consumer cooperation in lowering gasoline consumption; 4) consumers have not been significantly receptive to either increasing foreign oil imports or in permitting the government to impose a tax on fuel inefficient automobiles; 5) increases in gasoline prices since 1974 have not significantly altered consumer travel behavior; 6) the perceived responsibility for the energy crisis and its resolution rests primarily with government and big business and secondarily with the American public; and 7) the development of an effective comprehensive national energy policy will be an impossible task unless the following criteria are met:

1. The government must accept the responsibility for its development.

2. The American public must comprehend and accept the severity of the energy crisis.

3. The American public must be "willing" to make the sacrifices which will accompany an effective national energy policy.
On Energy Consumption; 1973-1982: Why Did the Crisis Worsen?

Following the Middle East Oil Embargo in November of 1973, President Nixon presented a wide-ranging program to curtail United States energy consumption. He asked for voluntary conservation measures and, in his 1973 Energy Address to the nation, stated that:

If shortages persist despite all of the voluntary actions, it may become necessary—to take even stronger measures. It is only prudent that we be ready to cut the consumption of oil products, such as gasoline, by rationing, or by a fair system of taxation. I have directed that contingency plans, if this becomes necessary, be prepared for that purpose. (Energy Policy, 1981:240)

The American people were warned of the potential for the short-run personal sacrifices. However, at the same time they were assured that:

1) efforts were being made to increase domestic supplies of gasoline; and
2) that a fuel allocation program would be implemented so that consumers would not be forced to "suffer undue hardships" (Energy Crisis, Volume 2, 1974-75:76). It appeared that the President wanted to make the American people aware of the need for voluntary conservation. He also attempted to create an awareness of growing U.S. dependence on foreign imports in his assertion that (Energy Crisis, Volume 2, 1974-75:76):

The American people must face the fact that when and if the oil embargo ends the United States will be faced with a different but no less difficult problem. Foreign oil prices have risen dramatically in recent months. Without alternative and competitive sources of energy here at home, petroleum prices could remain at crippling high levels.

He said the United States must embark on an intensive program of research and development of new technologies because:
This will assure that the genius of the free enterprise system is maintained and not destroyed by the energy crisis. Gas rationing with its attendant bureaucracy and cost to the taxpayer should be only a last resort. Years from now, let us look back upon the energy crisis of the 1970's as a time when the American spirit reasserted itself for the lasting benefit of America. (Energy Policy, 1981:75-78)

The oil embargo continued, and the gasoline situation worsened. American consumers experienced, in varying degrees: 1) long lines at gasoline stations (Newsweek, 1979); 2) worsening gasoline shortages that were especially severe in urban areas (Energy Crisis, Volume 2, 1974-75:3); 3) a form of rationing that based distribution on odd and even numbered license plates; 4) minimum-purchase amounts to avoid panic buying or "topping-off" tactics; and 5) continued increases in the price of gasoline. Each of these factors served to heighten consumer frustration with and anger at the government's inability to deal adequately with the shortages (Murray et al., 1974).

It was also in 1974 that Congress acted in reducing the national highway speed limits to no more than 55 miles per hour. The President indicated to the American people that he was pleased with the favorable public response to the lowered speed limit. He stated that if consumers continued to cooperate, gasoline rationing could be avoided, but added:

The United States is still facing a severe energy shortage. Any slackening of conservation efforts by the public could result in the crisis being "brought home to America in a most devastating fashion." (Energy Crisis, Volume 2, 1974-75:78)

He reminded the American public that rationing was a possibility for which the government must prepare.
Then, in March of 1974, following the lifting of the oil embargo, President Nixon altered his stand on an energy conservation policy. He barred gasoline rationing by vetoing the emergency energy bill that had already been passed by a 67-32 Senate vote, February 19, 1974, and a 258-151 House vote February 27, 1974. At that time, he "flatly ruled out the need for compulsory gasoline rationing" (Energy Crisis, Volume 2, 1974-75:83). This veto was carried out in conjunction with his request that American consumers continue to voluntarily conserve gasoline by using car pools and reducing speed limits.

President Nixon's policy change could have appeared justifiable in light of his faith in American capabilities to: 1) maximize energy supplies; and 2) develop new technology. President Nixon further suggested:

By increasing gasoline supplies, prices will go down, gas lines will surely disappear, and we can move forward as a country with the energy that we need. (Energy Policy, 1981:78)

The President's policy changes, however, both confused and angered some consumers. Murray et al. (1974:257) found that "many consumers were angry and annoyed by the inconveniences created by gasoline shortages." Others were frightened by the ambiguity associated with the government's stand on energy. Freeman (1973), Murray et al. (1974), and Wirth (1975) concluded that:

For many Americans, the most frustrating aspect of the energy crisis is that their government, for all its alarmist rhetoric, is carrying on business as usual. The energy issue has evoked a sense of national emergency, yet the politics surrounding it seem to lack any urgency. Everybody talks about the energy crisis, but no one does much about it. (Wirth, 1975:93)
The conflicting messages which the American people perceived they were getting led to a dangerous evaluation of the energy crisis. It was viewed as an energy availability problem, not an energy supply problem (Freeman, 1973; Wirth, 1975). As a result, the United States continued to be a nation of gluttonous gasoline consumers. For example, in a Labor Department two-year survey, it was found that:

Gasoline expenditures accounted for 50% of a family's direct energy purposes. The data were gathered from diaries kept by more than 10,000 families for two years beginning in mid-1972. (Energy Crisis, Volume 2, 1974-75:125)

Also, in 1974, American consumers had not been convinced that it was necessary to examine and roll back the energy intensive way of life which predominates in American society. As Murray et al. (1974:257) found:

Since the Arab boycott and the President's appeal for conservation there have been pervasive but modest efforts at energy conservation on the part of the American public. However, these efforts have not yet gone beyond saving a bit here and there. There is little indication of any serious change in lifestyle such as changing the mode of transportation to work or increasing the average occupancy of cars on the trip to work.

Because of the confusion created by the energy crisis, in 1974, chairmen of four Congressional subcommittees declared their groups would begin hearings to discover if the energy situation confronting the United States was "fact or fiction" (Energy Crisis, Volume 2, 1974-75:51).

Senator Henry Jackson (Dem., Washington) stated that there was:

total lack of public confidence in the oil industry, in the federal agencies charged with regulating the industry, and in the validity of the spiraling costs of gasoline. People are not going to make sacrifices
unless they get some straight-forward answers
about the extent of the shortage and who is benefi-
ting from the shortage. (Energy Crisis, Volume 2, 1974-75:51)

Jackson's accusation appears consistent with the Murray et al. (1974)
study in which it was found that: 1) fewer than 25% of the American
people felt that the energy problem was critical; 2) agreement was wide-
spread that responsibility for the crisis lay most heavily on the federal
government and the oil companies; and 3) the federal government was not
handling the situation very well (1974:257-8).

In retrospect, public skepticism, unconcern, and anger appear to
have been understandable. While the extent, even the reality, of the
ergy crisis was being debated, national energy policies continued to
favor an increasing use of energy. As Freeman (1973:2) indicated:

   For decades the government and the oil companies have
   agreed on the goals of fullest exploitation of resources
   and maximum energy consumption. Until recently, no one
   has seriously questioned our growth policies. Energy,
   which does most of our hard labor and gives us leisure,
   comfort, and mobility, has been seen as an unmixed bless-
   ing. The premise that more is better has gone unchal-
   lenged.

Traditionally, the trust in American expertise, to manipulate the
environment to its own ends, had been widespread. There had been an
image of energy resources as endless, "as if the earth could absorb,
without limit, the damage inherent in all energy use" (Freeman, 1973:3).

All of a sudden energy became a problem. There were symptoms that
something had gone wrong. The depletion of petroleum resources became
more than an issue which only concerned the environmentalists. As
Wirth (1975:3) indicated:
Politicians became aware that energy is not only a scientific or a technical issue, but also a foreign policy issue. And when the OPEC cartel discovered that it could get away with sharp price increases, and the United States discovered that the era of cheap fuel was over, American politicians found that energy is an economic policy too.

It appears evident that awareness of the complexity of the energy crisis did not lead to a proposed resolution. When President Ford took office in 1973, his first energy address to the nation paralleled Nixon's initial stand on the energy issue. He warned that the United States must face the prospect of energy difficulties which may last until 1985 (Energy Policy, 1981). He also stated that the resolution of the crisis would require personal sacrifices on the part of the American people. He then proceeded, in a Washington speaking engagement on January 22, 1975, to say he would "veto any mandatory rationing program involving petroleum products" (Energy Crisis, Volume 2, 1974-75:114). Ironically, according to a Gallup Poll published in Newsweek Magazine, January 20, 1975:

55% of those responding favored a nationwide rationing program, compared with 32% who preferred to cut consumption through the use of higher gasoline taxes.

The President, however, favored higher oil tariffs as an incentive to reduce the United States' consumption of foreign oil. Even though he was warned by many governmental leaders of the danger of skyrocketing inflation which his tariff could cause, he remained firm. He argued that "failure to act on the tariff question would have been a sign of weakness around the world" (Energy Crisis, Volume 2, 1974-75:115). However:
If Congress rejected this proposal, Ford said, he would accept arbitrary allocation of petroleum products as an alternative approach to cut demand and limit foreign oil imports, but he restated his opposition to fuel rationing as a measure of "last resort." (Energy Crisis, Volume 2, 1974-75:115)

In 1976, President Ford maintained his stand on the energy issue. He emphasized that in pursuing the goal of energy self-sufficiency by 1985, he intended to implement the maximum production incentives that could be justified. His focus was on increased domestic production. It appears that the President's "resolution" to the energy problem paralleled that of President Nixon's. He argued that:

It is only through greater research and development efforts today that we will be in a position beyond 1985 to supply a significant share of the free world's energy needs. And I am convinced that the United States has the ability to achieve this energy independence. (Energy Policy, 1981:251)

The emphasis remained on finding more energy, not using less.

In light of the perceived contradictions in both government policy and Presidential states, it is not surprising that by 1977 researchers had found that (Moncrief et al., 1977:442):

It does not appear as if gasoline conditions will greatly influence future travel. A majority of American consumers felt gasoline "availability" would influence their future travel decisions either not at all or very little.

When President Carter made his first Energy Address to the nation in April of 1977, the American people were faced with a problem they were told was unprecedented in history. The President bluntly told his listeners that:
with the exception of war, this is the greatest challenge our country will face during our lifetime. It is a problem we will not solve in the next few years, and is likely to get progressively worse through the rest of this century. We must not be selfish or timid if we hope to have a decent world for our children and grandchildren. We simply must balance our demand for energy with our rapidly shrinking resources. By acting now we can control our future instead of letting the future controlling us. (Energy Policy, 1981:251)

He told the American people that they would be forced to make sacrifices and increase their tolerance for inconvenience. He did so in conjunction with the warning that the alternative may be a national catastrophe (Energy Policy, 1981:251). He attempted, then, to convince them that the crisis was both "real" and "long-term" in nature.

In addressing the issue of public disbelief and/or skepticism, President Carter said (Energy Policy, 1981:252):

I know many of you have suspected that some of the supplies of oil are being withheld. You may be right, but suspicions about the oil companies cannot change the fact that we are running out of petroleum. World oil production can probably keep going up for another six or eight years. But sometime in the 1980's it can't go up anymore. Demand will overtake production. If we do not act now, if we wait, we will live in fear of future embargoes. At our present rate of growth, within ten years we would not be able to import enough oil—from any country, at any acceptable price.

Following the President's speech, it first appeared that the American people "may have been" open to a strong comprehensive national energy policy. Many Americans were beginning to accept the reality of an energy crisis that would eventually be long-term in nature, even though they continued to blame Congress for failing to resolve it. In a 1977 Newsweek poll:
Ninety-two percent of respondents said the government had not done all it could to solve the energy problem. And approximately half of the sample indicated that they felt the energy companies were responsible in some way for the crisis. However, 58% also indicated that consumers, by failing to conserve, were actually responsible for the current crisis. (Henderson, 1978a:17)

On the other hand, it was found that travel preferences and willingness to sacrifice had changed little since the advent of the crisis (Fusso, 1978:127). The American people remained resistant to reducing mileage in order to conserve gasoline (Ball, 1977, Brunner and Bennett, 1978; Fusso, 1978). As Fusso (1978:126) indicated in a nationwide study:

In the fall of 1977, one-third said they would find it very difficult to reduce the number of miles driven and another third would find it fairly difficult.

It was apparent that American consumers saw the need for a reduction in travel. Still, their reluctance to be inconvenienced prevailed as:

1. Sixty percent opposed rationing;
2. Seventy-eight percent opposed higher taxes as a form of rationing;
3. Seventy-six percent favored keeping the present 55 mile per hour speed limit; and
4. Sixty-three percent indicated they would meet the President's request by not driving over the speed limit in order to save gasoline reserves. (Fusso, 1978:129)

The message consumers continued to give was that they were willing to make the effort to conserve gasoline so long as conservation did not interfere with their manner of living or cost too much (Murray et al., 1974; Brunner and Bennett, 1978).

An understanding of this apparent lack of acceptance and adaptation to the energy crisis has been offered by Brunner and Bennett
President Carter, in order to dramatize the seriousness of the energy problem, described it as the moral equivalent of war. Only a third of consumers agreed with this assertion, and about two-fifths thought that this was an overstatement of its gravity. It is interesting to note that approximately one-quarter were undecided on this matter, and many indicated they didn't understand the President's assertion. Substantiating the observation that the people did not understand the seriousness of the problem or the proposed program, 40% were uncertain whether the nation would be injured by the President's energy program if it was adopted. On the other hand, approximately one-third thought that the country would suffer if it was enacted and 28% felt that the program would not be injurious to the nation's economy. Clearly an educational program is essential if the program is to receive widespread support.

In light of the conclusions drawn by Brunner and Bennett (1978) and Richman (1979), educating the American public appears to be critical:

Despite the gas lines and President Carter's warning, most Americans remain doubtful that there is a "real" shortage stemming from a genuine depletion of oil resources. Their predominant view is that oil shortages have been contrived, particularly by oil companies, to raise prices and profits. Americans believe that the oil companies and the oil producing countries could provide all the gasoline that's wanted for the near future. (Richman, 1979:576)

This increasing skepticism came in the wake of President Carter's 1979 Energy Address in which he reevaluated his previous warnings to the public:

Our nation's energy problem is getting worse. We are wasting too much energy, we are buying far too much oil from foreign countries, and we are not producing enough oil in the United States. We are by far the largest customer for OPEC oil, buying one-fourth of that foreign cartel's total production. This growing dependence has left us dangerously exposed to sudden sharp price rises and interruption in supply. In 1973 and 1974, shipment of oil was embargoed and the price quadrupled overnight. These
shocks have sent us stern warnings about energy, but our nation has not yet responded to these warnings. (Energy Policy, 1981:256)

The American public, however, did respond in a nationwide poll conducted by Richman (1979) in which they indicated the following:

1. In June of 1979, 69% of the American people did not believe the energy crisis was as bad as President Carter had indicated;
2. By mid-July, 1979, 53% of the American people believed they were merely being told there was a real shortage; and
3. In mid-August of 1979, 65% of the American people indicated they did not believe the shortage was real.

These findings were presented on the heels of the first-hand effects of the "new" energy crisis. From all indications, gasoline supplies would remain tight for the summer of 1979. As California struggled with its long lines at gasoline service stations and gasoline shortage, fears spread that other states would soon feel the crunch (Sheils et al., 1979:24). In one unprecedented episode:

As "gasoline-starved" motorists scrambled and schemed for short supplies in California, bizarre behavior seemed almost ordinary. But when customers lined up at a Union 76 Service station in El Cajun, they were startled to see the owner presiding in Arab dress, a flowing silk burnoose on his head and a .44-caliber pistol strapped to his side. "I just got mad seeing these lines and wanted to attract some attention to our problem," he explained. "Is it the Arabs? Is it the government?" (Sheils et al., 1979:24)

The individual's behavior may well have been considered bizarre. However, his attitude at that time was shared by a majority of Americans who flatly refused to see the energy crisis as anything more than an oil industry conspiracy (Richman, 1979:576).
It was also at this time that President Carter was attempting to sell his Contingency Gasoline Rationing Plan to Congress (see Appendix B). His proposed plan was an attempt to strike a reasonable balance between equity and administrative feasibility. The President indicated that:

Any gasoline rationing plan necessarily will be costly and administratively complex, will cause hardships to many users, and will inconvenience large numbers of gasoline consumers. Nonetheless, in a period of serious shortage, gasoline rationing would assure access to some gasoline by all motorists at a reasonable, controlled price, reduce or eliminate long waiting lines, stabilize the market for gasoline, and would significantly mitigate the economic dislocations caused by a severe energy supply interruption. (Federal Register, Volume 43, No. 125--Wednesday, June 28, 1978)

Even with the severe shortages that occurred during the summer of 1979, however, the Carter Administration continued in unsuccessful attempts to persuade Congress to pass the rationing plan until August 1, 1980. It appeared that the United States had become politically paralyzed over its energy policy (Richman, 1979; Sheils et al., 1979). A reason for the lack of both public and Congressional support could be considered. President Carter, like his predecessors, emphasized conservation and sacrifice along with increased production and faith in American technology to give the United States energy security in the future (Energy Policy, 1981: 256-7). And as Wirth (1975), Ball (1977), Henderson (1978a), Henderson (1978b), and Shippee (1981) have pointed out, it is this continued emphasis on a market-oriented solution to the energy crisis which had led to the consistent lack of support and ultimate failure of United States
energy planning. For example, Carter Henderson (1978a) argued that:

Market-oriented supply-demand economics assumes that higher prices must inevitably call forth increased supplies of oil, while simultaneously discouraging their use.

Hazel Henderson (see Henderson, 1978b:15) supported this argument as follows:

This conventional economic approach to the nation's energy problems has completely dominated the energy debate among lawmakers in Washington, D.C., even though the assumptions behind it and the credibility of the profession which propounded it are in growing disrepute.

In addition, in 1978, U.S. Treasury Secretary W. Michael Blumenthal argued that "the economics profession is close to bankruptcy in understanding the energy crisis--before or after the fact."

The White House and Congress continued to pursue the economists' largely discredited rationing-by-price theories which cannot possibly bring America's gluttonous energy appetite under control. (Fortune, cited in Henderson, 1978a:15)

The conclusion drawn is that a large gap exists between the magnitude of the energy crisis and the resolutions offered to the American people, which has called for only minimal sacrifices in lifestyle and economic growth (Orr, 1981:7). In the words of one critic (Orr, 1981:9) "the government's energy program resembles the captain of the Titanic asking the passengers to close their portholes for fear of getting wet." Politicians and economists alike have continued to emphasize a "painless" resolution to the energy crisis, as they suggest voluntary conservation and the use of price mechanisms to control gasoline consumption, neither of which has been successful (Freeman, 1973; Businessweek, 1974; Wirth,
Gasoline price increases have been both an ineffective and inflationary method of regulating gasoline consumption. While consumers appear to be opposed to price increases, they have not, to any appreciable extent, changed their driving habits (Murray et al., 1974; Sacco, 1976; Willenborg and Pitts, 1977; Brunner and Bennett, 1978). For example, in 1974 (see Figure 3) it was found that:

Despite the fact that gasoline prices jumped 43% since June of 1973, vehicle usage in the United States turned up faster than anticipated. Americans stepped up their driving despite the fact that they were paying an average of $.56 a gallon compared with $.39 in 1973. (Businessweek, 1974:58)

Consumers express a preference for cheap energy. Still, a majority, when faced with continued increases in price, forego other expenditures (e.g., food and savings) rather than cut back on driving (Businessweek, 1974:58). A reason for this has been offered by Willenborg and Pitts (1977:29). They suggested the gradual, though steady, rise in gasoline prices since 1973 permitted consumers to become accustomed to the higher price levels and adapt to them. For example:

In the mid-1973 to mid-1974 period, gasoline prices increased by 45-50%, or by 4% a month. These increases had an apparently negligible effect on the number of miles driven by consumers. Price mechanisms did not act as deterrents to drivers, even in a period of unusually rapid and steady price
Gasoline prices have risen sharply . . . but vehicle usage is coming back fast.

![Graph showing gasoline prices and vehicle usage trends](image)

Data: Platt's Oilgram  
Data: Federal Highway Administration, BW est.

Figure 3. Consumer response to gasoline price increases from June 1973 through June 1974 (Businessweek, 1974:58)

An extremely inelastic demand situation seems to have prevailed. (Willenborg and Pitts, 1977:30)

While the precise effects of price on gasoline supply and demand are not known, it has been predicted that:

- Gasoline demand will fall by about one percent for each four percent increase in price. Supply will then rise by about one percent for each five percent increase in price. (Henderson, 1978a:18)
On the other hand, economists have indicated that "actual" consumer response to gasoline price increases may be less than that which was predicted (Businessweek, 1974:58). The most promising estimates have shown that a 10% increase in price would cut demand by less than 3%. This was reinforced by Willenborg and Pitts (1977:31) who suggested that only a dramatic price increase—perhaps about 100 percent—would be effective in lowering gasoline consumption. As a result, "even at once unheard of prices, most Americans would undoubtedly still find ways to keep their tanks full and maintain their current levels of travel" (Sacco, 1976; Moncrief et al., 1977; Brunner and Bennett, 1978; Richman, 1979).

As Martin (1981) suggested, perhaps it is not possible to instill into American consumers a conservation ethic because they are not interested in saving energy, especially for its own sake (1981:104). This appears to be consistent with Henderson's (1978a:17) assertion that:

> the American way of life is sustained by the burning of petroleum and more than 130 million American motorists are not about to let a few pennies per gallon interfere with what they see as their God-given right to drive when, where, and in whatever manner they please.

Thus, it may not be feasible to assume that gasoline consumption will decline in relationship to the amount of price increases.

It would appear that there are many persons who consider it a necessity to continue to drive the distances they currently travel, who are willing to pay a price which increased nearly 60% in two years, and who will resist cutbacks even in the face of gradually increasing prices. Thus, the reduction of gasoline usage can probably best be
accomplished through manipulation of elements in the total picture other than price mechanisms.
(Willenborg and Pitts, 1977:31)

Rationing: Will It Work Again?

Consumers seem to be either unaware or unconcerned about the possibility of future energy shortages. They apparently do not comprehend the ramifications of their continued demand for more and more energy supplies. Freeman (1973:2) suggests that the inevitable result is that:

energy problems will worsen if the United States fails to face disagreeable facts, abandon old habits, and make the difficult choices involved in shaping new energy policies.

Continued price increases used to curtail gasoline consumption do not appear to be the answer. As Burnett (1978:43) has pointed out:

Americans have become so wedded to their automobiles that it isn't clear if any price would make them drive much less. Indeed, a recent survey of business executives showed that prices could go as high as $2 a gallon without curtailing the urge to drive.

In fact, the only thing higher prices guarantee is more inflation, which is the number-one concern of the American people (Burnett, 1978:43). Thus, it could be suggested that all the government would need to do is show consumers the relationship between rationing and the control of inflation and they will accept rationing (Burnett, 1978:48; Henderson, 1978a:17). This parallels with a survey conducted by the Lundberg Letter in 1977. At that time, it was found that 60% of the American people would favor gasoline rationing "if they were offered a choice between
(it) and considerably higher prices" (see Henderson, 1978a:18).

Those who oppose rationing do not appear to have realistically assessed the long-term nature of the crisis. They have not acknowledged President Carter's 1979 energy address to the nation in which he stated:

> The world has not prepared for the future. During the 1950's, people used twice as much oil as during the 1940's. During the 1960's, we used twice as much as during the 1950's. And in each of those decades, more oil was consumed than in all of mankind's previous history. World consumption of oil is still going up. If it were possible to keep it rising during the 1970's and 1980's by 5% a year as it has in the past, we could use up all the proven reserves of oil in the entire world by the end of the next decade. (Energy Policy, 1981:252)

As a result, the following arguments have been posited:

1. The public will not accept gasoline rationing. (Burnett, 1978:43)

2. Its administration would require a vast government agency that would quickly become yet another bureaucratic disaster. (Burnett, 1978:48)

3. Continued price increases are a natural curb on demand. (Freeman, 1973; Richman, 1979)

These arguments appear to be a measure of the government's unwillingness to accept the responsibility for the development of a strong and comprehensive national energy policy (Wirth, 1975; Shippee, 1981). One reason for this lack of commitment to dealing with the energy problem might well be that only another crisis or the immediate threat of a crisis would prompt a new look at emergency preparedness. As late as 1980, Congress simply did not want to give even the appearance of telling Americans to use less gasoline (Energy Policy, 1981:95).

They remained hesitant to be in the position of
being an obstructionist force which restricts individual freedom. (Energy Policy, 1981:96)

This, however, may be understandable in light of the serious concerns about rationing voiced by large and politically powerful organizations such as the National Automobile Association. Its members have argued that consumers would not tolerate the drastic reductions in travel mobility which rationing would demand. Operating with this assumption, in 1979, they began a nationwide advertising campaign using the theme, "Help us protect your freedom to drive" (Energy Policy, 1981:96). The campaign was financed by Chrysler, Ford, General Motors, and others who were instrumental in forming a new corporation called the Automobility Fund. The following is a statement of the focus of its members:

"Don't take your wheels for granted," stated one advertisement that appeared in February 1979 issues of national magazines. "There are people in government and others, whose only answer to our energy problem is to restrict use of the automobile. . . . Join with us. . . . Because if you don't speak up today, your freedom to drive may be restricted tomorrow." (Energy Policy, 1981:96)

Nonetheless, proponents of gasoline rationing continue to justify and legitimate its implementation. They argue the following:

1. Gasoline rationing would give the United States immediate control over the consumption factor of the petroleum equation while alerting the American people to the reality of the energy crisis. (Henderson, 1978a:17)

2. For most Americans, gasoline rationing would force some "real" energy conservation for the first time since 1974. (Burnett, 1978:43)

3. Gasoline rationing would buy the time needed to develop the new energy sources and techniques the United States will need to survive in the twenty-first century. (Burnett, 1978:48)

5. Rationing would empower the federal government to begin the critical and heretofore impossible job of slowing, halting, and then gradually reversing the unsustainable and ruinous growth of energy consumption. (Henderson, 1978a:18)

6. Gasoline rationing would dispel the confusion surrounding the sudden jumps in prices at the pumps which has been caused by the fact that the motorist had only a vague idea of who was getting what out of the price he was paying for a gallon of gasoline or where it came from. (Knowles, 1980:160)
Social scientists are preoccupied mainly with "techniques", "narrow concrete problems", and "analytical theorizing". Detached from empirical realities, recent sociology has produced neither a great synthesis nor discovered a great empirical uniformity. Through empirical research, recent sociology has given us a fuller knowledge of a few specks and dimensions of the total immense, multidimensional social reality, but it has not substantially increased our understanding of the total "superorganic" reality. (Sorokin, 1965:833-843)

As Sorokin (1965:833-843) has pointed out, in the mass accumulation of facts that has traditionally preoccupied social science research, little new sociological knowledge has been generated. He argues that because of an almost exclusive emphasis on microsociological problems to the exclusion of "different realities or the total sociocultural universe" (1965:836), sociology suffers from a lack of theoretical integration. That is, the emphasis on lower-level analytical theories provides a knowledge of only "specks" of social reality. These specks are "often viewed in isolation from the whole configuration of which they are a part" (1965:837). As a result, "the knowledge which is generated is obviously meager and limited" (1965:837).

In addition, social science models which are developed from lower-level analytical theories have largely been a reflection of a rational positivist (or objectivist) mode of thought. That is, the assumptions are made that:

1. Reality exists external to individuals; once individuals come into interaction, they form social structures which constrain their subsequent interactions.
2. Through the development of abstract theory, the social world can be understood.

3. In trying to understand the social world, the contaminating influence of human senses and intellectual biases can be suspended by the application of the scientific method. (Turner, 1978:393)

Social scientists are both encouraged and rewarded for adopting this mode of thought to understand the social world (Bierstedt, 1974; Bernstein, 1978; Skidmore, 1979; Ritzer, 1980, 1981; Perrow, 1981; Kinloch, 1981). As Skidmore (1979:25) points out:

Objective things, in principle, can be measured, counted, observed, and correlated. This is an advantage to the social scientist who wishes to make the strongest possible empirical case for his theories, and to use observable facts to do it. There is also a formidable argument that there is no alternative to the objective approach.

There are two potentially critical problems that have emerged as a result of the acceptance of rational positivism. First, as Zeitlin (1973), Kinloch (1981), and Perrow (1981) have commented, social scientists appear to be primarily interested in constructing rational models of human behavior based on extant mainstream sociological theories. Their concern has not included the testing of whether or not the theories themselves are valid representations of social reality. Thus, the social scientist does not ask if his theory accurately reflects social reality; rather he asks, "Does my model accurately reflect the theory?". A second and related problem which emerges involves the social scientist's insistence on the intrinsic rationality of social action (Kinloch, 1981:57), indeed on rationality as the "norm of science" (Barber, see Merton, 1973:225). An emphasis on rational behavior to the exclusion of an emphasis
on nonrational behavior (see Chapter I) has led social scientists to approach most, if not all, of the phenomena of human existence in the attempt to reduce them to evermore rationally consistent, orderly, and generalized forms of understanding (Zeitlin, 1973; Bierstedt, 1974; Bernstein, 1978; Kinloch, 1981; Perrow, 1981). Thus, the goal of social science research is to study "empirical regularities that are taken to be reflections of the external laws of an objective social reality independent of man's constitutive activity" (Ritzer, 1980:120). Emphases on rationality and objectivity have created a belief that it is possible to "observe, count, put data into the computer, have them analyzed statistically, and in this way gain valuable knowledge about human beings" (Morris, 1977:4). The primary requirement is that the social scientist must act as a disinterested and detached observer having "no vital or practical interest in the situation he observes, only a cognitive or theoretical one" (Zeitlin, 1973:179). It is accepted that this point of view will permit the social scientist to "observe interaction from the outside uninvolved in the hopes and fears of the participants, sharing none of their anxiety about the outcome of their actions" (Zeitlin, 1973:179). Such an approach assumes that human conduct is shaped primarily by common norms. This point of view obviously restricts the range of human behaviors of relevance to the social scientist (Wrong, 1982:104-114), and may well lead to a one-sided, static interpretation of social reality because it does not consider the inherently dynamic and ever changing nature of social interaction (Schutz, 1967; Zeitlin, 1973; Bernstein, 1978; Ritzer, 1975, 1980, 1981; Kinloch, 1981; Perrow, 1981).
Continued emphasis on the development of rational positivistic models of human behavior may serve only to undermine the ultimate goal of social science research--the goal of understanding social reality.

The author suggests that social scientists can no longer evade the anomalies that defeat the current tradition of sociological inquiry. As Ritzer (1981:212) comments:

It is difficult to see how an unreal world (detached from empirical reality) peopled by mindless puppets helps us much in understanding a real world where people clearly have the conscious capacity to create, negotiate, and so forth.

Until social scientists begin to reexamine the fundamental assumptions inherent in the image of their subject matter, Sorokin (1965:837) points out, there will continue to be an overabundant supply of statistical samples and collections of objective facts.

In addition social scientists will continue to suggest some refinements of the techniques of interviewing or questioning, statistical sampling, data processing and content analysis, some elaboration of sociometric, psychodramatic, "scalogrammatic", "group dynamic", "operational", "projective", "cybernetic", "semantic", "functional-structural", and "analytical" research; they furnish us with a number of formulae of uniformities, indexes, and tests, allegedly more "precise" than before; and once in a while they offer an improved variation of a previous sociological theory. But when these refinements, improvements, and reformulations are viewed in the light of the preceding currents of sociological thought, they turn out to be, at best, improvements of details only and sometimes no improvements at all. (Sorokin, 1965:837)
Chapter Goals

The inadequacies associated with past attempts to understand, explain, and predict consumer response to an energy crisis of unknown parameters appear to be a direct result of theoretical and methodological limitations of social science research, in particular the rational positivist mode of thought. As such, the ultimate objective of this chapter is to develop a theory of decision-making which will permit an adequate understanding of potential consumer travel behaviors which may occur under conditions of energy scarcity. Attainment of this goal will necessarily involve: 1) a critique of the rational positivist's approach to understanding consumer response to the energy crisis, 2) a reexamination of the role of rationality in the decision-making process, 3) a re-evaluation of the value of Max Weber's contributions to an objective (or scientific) understanding of social action, and 4) an alternative to traditional images of the decision-making process: A phenomenological model of decision-making.

Theoretical and methodological limitations of rational positivism: The energy crisis

Because of the atheoretical nature of existing studies of consumer responses to the energy crisis, many researchers would be hard-pressed to explain the event described in the Newsweek quotation below:

Rationing got off to a bumpy start where the shortages were worst. Panicky motorists bluffled and bribed to beat the odd-even system and station operators took most of the heat. One station operator reported, "one guy I didn't serve before his tank was full said he'd come back and drop a hand-grenade on me. There is a panic at the pumps and it's the worst I've ever seen." (Newsweek, 1979:22)
With the exception of two articles reviewed for this study (Willenborg and Pitts, 1977; Martin, 1981), theoretical justifications and explanations were conspicuously absent. On the other hand, studies reviewed contained detailed discussions of methodology and statistical findings. This may be somewhat understandable, though not justifiable when it is recognized that "methodology is often confused with sociological theory and 'theory' has come to have a somewhat pejorative connotation in sociological discourse" (Bierstedt, 1974:134). The implication is that theory is subordinate to methodology and as such is "useful" only insofar as it aids research by serving as a source of hypotheses or as a fabricator of analytical tools (Sorokin, 1965; Bierstedt, 1974).

Several studies evaluated by the author for this investigation were nationwide opinion polls and surveys designed to provide insights into consumer attitude and response to the energy crisis (Moncrief et al., 1977; Brunner and Bennett, 1978; Fusso, 1978; Richman, 1979). These polls produced a wide variety of facts. For example, it was found that:

1. Gasoline availability and price will influence future travel behavior plans either not at all or very little. (Moncrief et al., 1977:248)

2. About one-half of the consumers polled believed it was possible to conserve energy and at the same time maintain their present standard of living. (Brunner and Bennett, 1978:248)

3. Sixty percent of the consumers polled opposed a plan of permanent rationing of gasoline as a means of cutting back on the amount of gasoline people use in their cars. (Fusso, 1978:132)

4. Sixty-five percent of the consumers polled say there is not a "real" shortage of gasoline. The big oil companies are holding it back for their own advantages. (Richman, 1979)
These and other similar "facts" have been used in the development of United States energy policy placing a focus on:

1. Obtaining adequate supplies of gasoline for public consumption. (Freeman, 1973; Wirth, 1975; Bearden et al., 1977; Richman, 1979)

2. The growing dependence on foreign oil which must encourage the United States to intensify research and development efforts so that energy independence can be reached. (Energy Policy, 1981)

3. Control versus decontrol of gasoline prices. (Freeman, 1973; Businessweek, 1974; Corsi and Harvey, 1977; Willenborg and Pitts, 1977; Ball, 1977; Moncrief et al., 1977; Bearden et al., 1977; Burnett, 1978; Martin, 1981)

4. Concern for continued freedom and transportation mobility for American consumers. (Murray et al., 1974; Brunner and Bennett, 1978; Richman, 1979; Energy Policy, 1981)

Henderson (1978a:15) points out it is assumed these issues can be incorporated into energy policies which will reflect the best interests of the United States energy budget and the values and needs of the American people. It is thus assumed that American consumers understand and accept the energy crisis as a legitimate problem, resolvable "without undue personal hardship" (Ball, 1977:48-51). The author suggests, however, that policies developed from fact-finding wholly objective research are prone to failure.

Past U.S. energy policies, for example, that suggest the energy crisis can be resolved assume that:

1. Mankind's future well-being is intimately linked to the prospects for an abundant supply of energy at reasonable prices. (Kahn et al., 1976:59)
2. The energy crisis is basically a supply problem and only secondarily one of excess demand. (Orr, 1981:7)

There are two basic reasons why an emphasis on these issues will lead to a continued failure of energy planning in the United States. First, the energy problem is authentic and will be long-term in nature (Ball, 1977:48). A second and related reason why an emphasis on a supply-demand approach to the energy crisis will fail involves an understanding and evaluation of the complex nature of social action. Researchers must begin to realize that all of the knowledge consumers have gained about the energy crisis has been conditioned or colored by the meaning contexts within which it has been acquired, transmitted, or learned. American consumers have been bombarded from all sides with facts about the energy crisis. Their exposure has come through television, advertising, the news media, and their own past experiences, each of which has been critical in shaping perceptions and guiding travel decisions. Murray et al. (1974), Kristol and Anderson (1977), Fusso (1978), Ball (1977), Henderson (1978a), and Shippee (1981) all point out that many of these facts have been inaccurate and misleading. It is also important to note that many consumers do not possess the "intellectual tools" (Sullivan et al., 1980:38) needed to evaluate the accuracy of the information given them. Even if they did, March and Simon (1958:137-171) point out:

Individuals cannot process large amounts of information but only limited bits, and these slowly. Information is distorted as it is processed. Individuals cannot gather information very well even if they could process it; they do not always know what is relevant information, inasmuch as they do not always understand how things work. Above all, they cannot even be sure what their preferences are.
They also have contradictory preferences, of contradictory goals, and are unable to fulfill them all at once. As a consequence, they do not always look for optimal solutions; they settle for the first acceptable solution to come along.

In other words, consumers possess only a limited capacity for cognition and understanding, and much of it is profoundly dependent on their subjective interpretation of the energy crisis. Sullivan et al. (1980:38) have indicated the ability to accurately evaluate consumer perception of the energy crisis is important because policies developed to resolve problems are based on public understanding and acceptance of certain information and facts. As such it would appear necessary to reexamine the reasoning for continuing fact-finding studies of consumer response to the energy crisis. As Bierstedt (1974:145) points out:

Sociologists are currently laboring under the impression that for some reason it is important to invade the American community with a battery of schedules and questionnaires and to compile as many facts about them as it is possible to stuff into a filing cabinet.

The consequences of fact-finding approaches appear obvious to Bierstedt (1974:143-144) who comments:

The more a sociological investigation resembles a collection of facts, no matter how comprehensive, complete, and accurate they might happen to be, the less is its scientific significance. A survey or a census no matter what its intrinsic merit or utility does not contribute to a science except in its function as a laboratory for testing the tools of research, and as a source of data upon which to construct rational scientific theory.

Continued dependence on opinion polling agencies such as the Gallup or Harris Polls (Fusso, 1978) and consumer surveys such as those conducted by Moncrief et al. (1977), Brunner and Bennett (1978), and Richman (1979) places an inappropriate emphasis upon an "aimless assembly of facts"
(Bierstedt, 1974:144) about the energy crisis while subordinating or abandoning the role of theory to explain them (Sorokin, 1965; Bierstedt, 1974). Facts do not speak for themselves. They become meaningful only when they are grounded in theory; when the theoretical question, "Why did this occur?" is asked. As Sullivan et al. (1980:38) point out, facts without theories are merely unsubstantiated statements. In addition, as Skidmore (1979:25) comments, when the theoretical question is asked:

"Why are these objective things the way they are and not otherwise?" pure objectivity does not carry us very far. As soon as an answer to one of these questions comes in terms of will, choice, belief, value, and so on, we are out of the realm of objectivity and face to face with human motives, which do not respond well to "purely" objective research.

In the pursuit of objectivity, it may be that the goal of sociological theory has been misplaced—the goal of generating adequate explanations of social reality. Others too have noted (Kinloch, 1981; Perrow, 1981; Ritzer, 1981) that in their insistence that insights can be gained through the study of objective reality, social scientists fail to realize they are attempting to explain events, many of which are, as Perrow (1981:3) points out:

the result of happenstance, accidents, misunderstandings, and even random, unmotivated behavior. They write articles with simple, elegant, and inclusive hypotheses of what the world "should" look like. They test their models with questionnaires that create the world they want to "prove" exists. Each step contains self-deception.

Also inherent in the fact-finder's methodology is the assumption that "rational calculation on the motivational and behavioral levels, is the prime mover of social conduct" (Brown, 1978:160). Such an assumption
seems only to aggravate the problem pointed out by Perrow (see previous citation). As Ritzer (1975:112) comments, this rational and artificial approach to understanding the social world leads to the assumption that social action is determined by general "laws" which regulate social behavior. These laws can be "revealed objectively through empirical techniques construed to constitute the scientific method" (Ritzer, 1975:112). As March and Simon (1958) point out, however, awareness of the alternatives, facts, and information may not be sufficient to permit American consumers to make rational decisions concerning their travel options. Mills too (see Sullivan et al., 1980:38) suggests:

In this Age of Fact, information dominates their attention and overwhelms their capacities to assimilate it. It is not only the skills of reason that they need - although their struggles to acquire these often exhaust their limited moral energy. What they need and what they feel they need, is a quality of mind that will help them to use information and to develop reason in order to achieve lucid summations of what is going on in the world and of what may be happening within themselves.

The recognition of limited capacity for cognition advanced by March and Simon (1958) and Mills (see Sullivan et al., 1980) is consistent with Perrow's comments on rationality and social action. To reiterate:

Neither social scientists nor people in general are as smart and rational as we think they are. Social scientists mask this reality by desperately trying to make sense of many things that are really quite senseless when examined closely. Yet they convey the impression of lawful, even rational behavior because of research techniques that are largely self-serving. (Perrow, 1981:2)

The author's intent is not to imply that rational human action does not occur; for it surely does (Kockelmanns, 1979:86). Rather the goal is to acknowledge "limited rationality" (Perrow, 1981:2-9) and "nonrational
behavior" (Brown, 1978:160), to generally widen the scope of behaviors of concern to the social scientist as he attempts to understand the complex attitudes and consumer responses to the energy crisis. This will necessarily involve a reevaluation of the social scientist's traditional emphasis on finding and discussing rationally determined relationships between concepts.

The problem of rationality

Most of the time individuals do make rational decisions; and they allege to have good reasons for their actions. The result of the decisions made may have been contrary to what rational individuals "should do". Nonetheless, it has been suggested (Skidmore, 1979:119) that all forms of individual decisions to act are oriented toward some goal, regardless of the motives or reasons given. Perhaps then the social science debate over rational versus nonrational behavior is superfluous (Kockelmans, 1979:86). On the other hand, it could be argued that the problems inherent in the use of rationality to understand social action are relevant to any school of thought or methodology concerned with understanding social action in general and the decision-making process in particular. As Kockelmans (1979:86) comments:

I am convinced that any sociologist who engages in a debate over the rationality of social actions is concerned with an issue of great importance in social theory.

In a review of the theoretical literature in sociology, it was found that a number of social theorists have begun to address the problems with objectivity and rationality in social science research. Sorokin (1965),
Schutz (1967, 1970), Berger and Luckmann (1966), Zeitlin (1973); Ritzer (1975, 1980, 1981), Kinloch (1981), and Perrow (1981) have indicated that one of the major problems found by the sociologist in attempting to remain detached or objective is the inevitability of:

the imposition of rationality upon individuals (as an interpretive device) rather than appreciating their own construction of reality as methods in their own right. Social scientists in particular make human beings out to be "judgmental dopes", attempt to "remedy" their behavior through empirical and theoretical devices, and search for the "invariant" and "calculable" in their research. (Kinloch, 1981:138)

The "judgmental" or "cultural" dope model (Kinloch, 1981; Zeitlin, 1973) appears to have been developed in an attempt to: 1) mask the limited capability possessed by individuals for cognition; 2) fulfill a need to make sense of things, to find an order, to acknowledge a rationality; 3) to eliminate disorder with rational designs; and 4) to generally simplify explanations of all types of social action (Perrow, 1981:2-9).

In their search for order, social scientists have created artificial social beings "who have no real biographical situation in the social world" (Ritzer, 1981:211). It is not the individuals under study but rather social scientists who define their situation for them (Zeitlin, 1973; Perrow, 1981; Ritzer, 1981; Kinloch, 1981). This one-sided image of human action cannot account for the fact that, as Morris (1977:5) points out:

The actions of human beings can be understood only if cultural definitions and the meanings implicit in personal and emotional feelings are taken into account, together with a consideration of the situations in which the behavior occurs.
A majority of social scientists fall short of providing much, if any, insight into this apparently subjective dimension of human action because of their commitment to a narrow sense of science (Ritzer, 1981:211). Essentially, their position is that the subjective dimension of human action cannot be studied scientifically, and as such, is not a legitimate part of the field (Ritzer, 1981:211). The problem is, as Ritzer (1981:211) points out:

Whether or not subjectivity can be studied scientifically, it is a significant aspect of the social world. Thus to ignore it for scientific or other reasons is to ignore an important component of social reality. In ignoring it, sociologists simply create a source of unexplained variance in their work.

Social scientists nonetheless have maintained the scientific attitude. In the process they have developed for imposition on the social world, a "standardization of common understandings" (Kinloch, 1981:139). Such a perspective leads to a conception of the character and consequences of social action in terms of:

- standardized expectancies, compliance with preestablished and legitimate alternatives of action that the common culture provides, a hierarchy of needs dispositions, and available theories of the formal properties of signs and symbols. Social scientists underestimate the individual's interpretive complexity by controlling the research environment and interpreting the subject's behavior only in reference to these standardized expectancies. (Kinloch, 1981:141)

The conceptual model of social action described by Kinloch (1981:138, 141) contains limitations and deficiencies which would render the adequate understanding of consumer response to the energy crisis impossible. In illustration, during the gasoline shortages of 1979, American consumers
were told that "topping off"—filling their gasoline tanks when they are nearly full already—could create a critical problem. The Atlantic Ritchfield Company, during the 1979 shortages, distributed a pamphlet titled, *Oil: America's Continuing Crisis*. In it, consumers were informed that:

The average car contains about four gallons of gasoline at any given time. If motorists suddenly start topping off their tanks—as in the 1973 embargo—millions of barrels of gasoline will shift from service stations to "personal inventory". We would have the effects of a shortage—including lines—when no real shortage exists.

Many consumers did top off their gasoline tanks in spite of this and other well-publicized warnings. Such behavior was nonrational in the theoretical sense of the term. As a result, it could be suggested that it occurred because of consumer ignorance or stupidity. However, had the researcher investigated the subjective dimension leading to consumer decisions, it may have been discovered that there was a strong relationship between consumer belief in the reality of the energy crisis and tendency to top off gasoline tanks; or between distance driven to work each day and topping off. It could even have been related to the "American as energy glutton" label which consumers may have felt was unjustified. Consumers topping off their tanks may have merely been striking back at what they believed to be an unnecessary negative label. As Bradshaw (1979:2-7) points out, America has become an energy intensive society because energy has always been both cheap and plentiful. Therefore, it is neither fair nor constructive to point a finger at the American people and say, "You are energy gluttons". The point is, unless
the social scientist can understand the meaning context in which consumer travel decisions are made, an adequate evaluation of their actions will not be possible.

Rationality and teleology

The predetermined and rational perception of social action presented by the "judgmental dope" model is simplistic and ideologically biased. It may well lead the researcher into a teleological explanation of consumer travel behavior. Teleological analysis indicates that "some future consequence of an event causes that very event to occur" (Turner, 1978:26). Woodman (1977:6) comments:

Teleological arguments are those which predispose the reader to presume that events are heading toward some unalterable and somehow predictable outcome.

As a result, if consumer travel decisions are presumed to be rational, the danger of teleological reasoning emerges. That is, it may be assumed that the effect of rational consumer travel decisions—a stabilized U.S. energy budget—is the assumed cause of those decisions. In illustration, it has been pointed out by a number of researchers (Ball, 1977; Henderson, 1978; Shippee, 1981; Martin, 1981) that consumers must significantly slow down their consumption of gasoline if the United States is to expect to resolve the energy crisis. One way in which this could be accomplished is for consumers to change their mode of transportation from private automobile to the use of mass transit. Therefore, if mass transit is available, and consumers decide to use it as an alternate form of transportation to and from work, it may be assumed they have made a rational decision. This decision to ride the
bus will help in stabilizing the United States energy budget. However, in an analysis of this decision, it may be concluded that the effect of consumers' decisions to use mass transit--movement toward a more stable U.S. energy budget--is also the assumed cause of the decision to use mass transit. Such an assumption may narrow the range of acceptable behaviors for consumers for whom the option of using mass transit exists. This may in turn create a large category of "nonrational" individuals (e.g., those whose decisions instead reflect their politics, concerns for safety, fun, privacy, or tradition). Teleological reasoning seems to deny the reality and meaningfulness of the Hobbesian question, "How is social order possible?" It implies that consumers will internalize the norms of society--in this case, that the energy crisis demands use of available mass transit--because they are motivated by the desire to attain a favorable image of themselves by winning acceptance and/or status in the eyes of others--in this case, by contributing to the stability of the United States energy budget. It is further assumed that:

People are so profoundly sensitive to the expectations of others that all action is inevitably guided by these expectations. (Wrong, 1982:108)

There are two identifiable problems with these premises. The first is that they lead to an image of society as an all-encompassing phenomenon that controls, shapes, and molds the individual. As Skidmore (1979:27) points out:

In its extreme form the argument leads to the conclusion that whatever society wishes to make of us, it can. The individual has no power of resistance.

Ritzer (1981:207-214) comments too that in its construction of an
artificial social reality this "determinist" point of view relies strongly on the need individuals have to conform to societal expectations that contribute to the social order. As Wrong (1982:108) has indicated, however, the social scientist must ask himself the following question:

How is it that violence, conflict, revolution, and the individual's sense of coercion by society manage to exist at all, if this view is correct?

Ironically, it is often assumed that human action that does not fall within the realm of social acceptability has only limited relevance or is thoroughly unsound (Wrong, 1982:108). Deviant or nonconforming behavior is thus accounted for by special circumstances, all of which label the individual in a pejorative manner. These include labels such as "ambiguous norms, anomie, role conflict, or greater cultural stress on valued goals than on the approved means for attaining them" (Wrong, 1982:34).

In their attempts to justify a static conception of social action, social scientists have left little room for the inclusion of the wide ranging scope of consumer perspectives on the energy crisis that actually influence travel decisions. That is, each perception held by consumers about the energy crisis will inevitably lead to different actions. Therefore, it would seem that an evaluation of consumer responses to the energy crisis demands a far more complex examination of social action and the course it follows in the decision-making process. As such, this examination demands a reevaluation of one of the cornerstones of rational positivism, that "social action is determined by institutionalized
patterns, or that human conduct is totally shaped by common norms" (Wrong, 1982:105).

Institutionalized patterns of social action appear in the form of social facts (social structures and social institutions) which are characterized by their external nature and coercive power. They are presumed to exist independent of any individual manifestations. Peter Blau (1960:178) distinguished between two basic types of social facts:

1. **Social structures**: networks of social relations in which processes of social interaction become organized and through which social positions become differentiated.

2. **Social institutions**: which consist of the common values and norms embodied in a culture or subculture.

The conception of social facts implies that reality exists *sui generis*, apart from the individual (Durkheim, 1964). As a result, once individuals come into interaction, they form social structures and social institutions which govern future interaction and develop the potential to define and determine individual behavior.

Social facts do guide human action. However, granting real or concrete status to socially constructed phenomena introduces the danger of reification, which, according to Berger and Luckmann (1966:82), indicates:

> an apprehension of social phenomena as if they were something other than human products - such as facts of nature, cosmic laws, or manifestations of divine will.

Berger and Luckmann (1966:82) further comment that:

> Reification implies that man is capable of forgetting his own authorship of the human world, and further, that the dialectic between man the producer, and his products
is lost to consciousness. The reified world is, by definition, a dehumanized world. It is experienced by man as a strange facticity, an opus alienum over which he has no control rather than as the opus proprium of his own productive activity.

Reification may lead to the researcher to view social facts as if they contained a timelessly valid quality, which implies they must be adjusted to, rather than altered or changed (Ritzer, 1980:46-47). When this view is accepted, the social scientist may neglect a consideration of the interpretive processes that take place in the mind of man which amounts to a denial that much of social action is influenced by the dynamics of reality construction and is not directly observable. An overemphasis on social facts further downplays the realization that:

Human beings are not merely acted upon by objectively and clearly defined social forces; they are constantly shaping and creating their own social reality in interaction with others. (Morris, 1977:8)

A new direction

The author suggests that a careful examination and evaluation of consumer responses to the energy crisis in general and to potentially restrictive conditions of energy constraint in particular are of both practical and theoretical concern to transportation researchers and policy makers. A reevaluation of the role of theory seems especially urgent in light of the apparent failure of United States energy planning (Wright, 1975; Freeman, 1973; Ball, 1977; Mancke, 1977; Henderson, 1978a; Shippee, 1981; Martin, 1981). What is needed is a theory of decision-making that emphasizes the social processes which influence travel behavior. An adequate theory should be general enough to consider the
continuum of diverse and often conflicting perceptions of the energy crisis, yet specific enough to generate adequate explanations and predictions. A reevaluation of Max Weber's contributions to the development of a scientific understanding of social action will provide the foundation for such a theory—a phenomenological model of decision-making.

The legacy of Max Weber

There are those who would attest to the merits of men such as Max Weber. Yet, generally speaking, they argue his conceptual and methodological systems do not provide useful guidelines to the present analysis of sociological questions (Bierstedt, 1974:146; Ritzer, 1980:89). Nevertheless, Weber's goal of developing an objective (or scientific) understanding of human conduct has contributed immeasurably to sociological theory. As such it may be helpful in the development of a theory of decision-making. The uniqueness of Weber's contribution is that he did not distinguish social structures and institutions from the diverse actions of the individuals who both constructed them and provided them with meaning (Ritzer, 1980:84). It was Weber, for example, who insisted that:

To study the development of a social institution solely from the outside, without regard to what man makes of it, is to overlook one of the principal aspects of social life. The development of a social relationship can also be explained by the purposes which man assigns to it, the benefits he derives from it and the different meanings he attaches to it in the course of time. . . .
(Freund, 1968:88-89)

As he developed his interpretive scheme for understanding human conduct,
there is little argument that Weber recognized the complexities of the social world. He acknowledged social reality as a phenomenon unknowable in its totality, reasoning there will always be some other way of looking at it. Because of his belief in the unknowable quality of social reality, Weber insisted the social sciences not copy the natural sciences by searching for general "laws" of social behavior (Weber, 1949:80). He pointed out that if this occurred:

not much useful knowledge would be produced. His reasoning was that any social science oriented toward the development of "timelessly valid laws" would, of necessity, emphasize those patterns of action that are common from one society to another, with the result that idiographic (individualized) events would inevitably be omitted from consideration. (Turner and Beeghley, 1981: 215)

Weber's conceptual schema appears to be critical to the development of an adequate theory of decision-making which emphasizes the enormity of scope of attitudes and perceptions of the energy crisis. As Kristol and Anderson (1977) point out, there is a large array of perceptions of the energy crisis. Each perception will lead to different actions. As a result, if the researcher artificially narrows the scope of the problem in a search for specific laws he will inevitably fall short of his goal—understanding the energy crisis.

Weber also realized the danger inherent in going too far in the other direction, to an emphasis on subjective meaning. He pointed out that while a concern for individual meaning is critical, there is a danger of limiting the realm of knowable phenomena to some sort of "mystical and intuitive reexperiencing of others' desires and thoughts"
This is also consistent with the conception of the energy crisis offered by Kristol and Anderson (1977). They point out there may well be as many perceptions of the energy debate as there are observers, and it is impossible to analyze them all.

Weber offered a resolution to the dilemma involved in the objectivity versus subjectivity debate. He constructed a way of emphasizing the significance of "verstehen" that would permit an integration of individual meaning and general patterns of action. In defense of his orientation, Weber said that sociology should concern itself with the interpretative understanding of "social action" in order to achieve an adequate causal explanation of its course and effects (Weber, 1949). Social action refers to "all human behavior when and insofar as the acting individual attaches a subjective meaning to it" (Abel, 1948:211-218). Weber added, social action takes account of the behavior of others and is oriented by this concern for others. Thus, it can only be understood when considered in an intelligible and inclusive context of meaning (Weber, 1949). In illustration, the decision to pay a high price for a large automobile with low gasoline mileage may seem nonrational. However, the decision may have been made because 1) a friend was killed while driving a small underpowered automobile; or 2) driving a small automobile may not have been equal to the individual's status in the working world. The point is, the decision, however rational or non-rational, was derived as a result of the individual's perception of the negative consequences associated with driving a small underpowered automobile. While this is an individualized (or idiographic) event, as
Weber pointed out (Frank, 1976:18):

Individuals, societies, and events are not unique entities, but rather are representative of one or another general category, and each can be understood only by reference to their general category.

That is, the illustration just used was, in all probability, not wholly unique. Individuals, societies, and events share similar characteristics. As a consequence, wherever people converge it is possible to develop a schematic description of their behavior. "Such description can be thought of as a pattern into which ideas may be placed for convenience and clarity" (Skidmore, 1979:3).

In his development of a schematic description of social action, it would thus seem that the social scientist must be attuned to the reciprocal nature of relationships between the individual and his social environment (Ritzer, 1981:208). As Ritzer (1981:208) further points out, such an emphasis will permit an acknowledgment of the dynamic and historical orientation needed for an adequate understanding of social action, its course and effects. This point of view may well provide the impetus for an integration of nomothetic (generalizing) and idiographic (individualizing) approaches to social life (Ritzer, 1981:75) which may lead to the realization that individual factors or events may be the more salient in understanding social action. To ignore them in favor of an emphasis on general patterns of action would result in the reduction of reality to a set of "meaningless static laws" (Weber, 1903-1917/1949:80).

It was Weber's consideration for the inherently dynamic nature of social interaction that led him to insist the key to understanding social
action lay in the development of ideal types:

conceptual models or mental constructs used in the analysis of social phenomena. They are constructed from observation of the characteristics of subjects under study, but are not intended to correspond exactly to any single case. Rather they are used to describe and test hypotheses about empirical reality. (Encyclopedia of Sociology, 1981:131)

These conceptual models, while they do not mirror the social world, permit the social scientist to classify the varied and diverse dimensions of social action. As a result, it may become possible to uncover the norms which are characteristic of these dimensions. The danger does exist, however, for the ideal type to degenerate into a static and reified conception of social action. That is, it may if the researcher imposes his model and its theoretical assumptions on the individuals under study without assessing the degree to which both are representations of social reality. The ideal type must be viewed as a model in motion that acknowledges social action as a phenomenon contingent on an individual's past experiences which will influence future actions. Use of Weber's ideal type might well lead the social scientist away from an emphasis on institutionalized patterns of wholly acceptable conduct toward a focus on the inherently dynamic nature of the social processes which produce actual behavior. The author suggests that a reintroduction of Weberian objectivity and the conceptual versatility of ideal types in conjunction with a phenomenological approach will offer the social scientist an alternative to the fact-finding nature of the rational positivist methodology.
Phenomenology

In the comparatively brief duration since the concept "phenomenology" was brought into the realm of sociological jargon, it has come to be regarded by a select few sociologists as a viable alternative to the theoretical orientations adopted by a majority of social scientists. Berger and Luckmann (1966:19) comment:

The phenomenological analysis of everyday life, or rather of the subjective experience of everyday life, is a purely descriptive method and, as such, "empirical" but not "scientific" - as we understand the nature of the empirical sciences.

The phenomenological method reveals a specific type of sociological imagination, an imagination that represents a unique way of approaching the constitution of social reality. It is neither "objectivist, static, nor abstractly empirical" (Ritzer, 1980:109). Rather its emphasis is on the dynamics of reality construction. Johnson (1981:60) suggests that phenomenology requires special methods which permit a focus on:

the social processes whereby that which "seems" to be objective social reality is socially created and experienced as objectively factual in the individual's subjective consciousness.

Because of its emphasis on the subjective dimension of the social world, Ritzer (1980:109) has pointed out that "few concepts in sociology have created more confusion than phenomenology." The reason for this is that when reality is viewed as a socially constructed phenomenon, the operationalization of concepts, testing of propositions and hypotheses, and the development of theory are made extensively more difficult (Ritzer, 1980:129). Even its strongest proponents at times find it difficult to explain whether phenomenology is a theory, a method, or a
general descriptive approach to understanding social phenomena (Morris, 1977; Douglas, 1980; Ritzer, 1980, 1981). Some skeptics also suggest that because much of the phenomenological interpretation of social reality is qualitative, "it has made little substantive contribution to either theory or method and represents little more than cultish reaction to mainstream sociology" (Ritzer, 1980:109). Irrespective of these criticisms it is suggested that phenomenology attempts, with some degree of success, to narrow the gap which exists between the more or less stable "objective" world of empirical social forces external to human action and the "subjective" beliefs people hold about them (Johnson, 1981:60).

The phenomenologist acknowledges that:

A knowledge of social reality based on measurements taken of empirical indicators may or may not accurately reflect the underlying social reality that the researcher is trying to understand.

The implication is that an image of social action that interprets social reality in terms of a set of static and coercive social facts insults the intelligence, ability, and judgment of individuals (Skidmore, 1979:27) and reduces them and their consciousness to dependent variable status (Ritzer, 1981:211).

Phenomenological inquiry begins with silence (Psathas, 1972). It involves an attempt to understand and evaluate the meaning of events and interactions to ordinary people in particular situations (Bogdan and Biklen, 1982:31). Those who adhere to its tradition do not presume to "know" what things mean to the people they are studying (Berger and Luckmann, 1966; Schutz, 1967, 1970; Zeitlin, 1973; Ritzer, 1975, 1980,
Rather they begin with the individual and his own conscious experiences. There is an avoidance of the presuppositions and dogmatic assumptions about the ways in which individuals "should" behave. Such an approach may 1) permit an avoidance of the problems inherent in a wholly rational approach, 2) allow the researcher to reintroduce the reality and meaningfulness of the Hobbesian question, 3) recognize limited rationality and nonrational behavior as a relevant focus of the decision-making process, and 4) adequately address the fact that some, if not much of human action is "simply ill-informed, poorly thought through, and not sensible or rational and that all people commit a fair portion of such acts" (Perrow, 1981:4).

On the idea of loose-coupling

Reality construction involves:

a description of the process whereby people continuously create, through their actions and interactions, a shared reality that is experienced as objectively factual and subjectively meaningful. (Johnson, 1981:60)

It is believed that this point of view will permit a less rigid, more "loosely coupled" (Weick, 1976) image of American society. Loose coupling refers to the "disconnectedness of behavior" (Meyer, 1978:15). Within the context of this study, the implication is that there exists continua of:

1. Consumer beliefs and attitudes toward the energy crisis.

2. Social scientist's assumptions about what consumers "should do" to alleviate the energy crisis.
3. Consumer beliefs about what big oil companies, business, and government "should do" to alleviate the energy crisis.

4. Social scientists' conclusions about what steps can/should be taken to encourage consumers to adopt a "conservation ethic".

Consequently, it is inevitable that there will be a "slippage between intention and action, as people find it difficult, impractical, or impossible to carry out their intentions" (Weick, 1976). Inconsistency between intentions and actions may also be accounted for by ambiguous understanding (Freeman, 1973) caused by unclear policy statements (Wirth, 1975), which leads consumers in unintended directions. In other words, a consumer's intentions to conserve gasoline may be rational. However, intervening factors such as conflicting information render attainment of a rational goal--energy conservation--impossible.

If American society were a tightly coupled interactive system, the use of wholly rational assumptions about the individual decision-making process and ultimately, social action, would perhaps be appropriate. However, as Perrow (1981:9) points out, such an image will:

inevitably lead to policy failures more significant and catastrophic than the failure of loosely coupled and less interactive systems.

The implication is that if the assumptions of rationality and efficiency are not sufficient in account for social action, then one must turn to the "preferences and decisions of individuals" (Meyer, 1978:15). In illustration, consumers are angry, frustrated, skeptical, and confused about the severity and reality of the energy crisis. They neither care about, understand, nor actively seek out information (Meyer, 1978:15)
from every dimension of the energy crisis (e.g., political information, economic analyses, and/or social consequences). As such, while the purpose of disseminating information is to advocate compliance through understanding (Sullivan et al., 1980:38), this goal will be only imperfectly achieved.

Consumer's assessments of the energy crisis also depend on how the situation has affected them in the past and on how they perceive it may affect them in the future (Murray et al., 1974; Moncrief et al., 1977). These two factors may well be significant determinants of behavior. Even if consumers have an accurate understanding of the situation, they may be so angered by it that their behavior is nonrational—in effect a reflection of their anger and not their knowledge. The wide-ranging and conflicting information they have received may on the other hand, be insufficient for them to draw rational or reasonable conclusions. This contradiction in messages is reflected in the following statements:

Recent articles have focused on the international "oil glut" and the real progress the United States has been making domestically. Even venerable Harper's Magazine graced a recent cover with the flat assertion that "The Energy Crisis Is Over". (Luken, 1982:20)

The White House and Congress may just let U.S. consumers enjoy the pleasures of relatively low gasoline prices and freedom of mobility regardless of the unhappy consequences that might mean in the future. (Merbach et al., 1982:64)

Critics of the oil industry have charged repeatedly, and with some evidence, that shortages of gasoline have been produced artificially in order to increase retail prices for gasoline. During the gasoline shortages in the United States in 1979, it was reported that the big oil companies were keeping the supply low simply by significantly reducing the speed of their oil tankers. (Cook, 1979:229)
It is little wonder the American people are confused. Upon close exam­
ination of the multitude of information they are expected to digest, it
is also less surprising they appear to be unwilling or perhaps unable to
rationally consider altering their travel decisions in response to what
is objectively a critical situation.

In conclusion of this section, to what extent and more importantly,
under what circumstances nonrational behavior is significant in a theory
of decision-making has not been previously explored. The author suggests
that emphasizing rational/nonrational behavior on a continuum will aid
in increasing the range of relevant behaviors of concern to the social
scientist. As a result, it may well become possible to widen the scope
of understanding and increase the predictive power of models of decision­
making. A discussion of the need for such a development follows.

Should conceptual models mirror the "real" world?

To explain certain observed actions, the social scientist
constructs ideal typical courses of action along with their
accompanying hypothetical actors, whom he endows with
equally hypothetical consciousness. All this he does as it
relates to his specific scientific problem. Fictitious
motives are thus ascribed to fictitious actors in fictitious
situations. (Zeitlin, 1973:180)

Ironically, it has been suggested by Zeitlin (1973), Ritzer (1975,
1980, 1981), and Kinloch (1981) that some artificial distinctions are
needed in order to understand the social world. As Ritzer (1981:208)
points out:

We should not mirror the social world in our conceptual sys­
tems. If we do, we are simply replicating the confusion of
the world in our paradigmatic systems. Instead, what we
should be doing is developing systems of ideas that help us
to better understand the confusing reality of the social world. In short, a confusing or confused paradigm is of little utility in helping to understand a confusing social world. It is a paradox, but artificial distinctions are needed in order to deal with the real world.

Some comment and evaluation appear to be in order on Ritzer's (1981:208) statements. There is an objective reality labeled "the energy crisis". It is a condition which has led to political and academic debate, negative public sentiment, and a variety of conflicting interests (Wirth, 1975). On the other hand, the interpretation of the energy crisis, however simple or complex it may be, is mediated through the senses. As such, consumers do not "directly" experience it. As Zeitlin (1973:173) comments:

What we see is not at all the so-called "concrete" or "actual" world. For the most rudimentary commonsense perception involves highly complex abstractions. What we see is never just a "thing", "out there", "as it is". It is rather a thought object constituted by our consciousness.

In other words, something occurs in an individual's mind between the time a stimulus is introduced at point "A" and a response is exhibited at point "B". For example, consider the following statement excerpted from a CBS evening news report of July 3, 1982:

Consumers may find cash pump savings of up to $0.06 a gallon of gasoline this Fourth of July weekend. Service stations are competing for cash customers. They are using "sales gimmicks" we have not seen since before the oil embargo of 1973.

Even if the statement were taken at face value it contains a multitude of interpretations. If consumers believe in the "oil company conspiracy" theory, for example, it could have been construed as an attempt to
increase sales and maximize oil company profits. While this may be a nonrational interpretation, it addresses the creative process of reality construction which Berger and Luckmann (1966), Schutz (1967), Ritzer (1981), and Kinloch (1981) argue should be of concern to the social scientist. To ignore this interpretive process reduces the individual to a being totally constrained and coerced by external social forces. As a result, from a social scientific approach, consumer response to the energy crisis should be totally predictable. It is not. Still, in their attempts to be scientific, Ritzer (1981:212) comments:

Sociologists continue to create an actor that bears little resemblance to actors in the real world. It is difficult to see how an unreal world peopled by mindless puppets helps us much in understanding a real world where people clearly have the conscious capacity to create, negotiate, and so forth.

In an attempt to resolve this "problem" it is suggested that "what social scientists should be doing is developing systems of ideas" (Ritzer, 1981:208) that will illuminate and enrich their understanding of the energy crisis. Accomplishment of the objective will require the social scientist to strive for consistency and congruence between his constructs and those of the experiences of the American consumer (Schutz, 1967:44). As Zeitlin (1973:180) comments:

The fact that the social scientist has set the stage, assigned the roles, and written the scripts does not mean that his "puppet show" cannot illuminate the real social world. On the contrary, these "abstract", "fictitious", and "rational" models are indispensable in thinking about real individuals and their actions; if properly constructed they may in fact provide an understanding of social reality.

The factors that the social scientist must keep in mind as he develops
these dynamic models are that:

1. Individuals are not simply controlled by external social forces.

2. They also play a role in the construction of those forces both historically and contemporaneously.

3. As a result, an emphasis on the subjective and socially constructed nature of reality is of overwhelming significance. (Ritzer, 1981:214)

Of particular concern to the phenomenologist is the need which exists to develop:

...a dynamic, processual, creative sense of the individual who, while somewhat constrained by social forces is still able to exhibit at least partially innovative responses and to have some kind of impact on the larger social structure. (Ritzer, 1981:214)

It is important to point out that the potential of an individual to act, in part innovatively and creatively, does not mean there will be no pattern to his creativity (Ritzer, 1981:215). As Weber pointed out, the danger lies primarily in constructing models that digress so far from "actual" behavior that they become incongruous with them.

**Consciousness**

The construct which repeatedly appears as a hindrance to the social scientist is "individual consciousness" defined as follows:

Consciousness is the perception of what passes in an individual's own mind. Consciousness or reflection is a person's observing or noticing the internal operations of his mind. It is by means of consciousness that a person acquires the ideas of the various operations or mental states, such as the ideas of perceiving, thinking, doubting, reasoning, knowing, and willingness, and learns of his own mental states at any given time. (Encyclopedia of Philosophy, Volumes 1 and 2, 1967:191)
Whether or not consciousness can be studied scientifically, in the strict sense of the term, it is still a significant component of the social world (Zeitlin, 1973; Ritzer, 1981; Kinloch, 1981). As it was pointed out earlier, in ignoring it sociologists simply create a source of unexplained variance in their work (Ritzer, 1981:211). In acknowledging it, however, they must reexamine existing theoretical orientations and methodologies which may lock them into an inadequate approach to understanding the social world. In this reexamination, they may begin to see the need to focus on a theoretical and methodological approach which permits them to get at:

the obdurate reality of consciousness. The obdurate character of consciousness should not intimidate us since most of the social world is similarly difficult to penetrate. (Ritzer, 1981:212)

The conclusion drawn is that there is "no one natural objective order independent of man" (Ritzer, 1980:120). Realizing this, the social scientist must "take great care not to distort subjective definitions through the lenses of his own deductive concepts" (Ritzer, 1980:120). In fact, he must work from the ground up, so to speak, as he focuses on:

the form of the process by which all persons construct and utilize the data which constitute social reality, however aberrant that reality may seem to the researcher. (Woodman, 1977:8)

In other words, in focusing on the ways in which individuals create social reality, the social scientist may rephrase the Hobbesian question, "How do decisions make the social order possible?" to:

What reality construction devices are consistent enough across social aggregates to allow social scientists to
Psathas (1972:132-133) states his position of the advantages of this approach:

The distinction between natural science and social science, as Natanson, Schutz, and others clearly point out is based on the fact that men are not only objects existing in the natural world to be observed by the scientist, but they are creators of a world, a cultural world of their own. In creating this world, they interpret their own activities. Their overt behavior is only a fragment of their total behavior. Any social scientist who insists that he can understand all of man's behavior by focusing only on that part which is overt and manifested in concrete directly observable acts, is naive, to say the least. The challenge to the social scientist who seeks to understand social reality, then, is to understand the meaning that the actor's act has for him. If the observer applies his own categories or theories concerning the meanings of acts, he may never discover the meanings these same acts have for the actors themselves. Nor can he ever discover how social reality is "created" and how subsequent acts by human actors are performed in the context of their meanings.

In breaking down the obstacles that have reified the necessity for distance between himself and his subjects, the social scientist can pay more specific attention to the following questions:

1. What particular motivations prompt the construction of social reality?

2. Why do they do so?

3. What are their behavioral consequences for consumers who are operating under conditions of energy constraint?

Motivation

If we are to construct a theoretical perspective emphasizing the creative conduct of individuals, and if we are to account for institutional structures by reference to individual lines of action, then the theoretical explanation of these lines of action is paramount. (Skidmore, 1979:219)
An adequate understanding of what it is that motivates social action must include the meaning of the action and the degree of clarity with which the social scientist is able to grasp that meaning (Schutz, 1967:19). Schutz (1967, 1970) suggests there are two basic types of motives which may aid the social scientist in reaching this level of understanding. The first is the "in-order-to" motive which refers to a future state that an individual wishes to bring about by his actions. This future state involves the completed act which the individual has imagined in his future perfect tense (Schutz, 1967:91). According to Schutz (1962:20):

"A characteristic of genuine "in-order-to" motives is that they have causal efficacy. Motivated the way of "in-order-to", therefore, is the 'voluntative fiat', the decision: 'Let's go!' which transforms the inner fancying into a performance or an action gearing into the outer world."

The second type of motive is the "because" motive which refers to past experiences the individual may have had (Schutz, 1967:91). Woodman (1977:8-9) comments:

"The "because" of an act resides in the environment; the socialization, the past experiences of the individual. These experiences have influenced his decision to act as he did."

For both theoretical and methodological considerations, it is important to note that traditional methods of research into the individual decision-making process have used interviews or questionnaires. The latter have employed the "what if...?" and "why did you...?" survey instruments. Woodman (1977:9) has pointed out that this method is predestined to derive answers consciously constructed by the respondent using
rational, and hence socially acceptable, "in-order-to" motives. This criticism is consistent with Wrong's (1982:108) discussion on the "man as conformist" perspective accepted in sociology. He (Wrong, 1982:108) comments:

Parsons' model of the "complementarity of expectations", the view that in social interaction men mutually seek approval from one another by conforming to shared norms, is a formalized version of what has tended to become a distinctly sociological perspective on motivation.

In illustration, a respondent may inform the researcher he purchased a fuel efficient automobile "in-order-to" save both money and gasoline. Realistically, however, the cost of the automobile was thousands of dollars more than fuel costs could ever save him. It may have been more probable to assume the individual's social environment--occupation, residence, socioeconomic status, or family type--was influential in his decision. He may have felt, for example, that a low mileage automobile presented him as an energy conscious individual and hence would increase his status in the eyes of his employer. The point is, it may well have been a nonrational "because" motive and not a rationally determined "in-order-to" motive that led to his purchase. If policy research emphasizes "in-order-to" motives to the exclusion of "because" motives, the result will tend to be ex post facto explanations of behavior. Finsterbusch and Motz (1980:25) have commented that a major defect of such an approach is that it fails to take account of the limits of human knowledge. That is, it must be realized that while individuals are conscious of their "in-order-to" motives, they are not conscious of their "because" motives (Schutz, 1967, 1970). This
assertion seems relevant in light of arguments posed by Kristol and Anderson (1977) and Sullivan et al. (1980) in which it is pointed out that people are rarely aware of the extent to which the reality they experience is shaped by factors in their environment such as "culture, education, advertising, the news media, and past experience" (Sullivan et al., 1980:38). They become aware of their actions only after the act or its initial phases have been completed (Zeitlin, 1973:177). In addition, Schutz (1967:96) comments:

An adequate social science and theory must be concerned with both types of motives. Social phenomena are only understandable if they can be reduced to human activities; and human activities are only made understandable by showing their "in-order-to" and "because" motives.

**Commonsense knowledge in everyday life**

Individuals share and experience the social world intersubjectively. The concept of intersubjectivity acknowledges that groups of individuals both interpret and experience the social world in a similar manner. The phenomenologist assumes that this reciprocal understanding is needed for successful interaction to occur. Thus, the reality of everyday life is never wholly private, not even in the consciousness of the individual.

As Schutz comments (cited in Zeitlin, 1973:171):

I find evidence of others, evidence that my unique biographical situation is not wholly the product of my own actions. Each of us is born into a historically given world that is simultaneously natural and socio-cultural. Each of us is an element in the life situation of others, just as they are in ours. I act upon them and they act upon me, and we all experience our common world in a similar fashion. Our experience of this everyday world is a commonsense one, for each of us takes for
granted that our fellow men exist, that we can communicate with them, and that they live in the same natural, historical, and sociocultural world that we do.

The phenomenologist is concerned with the social processes used by individuals as they construct and share the subjective meaning structures which are the basis for the decision-making process and ultimately for social action. As a result, his conceptual model will refer not to a "mindless meaningless world, but to a socially constructed world of meanings" (Zeitlin, 1973:176). Care must be taken in the development of these models. The constructs included must permit an objective understanding of social action and its accompanying subjective meaning.

Schutz (1967) has suggested three basic postulates which the social scientist may follow as he attempts to understand and explain social action within the commonsense reality of everyday life:

1. **The postulate of logical consistency**: the system of constructs should have the utmost clarity and distinctness. (Schutz, 1967:43)

2. **The postulate of subjective interpretation**: this underlies Weber's conception of the main task of sociology: the concepts and models should enable the social scientist to refer human action and its consequences to the subjective meanings of the actors involved. (Schutz, 1967:43)

3. **The postulate of adequacy**: each term in a scientific model of human action must be constructed in such a way that a human act performed by an individual in the way indicated by the construct would be understandable for the actor himself as well as for his fellow men in terms of commonsense interpretation of everyday life. (Schutz, 1967:44)

Postulates two and three clarify the phenomenological position on subjective meaning (or verstehen). Schutz (1967), like Weber, insisted that
a subjective understanding of social action does not involve the generation of "private, uncontrollable, and unverifiable intuition" (Schutz, 1967:56). Rather the emphasis on verstehen should be:

subjective only in the sense that the purpose of the method is to determine what meaning the action has for the actor as opposed to his partner or a disinterested observer. (Schutz, 1967:56)

The primary objective of the phenomenological method, then, is to use "verstehen" as a "commonsense method of everyday life that yields public, controllable, and verifiable conclusions" (Zeitlin, 1973:181). Also, in drawing from Weber's conceptual scheme, the phenomenologist acknowledges:

a concern with the actor's subjective meanings must not be construed to imply that the actors are always conscious of their intentions and purposes. Nor, certainly, should a concern with meaning lead one to ignore the fact that the actors' actions entail consequences that they did not intend and of which they are unaware. In this area the social scientist may make a most important contribution; he alone may be equipped to see what the direct participants do not see - the drama working itself out beyond their gaze. (Zeitlin, 1973:170)

The social scientist may accomplish his objective of understanding social action by observing individuals within the context of the situation under study. As he does so, he will "construct typical behavior or course of action patterns from what is observed" (Schutz, 1967:63-64). A discussion of the way in which Schutz (1967) uses the concept "typical" or "typification" in his evaluation of intersubjectivity follows.

Typifications

Typification refers to the ability to establish a situation or object as being part of a socially significant category of situations and objects. Actors sharing common sets of typifications are able to structure their experience
of the world similarly by applying common meanings to significant regions of experience. (Schutz, 1970)

The device individuals use to understand the reality of others in interaction is the "typification". Many, if not most, of the social situations encountered are characterized by "typical cases of interaction" (Berger and Luckmann, 1966:29-30).

Most of the time, my encounters with others in everyday life are typical in a double sense - I apprehend the other as a type and I interact with him in a situation that is itself typical. The typifications of social interaction, however, become progressively anonymous the farther away they are from the face-to-face situation.

The importance of the concept "typification" seems obvious for the social scientist attempting to understand the decision-making process. For example, the tendency exists for the social scientist to use his own typifications rather than those of the individuals he is studying (Woodman, 1977). The shortcoming of such an approach is clear. The social scientist's typifications may be used to presume how respondents "should" make decisions. This may in turn produce the dangers inherent in Kinloch's (1981) "judgmental dope model."

The usefulness of the concept "typification" is that it permits an emphasis on the general categories of social action (Weber, 1949) that emerge in the course of everyday life. The significance of this is that the study of the dynamics of reality construction need not be unsystematic. Rather, they can permit a scientific analysis of social action by focusing on "decisions made by individuals acting in groups" (Woodman, 1977:14). This may be made possible as the concept of "relevance" is

My relevance structures intersect with the relevance structures of others at many points, as a result of which we have "interesting" things to say to each other. An important element of my knowledge of everyday life is the knowledge of the relevance structure of others. (Berger and Luckmann, 1966:43)

The key words in Berger and Luckmann's statements are "at many points". The implication is that while others have a perspective on the everyday commonsense social world, that world does not appear identically to everyone. For example:

My here and now is their there. My now does not fully overlap with theirs. My projects differ from and may even conflict with theirs. (Berger and Luckmann, 1966:22-23)

This point of view produces some insights as to how social decisions are made. As Woodman (1977:15) points out, "what passes for knowledge is not evenly distributed." Because of this, social scientists should perhaps widen the parameters of relevant behavior. It is not sufficient to assume that everyday commonsense knowledge is something to which everyone has access or which everyone considers relevant. The author suggests that Berger and Luckmann's contributions to a conceptual model of decision-making demand that the social scientist reconcile the "totality of the social context and the dynamics of reality construction as they work together to produce the outcome of individual decisions. In summary of this section, Brewer and Woodman (1977) have developed a model from the Berger and Luckmann (1966) formulation depicting the dynamics of reality construction (see Figure 4). It is suggested that this model provides a guideline for social science research into the decision-making process.
V. REIFICATION

When meanings become focal and commonly accepted as real so that the reality is no longer subject to negotiation, reification is said to have occurred.

IV. OBJECTIVATION (OBJECTIFICATION)

When meanings assigned to the individuals are accepted by others, then the meanings are perceived to be objectively real.

III. RESUBJECTIFICATION

When assigned meanings (for any set of reasons) have been found not to serve intended functions, the meanings are changed, deleted, expanded (and so forth) and objectification may occur again.

II. SUBJECTIVATION (SUBJECTIFICATION)

As human beings move through the ontological world, they attach meanings to some objects and classes of objects. Some meanings are preexistent (socially derived before the individual) and others are intersubjectively assigned by the individual and others.

I. ONTOLOGY

The empirical world as an object in itself, unknowable in its totality.

NOTE: Broken line arrows are associated with weak delineations. While Berger and Luckmann may draw distinctions between the terms shown in parentheses for a semantic reason, we prefer to use them interchangeably.

Figure 4. Simplification of Berger and Luckmann formulation of the dynamics of reality construction (Taken from Brewer and Woodman (1977.)

which may well alleviate the danger of stressing reified, ahistorical analyses of the decision-making process.
Woodman and Brewer (1977) comment on their model as follows:

This figure contains a simplification of Berger and Luckmann's (1966) depiction of the process of reality construction. There, ontology serves as the data for reality construction wherein meanings are socially negotiated and attached to some social objects and not to others (called "subjectivation" by them). If, at some point these subjectively held meanings come to be consensually held to be real by most others, "objectivation" has been said to occur. Here, the meanings are taken to be real in an objective sense. Two things may then happen. "Reification" may occur, wherein the meanings attached are made no longer subject to negotiation, or some external or internal pressures may cause "resubjectivation" where new meanings are attached to the cultural elements.

General perceptions of the energy crisis: Problem or dilemma?

Two generalized conceptual models depicting consumer perception of the energy crisis may be considered to illustrate the degree to which "typification" and "relevance structures" may be applied to understand consumer travel decisions under conditions of energy constraint. The model presented by Orr (1981) may provide useful insights even though it presents the energy crisis as a dilemma (see Figure 6). The model offered by Kristol and Anderson (1977) on the other hand may be a wider, and hence more valid representation of the diverse and significant segments of opinion held by energy decision makers, analysts, and American consumers (see Figure 5).

It is suggested that the presentation of the energy crisis as a dilemma (Orr, 1981) could have been instrumental in the development of the antigasoline rationing approach discussed by Burnett (1978:43). It could also have been used as a justification for the rationing by price theory adopted by economists (Businessweek, 1974;
| Perception A. | tends to assume that energy policies that worked well in the past are also best for the future. The energy problem, as such, is essentially one of developing new supplies to meet expanding needs of consumers. |
| Perception B. | tends to see "business as usual" as a bankrupt strategy. It calls for a major reordering of values and priorities and sees the future as a whole new ballgame. |
| Perception C. | implicitly assumes that the trends that have characterized industrial society thus far cannot continue much longer. |

Figure 5. Model of consumer perception of the energy crisis (Taken from Irving Kristol and Robert O. Anderson, Energy, Society, and the New Class. Stanford Research Institute, 1977.)

| Perception A. | Energy is unanimously regarded as the key to future human progress defined in material and technological terms. |
| Perception B. | The energy crisis is basically a supply problem and only secondarily one of excess demand. More energy consumption is good. It is directly correlated with economic growth and with the quality of life. |
| Perception C. | The energy problem can only be solved by the elaboration of the existing technological paradigm (a "technological fix" solution). |

Figure 6. Model of consumer perception of the energy crisis (Taken from D. W. Orr, Problems, Dilemmas, and the Energy Crisis (1981: 3-17))
Willenborg and Pitts, 1977). It would then be most useful in the study of crystallized attitudes resulting in static conceptions of social action and continued failure of energy policy.

The model offered by Kristol and Anderson (1977), however, may permit the use of Weberian objectivity and methodology as useful tools for describing the decision-making process which leads to different types of consumer actions. The scope of perceptions presented by Kristol and Anderson may permit a realistic response to what Weber termed the most important methodological question facing the social sciences:

In what sense are there "objectively valid truths" in those disciplines concerned with social and cultural phenomena? (Turner and Beeghley, 1981: 211)

Conclusions

The goals of this chapter have been to demonstrate the manner in which objective scientific inquiry is rationally plausible in a discipline whose subject matter includes the subjectively meaningful actions of individuals. It is only in this way that an adequate understanding of the decision-making process is possible. In its use of Weberian objectivity as a methodological tool, phenomenology meets the requirements for providing insights into the decision-making process which have previously been impossible.

Phenomenology presents the researcher with a solid foundation for an adequate theory of decision-making. It is general enough to include all relevant social phenomena, yet specific enough to generate adequate explanations and predictions. The phenomenologist is concerned, then,
with 1) creating the social context within which individual decisions are made, 2) clarifying the nature of the social context, and 3) specifying the individual's place within the social context. This point of view allows the researcher to avoid the imposition of rationality and standardized expectancies which "make out the individual to be a judgmental dope of a cultural and psychological sort, or both" (Kinloch, 1981:138). The phenomenologist is also aware that in stressing objectivity (or scientific rationality) he is removed from the "practical rationality" of everyday life. As such he must take care not to confuse the reality construction processes used by persons in everyday life with scientific objectivity. Should this occur, those subjects under study may be "forced into preconceived molds that belie the reality of everyday life" (Poloma, 1979:187). This is consistent with Woodman's (1977) position, that a "good decision theory should not lend itself to an unseemly amount of ideological imputation." He points out (1977:6), for example, that:

The assumption of "mini-max" theorists that individuals assess costs and benefits solely on the degree to which the latter exceeds the former presumes far too much about human motivation, including such things as altruism, greed, and individual satisfactions.

A phenomenological model of decision-making will also provide a "framework for understanding decisions in such a way as to leave the subject of the research with a maximum of discretion" (Woodman, 1977:6). The researcher who emphasizes rationality in a model of decision-making to the exclusion of nonrationality may artificially narrow the range of relevant behaviors to be studied. As Wrong (1982:105) comments, to a
social scientist imbued with the conception that social action follows a rational path, opposition of individual and common interests has only a very limited relevance or is thoroughly unsound. Such an approach not only disposes of the Hobbesian question, it also presents the danger of teleological explanations of social action.

Woodman (1977:6) points out that "teleological arguments are those which predispose the reader to presume that events are heading toward some unalterable and predictable outcomes." While individual decision patterns do decrease the possibilities of subsequent decisions, a theory of decision-making should not contain a list of predetermined outcomes, as such an approach may preclude "actually checking to see what occurs" (Woodman, 1977:7). The implication is that the most critical elements to be included in an adequate model of decision-making should neither be derived solely from internal (or psychological) nor external (or social structural) sources. Rather, as Woodman (1977:8) comments, it should be derived from a "combination and perhaps unequal weighting of the two." To artificially weight variables in terms of the degree to which causality is believed to exist appears to be inherent in the positivist mode of inquiry. This artificial weighting tends to allow the social scientist to lose sight of his ultimate goal--to develop an acceptable explanation of the decision-making process that handles individual and social structural factors equally well (Skidmore, 1979:26). The positivist mode of inquiry renders attainment of this goal impossible. The result is a one-sided and teleological explanation of the decision-making process and the behavior it produces. On the other hand,
am emphasis on both individual and social structural variables carries with it the danger of the social scientist vacillating from one side to the other, resulting in an explanation more muddled and more confusing than enlightening (Skidmore, 1979:26).

It would appear critical to find a balance between internal and external variables. Phenomenology offers an alternative which will reduce the problems presented by the positivist approach, which are, according to Stinchcombe (1978:3-4) as follows:

The central model of positivism is that researchers are forbidden to think between the time they "posit the hypotheses" and the time they "accept or reject the hypothesis", after calculating a bit and transforming something they want to know into something they do not want to know (the null hypothesis). A really pure priest of positivism will only accept or reject the null hypothesis, never leaving the sacred precincts to make any bet about what the "real" world is like. The extreme of positivism is only to agree to talk about which theories have been rejected by the facts.

Phenomenology may not encourage the construction of artificial parameters of social action, nor the quantification and degree of rational inquiry offered by the positivist. However, as Bierstedt (1974:148) comments, sociology is not a mathematical discipline and as such cannot subsist on purely rational and empirical fare. In other words, adherence to the positivist tradition may result only in "busy work and in trivial, though systematic exercises." Phenomenology, on the other hand, offers a potent new method for the generation of knowledge which may provide insights into the decision-making process not possible using tightly structured, un-bending assumptions about what the social world "should" look like.
CHAPTER IV. METHODS AND MODELS FOR ANALYSIS OF THE DATA

The methodological goals of this chapter will emphasize an understanding of both theory and method and how they fit together to provide answers to questions asked about social reality. As Cohen (1980:95) points out:

If theories are to be more than the wise sayings of great men, their evaluation depends upon knowing how to evaluate; and knowing how to evaluate unavoidably involves issues of method. Similarly, methods for gathering observations, analyzing data, and making inferences, inevitably entail theoretical sophistication.

This chapter will entail more than just a description of the "method" or tool used to collect the data for this investigation. In an attempt to maintain an awareness of the theoretical importance of such a study, the author will present the following sections within this chapter: 1) the source of the data and the method and reasons behind the sample selected; 2) problems associated with the data set which emerged as a result of the newness of the methods (e.g., because this type of study has not been conducted before, it was not known what kinds of problems would occur); 3) merging the data sets collected during 1979 and 1980; 4) reasons why it became necessary to merge data sets; 5) theoretical and methodological advantages and disadvantages of simulation research; 6) the reliability and validity of simulation SHORTAGE; 7) SHORTAGE: Logic behind the development of strategy categories used by participants in SHORTAGE, including the creation of legal and illegal categories of alternatives; 8) specification of statistical procedures to be used in the analysis of the data; 9) combining the presimulation questionnaire
data with the data from SHORTAGE for purposes of statistical testing; 10) method used in collapsing questionnaire response categories and strategy categories; 11) testing for significant differences between presimulation and postsimulation responses in an attempt to determine whether or not knowledge gained from participation in SHORTAGE significantly altered respondent attitude toward the gasoline shortage, and finally; 12) relationships will be suggested between the presimulation questionnaire data and the SHORTAGE data.

Source of the Data

The data used in this study were collected at two different times over a sixteen-month period of time. For each group, the author and two graduate research assistants collected the data in Room 206 Curtiss Hall at Iowa State University, in Ames, Iowa. Curtiss Hall housed the local PLATO terminals. PLATO is a large time-sharing computer based at the University of Illinois and is jointly operated by the University of Iowa and Control Data Corporation.

The first data set was collected during June and July, 1979, from fifty-two Iowa State University students. The population from which the sample was drawn included all students enrolled during the first summer session in Sociology 134 (Introduction to Sociology), Sociology 420 (Complex Organizations), and Civil Engineering 351 (Introduction to Transportation Engineering). The second data set was collected during July, August, September, and October of 1980, from ninety-two Iowa State University students. The population from which the sample was drawn
included all students enrolled during the first summer session in Sociology 420 (Complex Organizations), Civil Engineering 351 (Introduction to Transportation Engineering) and all students enrolled during the fall quarter 1980 in Sociology 134 (Introduction to Sociology). All participating students ranged in classification from freshman to senior. The engineering and upper division sociology classes were composed primarily of majors in the respective disciplines. The Introductory Sociology class, however, because it is an elective for many departments, enrolls students from across all Colleges within the university.

Method of Sample Selection

The author received permission from instructors in each of the classes to solicit student participation in SHORTAGE. It was decided by the research group, including the author and the principal investigators, that students would be unlikely to volunteer for the task without incentive. Consequently, with permission of the Department of Sociology and Anthropology chairperson, each student was offered one academic credit in Sociology for participating. It was believed student interest, curiosity, and/or motivation to participate would increase with such an offer, and this offer was made to all students enrolled in these classes.

Instructors from each class informed students briefly of the nature of the project. Those interested were asked to identify themselves via index cards. Each student was contacted by telephone, given adequate information about the project, told what would be expected, and how much of a time commitment would be required. The author contacted each
potential participant over a nine-day period of time for both the 1979 and the 1980 groups of participants. The following statement of information was given during the course of the telephone conversation:

I understand your instructor has briefly informed you of the nature of the research project in which you have offered to participate. I must inform you that your participation is completely voluntary. If, after I have finished explaining the details to you, you wish to change your mind and not participate, you may feel free to do so. You will be asked to meet me in Room 206 Curtiss Hall. Upon your arrival there you will fill out a questionnaire which has been designed to assess consumer attitudes toward the energy crisis. The questions will refer specifically to the gasoline shortage. Upon completion of the questionnaire, you will be introduced to PLATO, an interactive gaming computer. You will then proceed to participate in SHORTAGE, a gasoline rationing simulation. I am interested in assessing consumer travel decisions under conditions of energy constraint. SHORTAGE is a straightforward simulation. You should have no difficulties understanding the rules of the game. If you do have problems, someone will be nearby to help you. When you have finished the simulation, you will be asked to fill out another questionnaire, one that is identical to the one to which you responded when you first arrived. This will be done because it is believed that once you have gained the knowledge and experience presented to you by SHORTAGE, you may want to alter some of your presimulation responses. The entire process should require no more than thirty to forty minutes of your time. I have been authorized to offer you a one credit grade of A in Sociology for your commitment and participation.

There was some initial student skepticism concerning the offer of one academic credit for such a brief time commitment. However, it was pointed out that the nature of the research topic and methodology warranted such an offer. Following the expanded explanation below, student skepticism seemed to be alleviated.

Simulation SHORTAGE is a relatively innovative data collection instrument. It may provide social scientists with new insights into the understanding of the energy crisis. Thus, you are being asked to be a part of a research project which may be instrumental in widening the knowledge base of the methods of sociological inquiry.
With the exception of three persons contacted from the 1979 group and two persons from the 1980 group, scheduled times were assigned to and accepted by all persons who had indicated their interest by signing their names on the index cards. From the total list of one hundred and forty-eight persons, six of those who were scheduled failed to fulfill their commitment. The total sample size was one hundred and forty-two.

Randomness of the Sample

Bailey (1982:91) defines a random sample as follows:

In a random sample each person in the universe has an equal probability of being chosen for the sample, and every collection of persons of the same size has an equal probability of becoming the actual sample. This is true regardless of the similarities or differences among them, as long as they are members of the same universe.

By Bailey's (1982:91) definition, the sample drawn for this study was not random. However, because of the time commitment involved and the possible inconvenience to persons being asked to meet the researchers in the PLATO terminal room, it did not seem feasible to use such an approach. It was also believed that the heterogeneous nature of the respondents from the Introduction to Sociology class would somewhat compensate for the absence of randomness.

The data collection began in June of 1979. At this time, respondents were asked to fill out a pencil and paper questionnaire designed to assess their attitudes toward the gasoline shortage. The questionnaire emphasized only those attitudes held toward the gasoline crisis and did not address the energy crisis in a general manner (see Appendix C). Upon
completion of the questionnaire, respondents were introduced to SHORTAGE. With the exception of two respondents, none had prior experience with interactive computer terminals. Each respondent was given the following information:

SHORTAGE is a gasoline rationing simulation. I will present you with the basic information needed for you to complete the simulation. If you will now note, the first page you will see printed on the screen in front of you asks you to type in your identification number (each respondent was assigned a number to assure anonymity). Then type in your group name, which is SOC. Press the key marked NEXT. This is a critical key. Whenever you are in doubt about what to do, this key may be pressed and you will go back to a familiar point in the simulation. The page now being presented to you is called Index Page one.

The following information appeared on the screen:

Choose an option by pressing the corresponding letter:

a. Introduction to SHORTAGE.
b. SHORTAGE instructions.
c. Gasoline rationing regulations.
d. Begin the simulation.

Each respondent was informed that if he wished to make comments at any time during the course of his participation he could do so by simultaneously pressing the keys marked SHIFT/LAB. Respondents were encouraged to make comments in reference to the following:

1. Whether or not the gasoline rationing regulations were fair (e.g., the motorcycle ration allotment was only one-tenth that for automobiles).

2. Whether or not they believed the strategies, alternatives, and/or consequences were realistic, fair, or perhaps too lenient in light of the seriousness of the situation.

3. How they might feel in general about the situation they were experiencing.

The researcher reminded each respondent from time to time that if he
forgot how comments were made, help was available. The instructions continued as follows:

Please read each option on Index Page one carefully. When you are finished reading these options in the order in which they appear, simultaneously press the keys marked SHIFT/BACK to return to Index Page one.

Upon completion of options "a" through "c", respondents were ready to begin SHORTAGE. They were asked to press the letter "d" at which time PLATO gave the following information:

You have just been issued ration checks for your automobile totaling 120 gallons of gasoline which must last you for a 90-day period of time. Use them wisely! Remember, we all have to live with and/or cope with the day-by-day decisions we make.

Respondents were then asked:

What kind of an automobile do you drive/own?

If the respondent replied he did not own an automobile, he was asked the following alternate question:

What kind of an automobile do you drive when you do have access to one?

There were no respondents who could not reply to one question or the other. The next question asked was as follows:

How many miles per gallon of gasoline does your automobile receive?

The response to this question allowed the researcher to assign an automobile "type" to each respondent. Automobile types were determined by the number of miles per gallon an automobile received. These types ranged from the letters "A" to "Z" and from numbers one through four. Type "A" received nine miles per gallon of gasoline, while type four received thirty-eight miles per gallon. Automobile type determined each
respondent's daily gasoline consumption rate for the purposes of the simulation. Daily gasoline consumption rate determined how quickly the respondent would "run out" of gasoline, or conversely, how much gasoline he could save (e.g., by driving a fuel-efficient automobile).

Daily consumption rate was determined by using point seven of the Economic Regulatory Administration's guidelines which read as follows:

Passenger cars have been found to travel an average of 10,100 miles per year with a fuel efficiency of 13.5 miles per gallon yielding an average annual gasoline consumption of 748 gallons. It is hereby noted that all passenger cars in a given state will receive the same 120 gallon ration allotment for each 90 day period of time regardless of fuel efficiency. This will give a significant advantage to fuel efficient automobiles and will hopefully provide an incentive to their use.

The daily gasoline consumption rate was calculated by dividing the 10,100 mile-per-year estimate (rounded to 10,000 miles per year) by the number of miles per gallon of gasoline used. This figure in turn was divided by four to determine the number of gallons of gasoline consumed in a three-month period of time. The result was divided by ninety to arrive at the daily gasoline consumption rate. The figure was computed by PLATO (see Figure 7). Respondent car types were collapsed into categories, labeling them as low mileage automobiles, medium mileage automobiles, and gasoline guzzlers. The breakdown of categories was not an arbitrary decision. The author telephoned six new and used automobile salespersons in the Ames, Iowa, area. The following information was given to each salesperson:

My name is Kathleen Waggoner and I am from the Department of Sociology and Anthropology at Iowa State University. I am currently involved in a research project dealing with the
A = average number of miles driven per year.

B = number of miles per gallon of gasoline per automobile (car_type)

C = Three-month period of time (120 days)

D = Ninety-day time period.

E = Daily gasoline consumption rate.

Average number of miles driven per year (10,000)

Number of miles per gallon of gasoline per automobile (car_type)

Three-month period of time (120 days)

Ninety-day period

Daily gasoline consumption rate

Figure 7. Calculations for daily gasoline consumption rate as computed by PLATO: car_type

energy crisis. I wonder if I might ask you some questions about automobile gasoline consumption?

The questions asked were as follows:

In your expert opinion, how many miles per gallon would you estimate a low mileage automobile would receive? A medium mileage automobile? A gasoline guzzler?

As it can be seen from the responses presented in Table 2, the mileage categories suggested by the salespersons were similar. The car_type categories were collapsed into categories for purposes of data analysis. As it can be seen from Figure 8, car_type ranged from nine miles per gallon to thirty-eight miles per gallon. The decision to set up car_type categories did not differ significantly from the information provided by the automobile salespersons surveyed.

Following the response to the question on car_type, respondents were asked to provide the information on family income. The following
Table 2. Estimated miles per gallon for low mileage automobiles, medium mileage automobiles, and gasoline guzzlers based on the expert opinions of automobile salespersons in the Ames, Iowa, area

<table>
<thead>
<tr>
<th>Salesperson A</th>
<th>Low mileage</th>
<th>Medium mileage</th>
<th>Gasoline guzzler</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28-48 mpg</td>
<td>17-27 mpg</td>
<td>9-14 mpg</td>
</tr>
<tr>
<td>Salesperson B</td>
<td>28-48 mpg</td>
<td>16-27 mpg</td>
<td>8-15 mpg</td>
</tr>
<tr>
<td>Salesperson C</td>
<td>27-54 mpg</td>
<td>16-26 mpg</td>
<td>9-15 mpg</td>
</tr>
<tr>
<td>Salesperson D</td>
<td>27-45 mpg</td>
<td>16-26 mpg</td>
<td>9-15 mpg</td>
</tr>
<tr>
<td>Salesperson E</td>
<td>24-45 mpg</td>
<td>15-23 mpg</td>
<td>9-14 mpg</td>
</tr>
<tr>
<td>Salesperson F</td>
<td>27-45 mpg</td>
<td>16-26 mpg</td>
<td>8-15 mpg</td>
</tr>
</tbody>
</table>

Car_type

- Low mileage car_type: 28-38 miles per gallon
- Medium mileage car_type: 17-27 miles per gallon
- Gasoline guzzler: 9-16 miles per gallon

Figure 8. Categories of car_types

question was asked:

Approximately what is your yearly income? If you are single, please estimate your parent's yearly income.

Response categories were as follows:

Income increments:

a. $0 - 4,999
b. $5,000 - 9,999
c. $10,000 - 14,999

d. $15,000 - 19,999

e. $20,000 - 24,999

f. $25,000 - 29,999
g. $30,000 - 34,999

h. $35,000 and above

Since the respondents were students, the question included parental income.

Upon completion of the question on income, respondents were asked to press the key marked NEXT to begin the simulation. At this time, each was given the following additional information:

You will now be presented with a number of different strategies which may help you as you attempt to adapt to the energy constraining conditions presented by gasoline rationing. You are reminded that some of the alternatives within certain strategies may border on the line between legal and illegal. It is assumed that regardless of your choice of strategy or alternative, the choices which you make are your choices and not a reflection of what you believe the researcher wants you to choose. Note that each time you make a decision, you will receive immediate feedback from SHORTAGE in terms of a consequence. Each alternative within the five strategies contains between one and nine consequences which will appear with random probability. You will also note that some of the consequences will reward you, while others will penalize you either verbally or by decreasing your daily gasoline consumption rate. In addition, if at any time during the course of the simulation you feel you have made any or all of the decisions which are relevant to you, please inform me that you are ready to stop playing. At that time, you will be asked to press the keys appropriate to ending the simulation.

If you will look in the upper left hand corner of the terminal screen, you will see a simulated gasoline gauge. You may want to keep an eye on it as you play SHORTAGE. The speed with which the gasoline gauge moves toward empty will be determined by your daily gasoline consumption rate which appears at the top of the screen toward the center. In the upper right hand corner of the screen, you will see a number which denotes the number of days which you have to play the game. Each day will be equivalent to "x" number of seconds. That is, for each "x" seconds that go by you will have one less day and "y" fewer gallons of gasoline depending on your car type. As you participate in SHORTAGE, you
may want to note how quickly (or how slowly) your gasoline gauge is moving, whether or not you have made decisions which have increased or decreased your daily gasoline consumption rate, and how many days remain in the game. These factors will determine if and when you will run out of gasoline before the game is completed. If you will note, in the few seconds I have been presenting you with information you have used "x" number of days and your gasoline gauge has moved "y" degrees toward empty. Good Luck! And remember, as in real life, time moves as you are making decisions. If you have any questions, please do not hesitate to ask.

With the exception of minor questions involving how to return to the index page to select a new strategy, or a reminder on how to type in comments, respondent participation was relatively trouble free. Upon completion of SHORTAGE, respondents were told:

Now that you have completed the simulation I would like you to respond to an attitude questionnaire that is identical to the one you filled out prior to your participation in SHORTAGE.

Nearly every respondent immediately asked, "why?". The researcher's response was similar to the information given to respondents over the telephone.

This research has been designed to determine whether or not SHORTAGE has made you more aware of the energy crisis and its implications for your personal transportation decisions. You may want to reconsider some of your initial responses. Please answer the questions as you interpret them. Do not alter responses because you may believe it is expected of you.

Problems with the Data Set

After the data collection was completed, the research group met to discuss problems that had emerged. A discussion of these problems follows. PLATO is often adversely affected by the summer heat and humidity. While the room in which the terminals were housed was air conditioned,
there were times when the system would break down while the simulation was in progress. Across the screen the respondent would read the following note from PLATO:

We are sorry. PLATO is "down". You may resume play in "x" minutes.

This message meant one of two things: 1) the respondents had to wait until the system was back up again, which was usually from ten minutes to two hours; or 2) the respondent's time had to be rescheduled. This set the research behind schedule so that one, two, or more respondents had to be rescheduled. The terminal was "down" on four separate occasions. The respondents who experienced the terminal breakdowns were cooperative and did not hesitate to reschedule. In order to avoid a loss of continuity, these respondents began the process over, including filling out the questionnaire. Each reported that this presented no problems in terms of comprehension or simulation credibility.

A second problem involved programming errors which resulted in unusable data. When the data were printed out, both decision patterns and gasoline consumption rates were recorded for each respondent. For eight of the respondents, the gasoline consumption rate figures were incorrect. The programmer was unable to explain this except to indicate it may have been due to a malfunction in the computer. As a result, nine of the cases were labeled unusable.

A final discussion of SHORTAGE's problems produced a consensus within the research group that the penalties associated with some of the consequences needed to be stronger. For example, respondents were always rewarded for making "rational" or wise decisions (e.g., riding the bus,
riding a bike to work, joining a car or van pool). These rewards were generally in the form of a decrease in their daily gasoline consumption rate. This was particularly helpful for those respondents who drove fuel inefficient automobiles. However, it was decided that in the "real" world, consumers are not always rewarded for making rational decisions. Because of this, some modifications of SHORTAGE seemed to be in order. Over a six-month period of time from October of 1979 to March of 1980 the necessary changes were made.

It was further necessary to somewhat modify the questionnaire. Some of the questions were eliminated because they were irrelevant to the sample used. For example, all of the students sampled were single. As a result, marital status was not a critical factor. Secondly, asking the number of automobiles owned was irrelevant to all respondents, who either owned only one automobile or had access to a single automobile belonging to either parents or friends.

The research group also concluded that if the presimulation and the postsimulation questionnaires were programmed into PLATO, there would be a sense of continuity for respondents not offered by the pencil and paper questionnaire. That is, instead of having the entire questionnaire in front of them, the terminal would be programmed to present only one question at a time. This would perhaps encourage respondents to evaluate each response more thoroughly before answering each question.

Finally, it was concluded that the 1979 data set would not be used in the final evaluation. Rather a second round of data collection would be conducted. The reason for this was that the problems associated with
the first data set had, for the most part, been resolved. Thus, it was believed the second generation of data would yield more valid and testable information about consumer responses to the energy crisis.

The second group of data was collected during July, August, September, and October of 1980. Identical instructions were given to respondents with respect to their participation in SHORTAGE. The primary difference was that each respondent was immediately introduced to PIATO upon his arrival. The most significant difference between the 1979 and the 1980 groups was the length of time spent with each respondent. As was predicted, when the questions on the attitude questionnaire were presented one at a time, respondents spent an average of ten minutes longer on each questionnaire. Thus, the average length of time spent with each respondent from start to finish increased from thirty to thirty-five minutes in the 1979 group to forty-five minutes in the 1980 group.

In November of 1980, the most serious problem associated with the project emerged. The computer programmer had made two errors which led to a loss of two-thirds of the 1980 data set. It was understood that PIATO should be programmed to store data for a total of one hundred respondents. The programmer was aware that each respondent would fill out two questionnaires, a presimulation questionnaire and a postsimulation questionnaire. The problem occurred because the programmer did not account for the use of two questionnaires for each respondent. As a result, PIATO's capacity for data storage was cut in half—from one hundred to fifty respondents. In addition, there were four unknown individuals with access to SHORTAGE who played the game for "fun", thus dropping
storage capacity to forty-six.

A second error in programming involved the programmer's discovery, three days and fifteen respondents into the data collection, that the gasoline consumption rate was, for some unknown reason, not being stored. As a result, data from another fifteen respondents were labeled unusable. The sample size was reduced from ninety to thirty-one.

Merging the Data Sets: 1979 and 1980

Because of the exploratory nature of this study, it was decided by the research group that to increase sample size an attempt should be made to combine the 1979 and 1980 data sets. It was recognized that the way in which the questionnaire was administered had changed. The questionnaire itself had been modified. In addition, SHORTAGE had been modified. A problem also emerged in that the two sets of questionnaires were identical on only sixteen of the original thirty-four items (see Appendix C for complete listing of questionnaire items for 1979 and 1980). However, because of the lack of time and computer resources to begin a third round of data collection, it was decided to conduct a difference of means test in order to determine whether or not the two independently drawn samples were similar enough to have come from the same population. There appeared to be reason enough to hesitate. In addition to the structural and content changes in the questionnaire, by the time the 1980 data collection began, the American hostage situation in Iran had intensified. In May of 1980, President Carter's attempt at rescuing the hostages being held in the United States Embassy in Iran had ended in the
deaths of eight American military personnel. It was believed this incident may have resulted in a significant change in respondent attitude toward the gasoline shortages. That is, the hostage situation was speculated to be energy related. Such a perspective introduced the possibilities of another Middle East oil embargo (Matthews et al., 1980:28). Despite these potentially influencing factors, it seemed important to increase sample size in order to provide a more valid analysis of the data.

The major criterion used for merging the data sets was whether or not they were similar. It would have been unrealistic to assume the samples were identical. As such, it appeared that there were two factors to consider: "One of absolute and relative size of differences and one of practical or 'real' significance versus statistical significance" (Kerlinger, 1973:199). An emphasis on relative size of differences may create problems in a small sample size. As Kerlinger (1973:199) points out "What appears to be a very small difference may, upon close examination, not be so small." Thus, it is important that the researcher use care and informed judgment in his application of substantive or practical significance. On the other hand, an emphasis only on statistical significance may result in a narrow and static analysis of the data. As Blalock (1972:163) comments:

Statistical significance can tell us only that certain sample differences would not occur very frequently by chance if there were no differences whatsoever in the population. It tells us nothing directly about the magnitude or importance of these differences.

Again because of the exploratory nature of this study, the author
concluded that only strong evidence that the samples might have come from different populations would prevent a merging of the data sets. The decision was made that if $\alpha < .01$ the data sets could not be merged. Statistical testing, however, yielded evidence that the population means were significantly different on only one of the questionnaire items. This was respondent attitude toward reducing the amount of allowable air travel.

The differences in the questionnaire item might have been due to sampling error generated by the small size of each sample (for 1979, sample size was forty-three; for 1980, sample size was thirty-one). On the other hand, the review of literature provided no insights into ways in which this factor might contribute to a better understanding of consumer travel behavior patterns under conditions of energy constraint. Thus, the final decision was to omit this attitude item from the analysis and merge the data sets because the statistical tests demonstrated that the populations were similar (see Appendix C for a discussion of the sample manipulation).

**Modifications of SHORTAGE**

Changes in SHORTAGE, while they did provide more significant penalties for certain consequences (see Appendix A for changes) did not alter the fundamental structure of the simulation. The most significant change involved the time element. In the 1979 data set, SHORTAGE was programmed to run a total of eighteen minutes from beginning to end. In the 1980
data set, the speed with which SHORTAGE moved was determined by the
reading speed of each individual respondent. The page describing the
scenario, the justification for gasoline rationing (see Appendix A) was
used to determine respondent reading speed. For respondents who spent
three minutes or more reading the scenario, SHORTAGE ran a total of
twelve minutes. That is, the ninety-day time period diminished by one
day for each eight seconds of time passed. For those respondents who
read the scenario in two to two and one-half minutes, SHORTAGE ran for a
total of nine minutes. Each ninety-day period then diminished by one
day for each six seconds of time passed. For those respondents who were
able to read the scenario in one to one and one-half minutes, SHORTAGE
ran for a total of six minutes. Each ninety-day time period diminished
by one day for each four seconds of time passed. This was done primarily
because a number of respondents in the 1979 group had asked to stop the
simulation before they ran out of time or gasoline. They indicated they
had made all of the decisions of relevance to them. Eighteen minutes
was too long a time for the game to last. It did not realistically
assess respondent attention span or reading speed. Also, the speed with
which time diminished was related to the speed with which the gasoline
gauge veered toward empty. As a result, it was believed respondents
might, as in real life, be more likely to recognize the costs involved in
making hasty decisions and/or taking too long to make decisions if they
were more acutely aware of the passage of time. The modification of time
did not, however, completely eliminate the attention span or reading
speed problems. There were still seventeen respondents who asked to
stop before the game was completed.

All of the factors contributing to the success of this investigation have not been worked out. The author confronted problems as they emerged, often not anticipating them. The reason for this seems obvious. It was not known what to expect. This was, however, no reason to underestimate the value of the study. On the contrary, as Anderson (1980:37) comments:

Computerized simulation games have begun to offer remarkably new pedagogical innovations. The computer acts as a patient tutor which individually responds to each participant depending on his or her sequence of decisions. The two key features are feedback and the ability to display and process language. These skills combined with large data storage, rapid computation, and control of input/output devices such as graphical display screens, open up vast new opportunities for simulation and gaming techniques.

The Advantages of Simulation Research

As it was pointed out in an earlier discussion, simulations are "models in motion" (Bailey, 1982:331). These models, while they do not mirror "real world situations", do offer the researcher a number of distinguishable and advantageous features not available using cross-sectional representations of reality (Bailey, 1982:331). Beyond the advantages pointed out by Anderson (1980:37), Raser (1969:15-19) comments that other features include:

1. Economy
2. Visibility
3. Reproducibility
4. Safety

A discussion of each of these features follows.
The use of simulations may not only be much less expensive than implementation of the "real" thing, but it also permits dry runs which may help to prevent costly mistakes in the real operation (Raser, 1969: 15). For example, transportation researchers have concluded in their investigations into consumer response to the energy crisis that the American public is opposed to rationing primarily because it would involve a significant change in travel behavior patterns (Freeman, 1973; Murray et al., 1974; Wirth, 1975; Henderson, 1978a; Brunner and Bennett, 1978; Richman, 1979). These changes would inevitably result in mandatory trade-offs in frequency, types, and/or modes of travel. Henderson (1978a) says this would permit consumers to end gasoline waste by allowing them to establish their own travel priorities. However, the impact of energy scarcity upon the individual's decision-making processes is a relatively unknown factor (Shippee, 1981).

Consumer encounters with gasoline shortages have been limited primarily to those experienced during the 1973 oil embargo and the "long dry summer of 1979" (Newsweek, 1979). Because of the limited nature of actual consumer experiences with gasoline shortages, an accurate understanding of travel decisions under conditions of energy constraint may net fewer economic, political, and social costs using a simulated situation of gasoline rationing than would an experimental program in the real world. Simulations may, for example:
1. Permit the researcher to reproduce and control the study of respondent decision patterns and travel behavior.

2. Provide the researcher with a predictive device which may be used in development of an actual policy for gasoline rationing.

Both points one and two are critical. SHORTAGE, for example, was developed within the framework of a particular goal—the development of an effective and adequate model by which to understand and predict consumer travel behavior under conditions of energy constraint. The author suggests that in giving respondents the opportunity to simulate a potentially "real" situation, they may become more attuned both to the reality of the energy crisis and to ways in which they as consumers may be able to adapt to conditions of energy constraint. Consumers may in turn be better able to evaluate gasoline rationing as the only way that each consumer will be able to gain access to at least some gasoline. The alternative may be long lines and irregular hours at service stations, outbreaks of violence due to heightened tensions, and the possibility of general social chaos (Energy Crisis, Volume 2, 1973; Newsweek, 1979; Henderson, 1978a).

Visibility

Watching consumer response to conditions of energy constraint allows a more readily observable understanding of their attempts to cope with the challenge and frustration of gasoline rationing. Raser (1969:16) comments:

Simulation can heighten the visibility of the phenomenon to be studied by making the phenomenon more accessible
to the researcher, and by clarifying the phenomenon by separating the essential components of the system from the irrelevant or less relevant features.

If it can be assumed that respondents in "real life" situations do tend to isolate themselves from reality and be less involved in real events than are players in simulations, critical insights into consumer evaluation of gasoline rationing may well become possible. As Roberts (1980:7) points out:

"Simulations seem capable of or at least have the potential of creating a sense of realism by bringing "real world" problems together in a setting in which respondents can practice making "real world" decisions.

In addition, if there are other critical components that have not been included in the simulation, they may be considered later in actual policy development. The researcher may become aware of these components through continued respondent observation and/or if and when respondents point them out as the simulation is in progress.

Reproducibility

"Simulations allow scholars to reproduce chains of events that they could not otherwise observe repeatedly" (Raser, 1969:17). There are two basic reasons for reproducing events. Raser (1969:17) points out, the first is chance. For example, suppose a researcher wants to find out how many American consumers are likely to make "high risk" decisions that involve personal danger or breaking the law—such as storing gasoline in a home garage, siphoning gasoline from parked cars, or rolling through stop signs to save the gasoline used by a full stop. The researcher
could perhaps link up with a computer that allows access to arrest records, or he could maintain close contact with the news media in his efforts to determine how many consumers have made such decisions. However, there are some elements of chances consumers take that would go undetected. Even if it were possible to gain access to such records, it may be virtually impossible to determine previous consumer decisions which led to the "high risk" category of actions. In this case, the computer simulation is not only more economical, it may be less time consuming because it allows the researcher to "build the element of chance into his simulation, run it repeatedly, and learn the decision paths taken which may result in 'high risk' actions" (Raser, 1969:17).

The reproducibility factor also permits respondents to reproduce as many times as they desire, a situation which they may well be facing in real life--gasoline rationing. This may encourage the respondent to examine and evaluate certain components of the simulation with respect to their possible impact if a sudden cutback in the supply or availability of gasoline should actually occur.

The gasoline crisis has repeatedly been a major news issue in recent years. American consumers have continuously been told of the dangers associated with dependence on foreign oil. And as the Organization of Petroleum Exporting Countries (OPEC) continues its debate over the level of oil production, the possibilities of another oil embargo have reappeared. It was pointed out on the CBS evening news of July 9, 1982, that Iran had been producing one million barrels of oil per day over its agreed upon quota. Its rationale was that the money received from oil
exports was needed to finance the war with Iraq. Iran indicated it might boost its production yet another million barrels per day. The Iranians argued that Saudi Arabia should cut back its production to compensate because Saudi Arabia is such a rich nation. OPEC had previously agreed to produce and export 17.5 million barrels of oil a day. As of July 9, 1982, the actual production rate was 18.2 million barrels per day. That figure was expected to rise to 19.5 million barrels per day by mid-August, resulting in a five-to-eight-cent drop in the price of a gallon of gasoline for Americans by late autumn, 1982. Some analysts suggested that this might have meant there was a "crack in the power of the oil barons or the Organization of Petroleum Exporting Countries (Yergin, 1982). On the other hand, a study conducted by Daniel Yergin of Harvard University (1982) yielded evidence that the energy crisis may soon reach a new peak. Yergin (1982:6B) suggests that oil prices may double by the year 2000. He predicts:

A third oil crisis worse than those of 1973 and 1979 is "highly likely" before the end of the 1980's. This would test the American system on a scale matched in this century only by the Great Depression.

While Yergin's is a recent study, the American public has been receiving similar messages since the oil embargo of 1973. As such, information to which consumers have been exposed in some form and content may be assumed to be a part of the "relevance structure" (Berger and Luckmann, 1966:43) of respondents who participated in simulation SHORTAGE. The author suggests also that the attitude questionnaire administered in conjunction with respondent participation in SHORTAGE may yield insights into the
decision process not previously addressed.

In summary of this section, simulation SHORTAGE affords the opportunity for the researcher to reproduce situations and thus:

1. Enable him to derive statistical probabilities when the outcome is uncertain and/or;

2. Encourage him to vary numerous aspects of the system in ways that may yield profitable insights into how the system works. (Raser, 1969:18)

In other words, simulations allow controlled experiments to be made that would otherwise be impossible (Raser, 1969:18).

Safety

Bailey (1982:333) points out that in social science research:

Simulations have potential use in situations that are theoretically important, but may cause harm, embarrassment or some other moral and/or ethical problems if human subjects are used in a natural environment.

Discovering, for example, that the consequences of storing gasoline in a garage are not only illegal but could have tragic consequences may be anxiety producing and/or humiliating. For the respondent, such an example may be as realistic on a computer screen as it is in real life when he is informed that a neighbor's child playing with matches caused an explosion and fire that burned the child over seventy-five percent of his body. Raser (1969:18) comments:

Not only do simulations allow us to avoid putting human beings in dangerous situations, but they also allow us to study dangerous situations themselves without creating them. So simulations are used for safety purposes, both to protect human beings while they are being studied, and to produce laboratory analogues of dangerous phenomena that we need to study.
Disadvantages of Simulation Research

It would be unrealistic to evaluate the content of this study without an examination and evaluation of some of the disadvantages and/or potential problems associated with simulation research. These disadvantageous elements include:

1. Artificiality
2. Cost
3. Training of research assistants and participants
4. Programming and other quantitative problems.

A discussion of each of these disadvantages and ways in which they may be minimized follows.

Artificiality

Smith (1981:220-221) states that simulations are "theoretical models of the elements, relationships, and social processes that may reasonably be included (and excluded) in symbolizing some system." They do not, therefore, represent an attempt at a perfect replica of that system. By its very definition, a simulation "constitutes a kind of caricature" (Coleman, 1966:3-4) of social reality. It may, therefore, not resemble a real life situation in one or more key elements (Simon, 1978:216). As a result, there is always the possibility that, as Bailey (1982:333) comments:

the simulation is so inaccurate or incomplete that conclusions drawn from it are not applicable to the phenomena being modeled, and thus the findings will be invalid.

However, as Ritzer (1982:208) points out, "we should not mirror the real world in our conceptual systems." Instead we need to develop systems of
Ideas that help us to better understand the nature of the real world situations we wish to understand. To reduce the probability of excluding critical components in the simulation, it would appear to be necessary to ask the following questions.

1. Does the scope of the simulation include components that permit it to "resemble" a real life situation?

2. Do the respondents who play the simulation act as if it were a real life situation?

3. Do the respondents experience motivations which parallel those experienced in real world situations?

It seems only logical to conclude that no simulation regardless of its sophistication and complexity will include all salient components or specify all relationships between components to the "nth" degree (Bailey, 1982:333). Nonetheless, it may still yield critical insights into the decision-making process not possible with cross-sectional models.

On the other hand, if points two and three are closely examined, it may be concluded that the simulation is not realistic. For example, will a player who indiscriminately makes a decision that may cause personal danger or imprisonment in the course of a simulation reproduce those same decisions and experience the same feelings in a real life situation? The author suggests that it is foolish to argue that the potential for such a danger does not exist. However, in examining other simulation research which has been conducted, Baser (1969) has argued convincingly that players do become immersed in the "reality" of the moment--the simulated situation with which they are attempting to cope. In addition, many respondents may well realize that the potential for gasoline rationing is indeed real. As President Carter pointed out to the American
public in his 1979 energy address to the nation:

The oil embargo of 1973 and the continued shock produced by OPEC price increases have sent us stern warnings about energy, but our nation has not yet responded to those warnings. We are dangerously dependent on a thin line of oil tankers stretching halfway around the earth originating in the Middle East and around the Persian Gulf - one of the most unstable regions of the world.

I know that many of you have suspected that some supplies of gasoline are being withheld. You may be right, but suspicions about the oil companies cannot change the fact that we are running out of oil. (Energy Policy, 1981:252)

The message seems apparent. It does not matter whether the gasoline crisis is a supply problem or an availability problem. The possibility of a sudden cutback in gasoline does exist. In light of the most recent studies on the energy crisis, for example, it has been argued (Yergin, 1982:6B) that:

President Reagan has a strong predisposition to turn the energy clock back to the 1950's. The administration is not preparing to deal with a new oil crisis, is cutting off research into alternative energy sources, and is generally letting politics and ideology lead it into a go-it-alone approach.

The author's primary concern has been to include, in SHORTAGE, the nature and kind of component that may reflect the intersubjectively derived perceptions of the American public. It is believed this goal has been realized by reviewing not only the professional literature, but also the varied and diverse often conflicting information and facts presented by influential persons, television, advertising, and the news media. In this way, it is suggested that SHORTAGE may be more likely to meet the necessary requirements for "resembling" the real world.
Cost

Although the author has commented on the economic advantages of simulation research, it should by no means be assumed it is inexpensive in terms of dollars and cents. SHORTAGE, for example, has been costly not only in terms of computer time but also in terms of computer programming. Three different work study student computer programmers aided in the construction of SHORTAGE. In addition, following the printing of the raw data from the PLATO system, it was necessary to hire a computer analyst from the Numerical Analysis Center at Iowa State University. This was done so that the author would be able to complete the data analysis using the Statistical Analysis System (SAS). The Statistical Package for the Social Sciences (SPSS) was not able to handle the complexity of the data set. The PLATO system is time consuming, expensive, and awkward for the purposes of data analysis. As a result, it was felt that SAS would provide a more practical way of interpreting the data.

Training Research Assistants and Respondents

While the rules and guidelines of SHORTAGE were neither difficult nor complex, training of research assistants was both time consuming and at times difficult to conduct satisfactorily. In order to ensure that each respondent received the information needed to successfully understand and participate in the simulation, it was necessary to delegate as little of the responsibility for data collection as possible. On the other hand, respondents learned the rules and guidelines very quickly and
were able to ask for clarification whenever it was necessary. Had this not been possible, the validity of the simulation would have been placed in question.

Quantitative and Programming Problems

Bailey (1982:333) comments:

Computer simulations may not only require costly computers, but may also entail programming (software) costs and complex mathematical problems. If the researcher does not have the ability to solve complex mathematical problems or do sophisticated computer programming, and if he is unable to hire someone to solve these problems, then he may be unable to complete the simulation research.

As it was pointed out in a discussion of the costs of simulation research, the author relied on three different computer programmers for the construction of SHORTAGE. When the researcher is unable to program the computer himself a number of problems arise, many of which, in the university setting, may be a function of relying on student programmers.

The problems associated with this study were serious, though not insurmountable. Both the author and the primary investigators concluded that there were two basic problems associated with having had to hire three different people in order to complete the research. The first involved the loss of continuity and direction. Each time a new programmer was introduced, there was a need to begin anew, from square one, introducing theoretical and analytical concerns. The problem was magnified when it was discovered that the TUTOR language used in programming SHORTAGE onto PLATO was not standardized. As a result, a great deal of time was wasted while each new programmer attempted to "get into" the system to make
necessary adjustments. The most serious problem, however, was the one which led to the loss of two-thirds of the 1980 data set (see discussion pages 120 and 121).

Reliability

Smith (1981:236) points out that the fundamental principle establishing the reliability of a simulation is that successive runs should give similar results. Consequently, there are three basic requirements that a simulation should meet:

1. The rules of the simulation should be as clearly and simply stated as possible.
2. The rules of the simulation should be complete and self-contained.
3. The simulation should not overtax the players span of attention.

Based on the discussions throughout the chapter on the advantages and disadvantages of simulation research, it is suggested that SHORTAGE met the requirements for reliability set forth by Smith (1981:236).

Validity

Crow and Noel (1965) indicate that:

Establishing the "validity" of simulations or any other behavioral science method, is difficult. We believe that much more rapid progress could be made by a seemingly simple change in viewing the problem; we should shift attention from the validity of the method itself to the validity of using the information produced by the method. We suggest that validity be measured by asking: "How useful to the purpose for which it is to be gathered is the information produced by this method, as compared to some alternative method?" We believe this approach to
validity brings it more closely in accord with modern concepts of the scientific method and guides research more directly to application.

According to Random House Dictionary of the English Language (1969:1453), valid implies a sound, justified, well-founded conclusion supported by objective truth. To speak of "valid statements" or a "valid claim", or a "valid simulation", then, carries with it a degree of unavoidable subjectivity, especially within the realm of social science research—objective truth according to whom? As Raser (1969:138) comments:

It is clear that the problem of "validity will differ for each type of research. As such the investigator cannot appeal to "objective truth" or "generally accepted authority" as a criterion.

Raser (1969:144) discusses three basic criteria of validity that he has extracted from simulation literature.

1. A simulation is valid to the degree that its structure (the theory and assumptions on which it is based) can be shown to be isomorphic to that of the reference system.

2. A simulation is valid to the degree that the social processes are isomorphic to those observed in the reference system.

3. A simulation is valid to the degree that it can reproduce historical outcomes or predict the future.

The author's position of the adequacy of SHORTAGE has already been discussed, so further elaboration may not seem necessary. However, in presenting some additional criteria to reinforce the validity of the simulation, the following questions have been asked and evaluated. First, "does the simulation appear reasonable or have face validity" (Smith, 1981:236)? SHORTAGE met this requirement in that the components built into the simulation were similar to those operating in the "real" world.
The author met the requirement in an intensive and continuous updating of the literature and a continued awareness of the dynamic and day-by-day changes associated with the energy crisis.

The second question to be asked was "did expected events actually occur" (Smith, 1981:236)? SHORTAGE was constructed and then modified over a lengthy period of time during which the author, the primary investigators, and the computer programmer met in weekly sessions to discuss possible consumer travel decisions, patterns of behavior, and potential consequences likely to occur under conditions of gasoline rationing. The group also evaluated the varied consumer responses to the gasoline shortage of 1979. At that time it was determined that nonrational behavior in some areas of the United States, depending on the severity of the shortage, had seemingly become the norm.

The third question asked was, "did unexpected processes, sequences, or structures emerge that violated the assumptions of the model" (Smith, 1981:236)? Regardless of the exhaustiveness of components included in SHORTAGE, the potential remained that a key element may have been omitted. However, most of SHORTAGE's components did parallel or were consistent with events and processes that occurred or were occurring in American society at the time SHORTAGE was constructed. As a result, it is believed that SHORTAGE did not divert significantly from the thought objects and experiences of consumers in the real world.

A fourth and related question was, "do the components of the simulation parallel those simulated" (Smith, 1981:236)? That is, "does the simulation reproduce historical outcomes or predict the future" (Smith,
In the early stages of SHORTAGE's development, the research group did question the validity of some of the simulation's components. It was wondered, for example, whether the scenario created to convince respondents of the reality of the energy crisis was too "far-fetched". Respondents were presented with the following information designed for this purpose:

There has been a nuclear explosion in one of the largest oil fields in the Middle East. As a result of this explosion, it will be from six months to one year before workers can safely enter the area. As you know, a large percentage of United States oil is imported from the Middle East.

The Department of Energy and the Economic Regulatory Administration here by inform you that the President of the United States has authorized the enactment of a stand-by gasoline rationing plan which will become effective in 60 days. Rationing will be implemented for a period not to exceed nine months. As of today the federal government has informed us that a cutback of 25% in gasoline consumption will be needed in order to assure this country will not run out of gasoline altogether. While it is recognized that, in the past, many people believed these gasoline shortages were created by large oil corporations in an attempt to drive up prices, this country has now reached the point at which it is critical that all Americans recognize the seriousness of this sudden cutback in the availability of gasoline.

Approximately two months before the author was ready to begin collecting data, the fear of a nuclear explosion in the Middle East was voiced in the media. This was also the time period in which Americans from the United States Embassy in Iran were being held hostage. Apparently such fears are reappearing in a similar manner in 1982. For example, Yergin (1982:6B) recently reported that:

Another serious energy crisis for the United States would be touched off by a "political accident", perhaps a war or a revolution in the Middle East.
The fifth, and final question asked was, "are the simulation's structure and processes isomorphic to those observed in the referent system" (Smith, 1981:236)? This question was evaluated in an earlier discussion. However, the author would point out that each strategy developed for use in SHORTAGE, each alternative, and its accompanying consequence(s) was observed to have occurred during the 1973 oil embargo and/or during the shortage of 1979. In addition, the strategies offered appeared to be consistent with the Kristol and Anderson (1977) model of general consumer perceptions of the energy crisis discussed in Chapter Three.

In summary of this section, it is recognized that the validity of SHORTAGE is not absolute. However, as Crow and Noel (1965) point out:

The amount of error in the information produced by a method is an important criterion for its usefulness, but it is not the sole factor, and may not even be the most important one. A less precise method may be preferable because it produces information more quickly and/or at less cost. Moreover, the information is more likely to be used if the method by which it was obtained is familiar and acceptable to the respondent - an important consideration to those who must produce it. If the purpose, is, for example, to generate new and unexpected contingencies as an aid to planning a hypothetical situation, then a "loose" method might be more useful (valid) than a precise one.

The last statement by Crow and Noel (1965) on "loose" methods is consistent with the Perrow (1981), Weick (1976), and Kinloch (1981) suggestion that society too is a "loosely coupled interactive system". Studying it through the use of precise and often rigid methods may result in the imposition of one's own--and therefore false--rationality, producing distortion and empirical blindness" (Kinloch, 1981:141). As Kinloch (1981:
Professional sociologists continue to grasp the invariant in their studies, manage research situations, focus on "assumed" correspondence between observed appearances and intended events, and attempt to bring each situation into conformity with an anticipated state, that is, the goal, the solved problem. These methods mean that little, if any, insight into individual rationality is gained, since the unavailability of formal structures is assured by the practices of constructive analysis.

An imposed formalized structure plainly contrasts with the commonsense decisions made by individuals in the course of everyday life. The point is, if the researcher rationalizes or reconstructs the individual's intentions--the very processes used by individuals in the dynamics of reality construction--he is effectively prohibited from gaining insights into those processes (Kinloch, 1981:141). SHORTAGE attempts to avoid the methodological problems inherent in traditional survey research. In doing so it provides the incentive to theory building, an inducement to gather further data, and a manner of grouping previously disjointed fragments of knowledge about the energy crisis into a coherent description. Because of this it is argued that SHORTAGE, in conjunction with the presimulation and postsimulation questionnaires, is scientifically useful and hence valid.

Processes Versus Structures

Phillips (1966:52) indicates that:

The importance of a knowledge of process or change must not be underestimated. Explanations attempt to describe causal relationships by filling the interstices between events or surrounding them within a more inclusive framework. A knowledge of process makes it possible to fill
these interstices and provide the more inclusive framework and thus increase our understanding of what is going on. It is one thing to know that if an experimenter introduces a certain change, a given effect will follow; it is quite another thing to be able to learn about the various mechanisms that lie between the given change and the given effect and convert the change into the effect. The experiment can, of course, focus on some of these interstices, and this technique is quite valuable for arriving at an explanation. Simulation techniques, however, are especially well adapted to producing data of a more continuous nature so that long sequences of phenomena can be analyzed.

Phillips' (1966:152) statements on the advantages of simulation techniques appear to be compatible with Max Weber's theoretical and methodological objectives. That is, both are concerned with gaining knowledge of the dynamic social processes that produce behavior. Both also appear to recognize the need to emphasize both the individualized and generalized factors that interact in the course and effect of social action. Other simulation researchers (Pool, 1964; Raser, 1969) in addition have noted that in using simulations and their accompanying flexible methodologies for testing theory, hypotheses are not evaluated solely in terms of whether or not certain decisions are made. Rather, the emphasis is on whether certain decision patterns emerge. Discrete choices are considered as critical dimensions of social processes only when they repeatedly occur so they may indicate some underlying social process (Raser, 1969: 85-86). This emphasis parallels Weber's in its insistence that the social scientist focus on the interaction between idiographic (individualized) and nomothetic (generalized) factors which result in certain categories of social action. Raser (1969:86) also points out that:

Simulations do not possess the capability of predicting
single events or "outcomes" of social processes. However, simulations can give us information about how the relationships among various states of a given system might change under given conditions.

And as Pool (1964:62-71) indicates:

Computer simulation offers a way of handling many propositions simultaneously, no one of which, taken singly, accounts for much of the total variance. Add to this advantage the ability of a computer simulation to "compress" time and to allow multiple replications, as well as its controllability and safety, and it is evident why this type of game is now employed as a research technique and why it represents a methodological breakthrough, especially in the social sciences.

Strategy Categories

The criterion for simulation credibility or validity is not contingent on the development of rigid definitions of and/or control of specified variables. Such an approach may too easily lead to dogmatic assumptions about behavior or "flat statements about discrete events" (Raser, 1969:85), in which case it may be assumed that the social scientist:

1. Does not believe in chance occurrences.

2. Is ignoring the fact that there always seems to be more influences on events than can be taken into account.

3. Is transforming tentative theories into certainties.

4. Is going beyond the level of prediction justified by the current achievements of social science and entering the twilight realm of Winchellian soothsaying. (Raser, 1969:85)

5. Has imposed his own - and therefore false - understanding of social reality on the subjects under study, producing distortion and empirical blindness. (Kinloch, 1981:144)
In an attempt to avoid the problems just pointed out, strategy categories were created for use in SHORTAGE. In introducing a wide range of choices for respondents such an approach provides a flexible method which corresponds more closely to social reality than do traditional survey research approaches (Crow and Noel, 1961; Pool, 1964; Raser, 1969). A discussion of these strategy categories follows.

In September of 1978, the principal investigators presented the author with a list of ninety-four possible choices/decisions which American consumers might have to consider should President Carter receive permission from Congress to enact his Standby Gasoline Rationing Plan (see Appendix C). The list was labeled the United States Department of Energy Ration Plan Behavior (see Appendix D for a complete listing). It was the task of the author to group the items into various categories or possible strategies which consumers might find helpful in their attempts to cope with gasoline rationing. These strategies encompassed the various ways in which consumers themselves might deal with these conditions of energy constraint, how they might adapt to the situation, how they might induce outside agencies to develop policies to reduce the severity of rationing regulations, or how they might attempt to "beat" the imposed regulations by bending or even breaking the laws defining rationing regulations. The strategies included the following:

1. Attempt to obtain as much gasoline as possible for personal consumption.

2. Make better use of gasoline rations that are made available (each automobile, regardless of fuel efficiency would be given a ration of 120 gallons of gasoline which was expected to last for a 90 day period of time).
3. Adjust individual travel needs in an attempt to use less gasoline.

4. Attempt to induce the government (local, state, and/or federal level) to change its energy policy or policies to relax rationing limitations.

5. Reconsider the social and moral issues involved with respect to individual style of living, values, and behavior. Make personal changes as needed.

A discussion of these strategies is in order.

In a sense, SHORTAGE is a future-oriented simulation. Its objective was to move its participants away from dogmatic assumptions about past and present perspectives on the energy crisis, to create an awareness of the reality of gasoline rationing and its accompanying regulations. SHORTAGE thus afforded its participants an opportunity to become involved in an as yet simulated environment which may someday become a reality. Out of the awareness created by their participation, respondents may well have become more attuned to the dynamics of their environment and the constraints which may be imposed on them. Through a realistic creation of strategies, then, respondents might have been expected to feel the impact of trade-off decisions they would be forced to make in such a situation—trade-offs that would inevitably restrict their mobility and upset their time management schedules. On the other hand, such an experience might also have provided them with the freedom to set their own travel priorities in order of personal importance.

The modeling of strategy categories proceeded through a process of design, development, and testing that included the following phases.

Awareness of probable, preferable, or possible decisions which respondents might make. Initially it was believed that respondent attitude
toward gasoline rationing would be a major determinant in establishing decision patterns. However, as the review of literature progressed it was demonstrated that: 1) consumer attitude toward gasoline rationing was primarily negative (Freeman, 1973; Murray et al., 1974; Wirth, 1975; Henderson, 1978a; Shippee, 1981); and 2) a majority of consumers do not believe there is an energy crisis (Richman, 1979; Shippee, 1981). In addition, it was also found that in many instances there is little or no relationship between these two factors (Wirth, 1975; Henderson, 1978a; Shippee, 1981). An outgrowth of this finding was a belief that it might be critical to consider the decisions consumers might make irrespective of their attitudes. It seemed necessary to emphasize numerous alternatives and their potential consequences for respondents. Because of this, as the Ration Plan Behavior list was categorized, each alternative contained from one to nine consequences each of which would appear on the computer terminal screen with random probability. There was also a systematic attempt to focus on a few decisions that might pose critical consequences for the respondent and/or those with whom he comes into contact as he develops his travel behavior patterns. It is suggested that attitudes toward certain decisions are characteristically positive or negative. Attitude (see Chapter One for discussion) is assumed, however, to be contingent upon the acceptability of the conditions envisioned (Plummer, 1980:108). For examples see Figure 9. Conservatively, these decisions are probably labeled correctly. However, a rationally motivated action is contingent on an individual's point of reference (Schutz, 1967; Kinloch, 1981). Also, what is termed rational may not always be the
Negative attitudes toward decisions:

1. You could steal coupons from mailboxes in large apartment buildings.

2. You would siphon gasoline out of cars in your parking lot.

Positive attitudes toward decisions:

1. Purchase a fuel-efficient automobile.

2. Ride a bus to work.

Figure 9. Attitudes negative and positive toward possible decisions respondents would make under conditions of gasoline rationing

Wisest choice. For example, as respondents participated in SHORTAGE, many made the decision to purchase a fuel-efficient automobile. Such a decision could have been labeled rational if the respondent's present car type placed him in a "gasoline guzzler" category (see Figure 8). However, the consequences randomly presented by SHORTAGE were as follows:

a. The Blue Book value of your present automobile has decreased by 30% because there is little demand for fuel-inefficient cars. Sorry! You just cannot afford a new automobile at this time.

b. The bank at which you have applied for a loan has just informed you that you will be able to obtain your loan at a reduced rate as an incentive to purchase a fuel-efficient automobile. However, your insurance company has informed you that the risk of serious injury or death in case of an accident is 30% higher in a small car than in a large car. Thus your insurance premium will increase by 100% if you purchase at this time. And with the price of small cars skyrocketing you really cannot afford one even with the reduced interest on the loan.
When seemingly rational decisions do not provide the desired results, it is suggested that respondents might well consider making decisions which bend or break the law. On the other hand, SHORTAGE was constructed so that respondents were not "forced" to make any decisions. Their choices were always voluntary. In illustration, assume a respondent had made two decisions within Strategy B, to make better use of the gasoline available to him. These decisions were 1) to join or form a car or van pool, and 2) to ride an intercity or intracity bus if one is available. There were still two decisions left to make within Strategy B, 3) to purchase a moped or a motorcycle, or 4) to purchase a fuel-efficient automobile. If, however, these choices did not parallel the respondents' needs, wants, or fall within his general relevance structure, he was able to go back to the index page at which time he could select another strategy. Or, if he decided he had made all of the decisions which he felt were relevant to him, he could tell the researcher he was ready to stop the game.

The second phase in the development of SHORTAGE was as follows: Components parts of the model were specified and organized. Phase two was critical in that it focused on the manner in which respondents might be presented with both legal and illegal alternatives. The computer programmer designed SHORTAGE so that respondents must press a special key in order to even see the list of questionable choices. In illustration, assume a respondent pressed the letter "A" which meant he had selected Strategy A which would offer decisions permitting him to obtain as much gasoline as possible for personal consumption. Within this
strategy there were six possible decisions made available. As it can be seen in Appendix A, if the respondent made fewer than two choices within Strategy A he would not be offered the set of illegal alternatives. If he made two or more decisions with Strategy A, SHORTAGE would present him with the following information which he could heed or choose to ignore:

If you find that none of the choices within this strategy meet your needs, Bill Gobal, who operates a gas station downtown, says there are other alternatives. Many people have tried this route. However, I must warn you, they do not all work equally well. Some have been considered to be socially unacceptable while others are illegal. There is a risk involved. Do you want to see them? Or would you like to try another strategy now? The choice is yours.

If you want to see these new alternatives, you must press the key marked DATA on the list of alternatives. Each time you select an alternative you immediately will be presented with a consequence. Each time you go back to Strategy A you will need to press the key marked DATA to see this list again.

The consequences for each alternative appeared with random probability. Because these alternatives were of questionable legality, it was believed that many respondents might view them as possible decisions, but not actually choose them unless they believed they were running out of gasoline. For example, those respondents who would make such decisions might have been expected to be driving automobiles which were classified as "gasoline Guzzlers". See Appendix A for a more detailed description of Strategy B and Strategy B, illegal alternatives. It is to be noted that the messages leading to illegal alternatives were different for Strategies B and E than for Strategy A. The following information was presented to respondents if they chose Strategies B or E:
If you do not like any of the above choices or if none of these choices fits your needs, your neighbors have all gotten together and have made a list of alternative ways to increase gasoline efficiency. However, they do admit to you and to themselves that while these alternative choices are being made, they do not work equally well for everyone. Some even border on the line between legal and illegal. Others are clearly illegal.

If you want to see these alternatives you must press the key marked DATA on the list of alternatives. Each time you select an alternative you will immediately be presented with a consequence. Each time you go back to Strategy B you will need to press the key marked DATA to see this list again.

Again the consequences for each alternative appeared with random probability.

Neither Strategy C, adjusting travel needs to use less gasoline, nor Strategy D, attempting to induce the government to change its policies to relax rationing regulations, contained any illegal alternatives. This was consciously decided in an attempt to maintain an accurate and realistic set of decisions. After all, in real life, illegal alternatives are not presented in the course of every decision made. Thus, there was no reason to assume that SHORTAGE should divert from reality merely by design. This decision did involve a value judgment. However, in an attempt to create a subjectively meaningful simulated environment, the choice appeared to be appropriate.

It was decided that an in depth evaluation of each and every component of SHORTAGE would become tedious and time consuming for the reader, and as such, unnecessary for an understanding of the methodology used. Thus, the remaining strategies, their alternatives and consequences are listed in Appendix A. A skeleton diagram of the decision paths of
each can also be seen.

In the strategy development stage, it was also critical to accurately depict real or possibly real decisions within the strategy categories. As it was pointed out, the decisions must be meaningful to respondents, yet objectively factual in terms of realistically designed patterns of events.

In the selection of illegal decisions to be included in SHORTAGE, it might be expected that respondents whose car types permitted them to finish the simulation would be the least likely to make decisions which would involve breaking the law. These included all respondents whose daily gasoline consumption rate was 1.7 gallons of gasoline per day or less. However, it was also noted that respondents who were sanctioned negatively even when making rational or wise decisions might strike out at the system by making illegal decisions, especially if they surmised they might not "get caught". In addition, it was believed that respondents who were negatively sanctioned would be most likely to type in comments reflecting their frustrations with the situation they were experiencing.

Phase three in the development of SHORTAGE was as follows: SHORTAGE was designed in a manner which gave concrete form to events which had already occurred, were occurring, or which might occur in the event of gasoline rationing. Thus, the decisions to be included were a reflection of these events. SHORTAGE's objectives, constraints, alternatives, consequences, general assumptions, and other structural components were stipulated as boundaries within which respondents were free to act.
Admittedly, the simulation design was a result of a number of conces-
sions and discretionary choices made by the research group. On the
other hand, the simulation's development process was a carefully planned
attempt to represent conditions of rationing as accurately as possible.

As Plummer (1980:109) points out:

A simulation should always be understood to inherently
reflect the knowledge, preferences, and perspectives of
its creator. To acknowledge bias in the design process
is not to attribute ulterior motives to the designer, but
is merely to recognize that it is often not possible to
incorporate as many features or to portray them as accu-
rately as one may wish.

While SHORTAGE was, by definition, developed within the boundaries
of a particular methodology, it was by no means an attempt to impose on
its participants decisions which they "should" make. On the contrary, a
number of SHORTAGE's participants offered invaluable insights which pro-
vided the impetus for the second generation of the simulation. For
example, some respondents pointed out the biases inherent in the design.
One person indicated that some of the penalties associated with certain
alternatives were not realistic. In the 1979 data set, a respondent's
decision to ride the bus, for example, was always rewarded with the fol-
lowing consequence:

Your cost of traveling to and from work has been cut by
one-third. It looks as if this was a good choice.

Not considered was the fact that riding the bus, either intercity or
intracity is often inconvenient and/or crowded. Individuals may have to
stand on the entire trip, buses are often late, inclement weather creates
problems, and there is an almost complete lack of privacy. These and
other bits of information provided by respondents created a need for phase four in the model development which is as follows: Feedback received by participants in the simulation created an incentive to modify and hence improve the validity of SHORTAGE for the second round of data collection. In illustration, for the 1980 data collection, a consequence was added to the alternative of riding the bus. It read as follows:

The bus is so overcrowded that by the time it gets to your stop you have stood the entire ten miles to and from work each day. Do you still want to ride the bus? Press the letter "y" for yes, "n" for no.

It was believed that this consequence might create respondent awareness that decisions made may be more realistic if they take such factors as individual comfort, safety, or privacy into account.

In observing respondents, it was also possible for the researchers to evaluate SHORTAGE while the simulation was in progress. This was a helpful factor in permitting an adequate evaluation of SHORTAGE's positive and negative elements. For example, some respondents seemed to have a need to converse with the researchers as the simulation progressed. Perhaps this dialogue interfered with their responsibility to type in comments on the terminal. On the other hand, it did permit respondents to vent frustrations at times. Sometimes comments did seem nonrational. One respondent, for example, replied, almost rhetorically:

This is not fair. I live in a democratic society. I should not be expected to undergo any personal hardships because of my government's ineptitude in solving the energy crisis - if there is one (an energy crisis), that is, and I'm not so sure.

One can only speculate the perspectives of other respondents who may have also felt their freedom and mobility to be in jeopardy but remained
silent. Consequently, it would seem the researcher must be aware of two important factors in simulation research: 1) that the events and decisions presented in the simulation are both familiar and understandable to respondents; and even more importantly, that 2) these events and decisions may not be acceptable to respondents. Hence, the respondent must feel free to make comments which maintain researcher awareness of otherwise latent respondent perceptions of the situation, perceptions which might influence the decision-making process.

Methodology

In a sense, the objective of this investigation is to test a methodology which has, to the author's knowledge, not been used previously in social science research. The term methodology has been used in preference to "research method" for a reason. As Bailey (1982:32) points out, "by method, we simply mean the research technique or tool used to gather data." SHORTAGE is far more than just a "tool" for gathering data. It involved the development of a new and innovative methodology and included a theoretical evaluation of the entire research process. As Bailey (1982:32) comments:

Methodology includes the assumptions and values that serve as a rationale for research and the standards or criteria the researcher uses for interpreting data and reaching conclusions. A researcher's methodology determines such factors as how he or she writes hypotheses and the criteria he chooses to demonstrate the existence of a relationship between two variables, while perhaps saying nothing about the nature of the relationship. Some researchers will first choose a research problem and then decide that one methodological perspective is superior to others for studying it. Other researchers may be intellectually committed to a
particular methodological perspective and will choose a research problem suited to that perspective.

For this investigation, the research problem was considered in conjunction with the methodological perspectives used in social science research. The phenomenological perspective was selected in response to the apparent failure of extant simulation and gaming theory which follows the basic assumptions of rational positivism. That is, as Brown (1978: 160) points out:

The focus is on calculating the optimal decision or choice among alternative means for achieving a given end. Formulas are developed for weighing risks, costs, and potential benefits; options are arrayed and the "rationally best choice" is determined.

Phenomenology, on the other hand, offers itself as a descriptive method, grounded in a theoretical framework which permits a focus on the socially constructed and socially negotiated nature of reality (Berger and Luckmann, 1966; Schutz, 1967; Zeitlin, 1973; Johnson, 1981). And as Kinloch (1981: 136) comments, such an approach deviates markedly from the assumptions inherent in the positivist perspective which tends to impose predefined rules onto empirical data.

As the data for this investigation are analyzed, there will be an attempt to avoid positing empirical hypotheses which might serve to hinder the discovery of unexpected contingencies or serendipitous events, i.e., "the discovery through chance by a theoretically prepared mind of valid findings which were not sought for" (Merton, 1957:12). Serendipitous events may emerge in the form of an apparently nonrational relationship between respondent attitude toward gasoline rationing and the
decision to make illegal decisions. It has already been noted that studies have often prejudged the utility of gasoline rationing as a non-inflationary and equitably way of dealing with the energy crisis. Researchers continue to generate information that reinforces the fact that respondent attitude toward the energy crisis is negative, that consumers do not want it considered as an alternative to present methods of conservation (e.g., rationing by price). As a result of the conclusions drawn by the researchers (Murray et al., 1974; Moncreif et al., 1977; Brunner and Bennett, 1978; Burnett, 1978; Richman, 1979), transportation researchers and policy planners have concluded that:

1. American consumers will be unwilling to accept the transportation and mobility constraints associated with gasoline rationing.

2. Consumers do not want to deal with the massive bureaucratic problems that would be created by a gasoline rationing plan.

Simulating Gasoline Rationing: Does the Method Work?

Barber (1963:4-7) comments:

Both scientific knowledge and ordinary knowledge of the commonsense objects of the external world are recognized as analytically unjustified, highly presumptuous, and fallible.

In spite of Barber's (1963:4-7) statement, SHORTAGE may provide transportation researchers with a perspective on consumer travel behavior that differs in a fundamental way from traditional survey research. Reasons for this are as follows. SHORTAGE is the result of a careful design in which participants were able to:
1. Become intellectually and emotionally involved in the situation presented to them.

2. Become goal oriented. That is, participants, because they were able to visually experience the passing of time, the rate of their daily gasoline consumption, and dwindling of their gasoline supply, appeared to be conscious of making decisions (not necessarily rational) that would profitably benefit them by decreasing daily consumption rate to a level which would permit them to finish the simulation without running out.

3. Have at their disposal a wide array of possible alternatives to aid them in attaining their goal (e.g., coping with, adapting to, or beating the system).

4. Communicate with the researchers. The researchers were always on hand to answer questions or to clarify the ways in which respondents could most effectively complete the simulation. The one problem which may have interfered with respondent decision making, however, was the intimidation they experienced interacting with a computer. In addition, it may have been uncomfortable making certain kinds of decisions with the researcher in such close proximity. It was, however, made clear to respondents that the researcher would leave the terminal room if/when asked to do so. Respondents who would experience this kind of discomfort might well be those who specified a positive attitude toward gasoline rationing but then made decisions which were illegal, and hence inconsistent with their professed attitude.

5. Participate in an ambiguous, threatening, and/or constraining situation.
That is, if the participants were representative of the larger population of American consumers, the possibility of gasoline rationing would serve to act as a constant reminder that the oil reserves of both the United States and the world are indeed finite and running out (Ritzer, 1982: 457). To summarize, the greater the degree to which the simulation provided an environment similar to that which might exist in actual conditions of gasoline rationing, the greater the degree to which there may be justification for saying the results of the data analysis are valid and hence scientific. It is argued that SHORTAGE met the qualifications stated in points one through five.

**Statistical Analysis Used**

The type of statistical analysis chosen for this study was contingent upon both the theory and the methodology adopted. The methodology called for an emphasis on the dynamic social processes which produce consumer travel behavior patterns. Also demanded was the flexibility needed to account for serendipitous findings. As a result, it would have been disadvantageous to have attempted to develop a complicated process of analysis such as that which is used in causal and noncausal relationship research and in comparison research. Simon (1978:362) provides the rationale for this approach when he points out that:

What type of analysis a researcher performs should depend upon the type of research question that he seeks to answer, as well as on the method by which he collects the data and the sharpness with which the research question has been formulated.
Univariate Analysis and Frequency Distributions

As Smith (1981:390) comments:

Univariate analysis refers to the examination of only one variable at a time. We often need to use this type of analysis for "descriptive" purposes.

In a descriptive investigation, particularly one that is exploratory, the researcher may be more interested in describing the degree to which a phenomenon occurs than with studying its correlates (Smith, 1981:322). That is, the raw frequency distribution—for example, the number of respondents who held a very favorable, somewhat favorable, somewhat unfavorable, or very unfavorable attitude toward gasoline rationing—may provide a clear picture of how this attitude is similar or dissimilar to that of the general population. In addition, a statistical summary average may be used in presenting the data:

The mode, most frequently reported raw grouped category, the median, the category with half the responses on either side of it, and/or the arithmetic mean, the sum of all responses divided by the number of responses. (Smith, 1981:390)

For purposes of this study, frequency distributions including the mean, median, and mode will be presented where appropriate in order to provide as much information as possible about the nature of respondent attitude toward the energy crisis and ways in which respondents may or may not feel it will directly impact their travel behavior patterns. It is further suggested that the interpretation of these frequency distributions may given some indication as to whether the results of this study are generalizable to the wider population of American consumers. These
distributions will be presented on respondent attitude toward the following two attitude items each of which contained response categories of 1) very favorable, 2) somewhat favorable, 3) somewhat unfavorable, and 4) very unfavorable. Attitude labels follow each within parentheses:

Attitude toward gasoline rationing (hereafter referred to as GASRAT).

Depending more on oil imports from other countries (hereafter referred to as IMPOIL).

Respondents were also asked to respond to the following questions:

Should a person strictly follow all laws that are set up to conserve gasoline, even if those laws result in personal hardships? (Hereafter referred to as CONSG.)

Do you think that most people are willing to give up some of their own gasoline needs so that others will be sure to have enough gasoline to meet basic needs? (Hereafter referred to as GIVUP.)

Do you think that you would get your "fair share" if a gasoline rationing system were set up? (Hereafter referred to as FSHAR.)

The response categories for the questions just listed were based on Likert scaling (Likert, 1982) and are as follows: 1) definitely, 2) probably, 3) not sure, 4) probably not, and 5) definitely not.

Other questions included the following:

Overall, would you say that during the last year or so the effect of the gasoline shortage on your household has been very severe, severe, not too severe, or not severe at all? (Hereafter referred to as SHSEV.)

Response categories for SHSEV were as follows: 1) very severe, 2) severe, 3) not too severe, 4) not severe at all, and 5) don't know.

Do you think that the shortage of gasoline will get worse, stay the same, or get better during the next ten years? (Hereafter referred to as SHWORS.)
Response categories for SHWORS were as follows: 1) get worse, 2) stay the same, 3) get better, and 4) don't know.

In general, which of the following statements best expresses your feelings about the "national" gasoline shortage of the past year or so? (Hereafter referred to as SHREAL.)

Response categories for SHREAL were as follows: 1) there is not and never was a "real" shortage; 2) there probably was a shortage, but I am sure it is over now; 3) there is still a shortage, but I am sure the problem will be solved; 4) there is a severe shortage, but it can be solved in the future; and 5) the shortage is so severe that nothing can be done about it.

Where do you feel the most responsibility for solving the gasoline shortages must lie? (Hereafter referred to as SHRESP.)

Response categories for SHRESP were as follows: 1) government, 2) business and industry, 3) individual consumers, and 4) don't know.

For purposes of the data analysis, attitudes toward SHWORS, SHREAL, and SHRESP will be considered as qualitative. Each individual response, therefore, will be viewed as a separate category which would not lend itself to quantitative analysis.

Testing for the Existence of Simple Relationships

Smith (1981:363) comments that:

To say there is an association between two variables is to say that when one phenomenon varies, the other is likely to vary in a predictable manner. All the more complicated statements in science - cause and effect statements, for example - are built upon the foundation of the association.

Smith's (1981:363) statements represent the goals of social science
research—to explain social reality and to find an order, to acknowledge rationality, and ultimately to make sense of things (Perrow, 1981:2-9). Thus, the statistical testing of relationships is expected to yield information on the degree to which there is (or is not) an association between two variables. Sometimes the answer seems to be statistically obvious. Within the context of this study, however, it is suggested that there may be little, if any relationship, for example, between the attitude held by respondents about GASRAT and the other attitude questions asked. By way of illustration, the following model, Model A, might be expected to yield valuable insights into consumer travel behavior patterns under conditions of energy constraint. Based on a review of the literature only those attitudes believed to be critical in understanding consumer response to the gasoline shortage were included in Model A.

Relationships Suggested

As it has been pointed out in previous discussions, American consumers have been repeatedly informed of the danger associated with dependence on foreign oil (Energy Policy, 1981). Thus, it would be expected that an attitude toward GASRAT would be related to respondent attitude toward IMPOIL. Secondarily, American consumers have been repeatedly warned of the ramifications associated with a continued increase in the demand for gasoline (Moncrief et al., 1977; Henderson, 1978a; Richman, 1979; Energy Policy, 1981). However, consumers have, since the 1973 oil embargo, responded negatively to reports of dwindling energy supplies. They have reasoned that the technology and genius of American
Figure 10. General theoretical model suggesting relationships between respondent attitude toward gasoline rationing and 1) increased foreign oil imports, 2) conservation of gasoline at the expense of personal hardship, 3) willingness to give up personal supplies of gasoline so others may have their basic needs satisfied, 4) the fifty-five mile an hour speed limit as a reasonable limit, 5) the degree to which the gasoline shortage has been personally severe, 6) what turn the gasoline shortage will take over the next ten years, 7) getting a fair share of gasoline if gasoline rationing is implemented, 8) whose responsibility it is to solve the gasoline shortage, and 9) whether or not the gasoline shortage is real.

know-how will solve the problem within five to ten years (Murray et al., 1974; Shippee, 1981).

The gasoline shortages have been viewed primarily as a part of the oil company conspiracy to drive up prices (Richman, 1979). Consumers report that rationing would cause "undue personal hardship" (Fusso, 1978). As a result, it would be expected that a relationship exists between attitude toward gasoline rationing and respondent willingness to conserve gasoline, even at the expense of personal hardship.

Researchers have also conducted studies to determine how American consumers feel about and would respond to cutting back of their individual
consumption of gasoline to assure that everyone would be able to satisfy at least basic travel needs (Fusso, 1978; Richman, 1979). Both Fusso (1978) and Richman (1979) found that one-third to one-half of those interviewed would find gasoline rationing a harsh imposition on their mobility needs. In addition, a study by Moncrief et al. (1977) yielded evidence that regardless of future shortages, consumers would not be willing to cut back significantly on their travel needs. Thus, it would be expected that there would be a relationship between attitude toward gasoline rationing and consumer willingness to give up individual gasoline needs so that others will be sure to have enough gasoline to meet at least basic travel needs.

Murray et al. (1974) found that consumer's acceptance of the seriousness of the gasoline shortages and their willingness to consider gasoline rationing favorably were related to consumer experience with those shortages. As a result, it would be expected that a relationship exists between attitude toward gasoline rationing and the degree to which consumers have been personally affected by the shortages.

Numerous studies have demonstrated that American consumers and government officials believe the shortage will be solved through domestic research and development and technological advances (Energy Policy, 1981). As it was pointed out in the Review of Literature, Presidents Nixon, Ford, and Carter all agreed that domestic research and development are the keys to energy independence. This message was passed on to American consumers as each president presented his energy address to the nation (Energy Policy, 1981). Also, in a study by Richman (1979:581)
eighty-six percent of those interviewed reported they were somewhat optimistic to very optimistic about the ability of the United States to "solve the energy problem by technological discoveries and developments." Thus, it would be expected that a relationship exists between attitude toward gasoline rationing and belief in the ability of the United States to solve the problem using the "technological fix" (Orr, 1981).

Studies have been conducted that have shown consumers would find it difficult to 1) significantly reduce their automobile mileage (Fusso, 1978, or 2) permit a gasoline shortage to interfere with their vacation travel plans (Moncrief et al., 1977). It might be expected then that there would be a relationship between attitude toward gasoline rationing and belief in getting a "fair share" of gasoline in the event of rationing.

A number of attitude evaluations about consumer perception of the gasoline shortages have demonstrated that consumers believe the primary responsibility for solving the problem lies with the oil companies, the government, and the individual in that order (Murray et al., 1974; Henderson, 1978a; Fusso, 1978; Richman, 1979). For example, in November of 1973, eighty-seven percent of those included in a nationwide survey by the Harris Poll (Fusso, 1978:129) believed the energy shortage in the United States to be somewhat serious (37%) to very serious (50%). By October of 1975, these percentages had dropped to thirty-eight percent and thirty-six percent, respectively. By July of 1977, twenty-three percent believed the shortage to be somewhat serious while an increase to fifty-four percent believed the situation to be very serious (Fusso,
1978:129). By 1981, however, this percentage had significantly dropped. Shippee (1981) reported that fully eighty-seven percent of Americans did not believe in the reality of an energy crisis. As such, it would be expected there is a relationship between attitude toward gasoline rationing and belief in the reality of the energy crisis.

The author suggests there may be little or no relationships between these various attitudes toward gasoline rationing and its potential consequences. It appears critical then to depict the data in such a manner that, as Simon (1978:363) suggests, "they are clearly shown, understood, and their meaning is grasped by the reader." Therefore, in discussing the results of the data analysis, there will be individual tables for each idea that is being communicated. These tables will include 1) frequency distributions for each of the questions from the presimulation and postsimulation questionnaires, 2) the measures of central tendency for each where appropriate, and chi-square tests of significance for Model A depicted in Figure 10. The use of simple statistics appears necessary in light of the exploratory nature of this study. Also, the small sample size precludes a more in depth analysis of the data.

Collapsing Categories for Questionnaire Items

In order to construct tables from the questionnaire data, it was necessary to collapse the range of responses into manageable categories. There were two basic collapsing strategies used--one was theoretical, the other empirical. Theoretically, the emphasis in this study has been on favorable versus unfavorable attitudes toward the gasoline shortages.
For the sake of the reader's understanding, the tables presenting the frequency distributions will demonstrate the continuum of attitudes from those strongly in favor to those strongly opposed to gasoline rationing as its incumbent constraints. However, for purposes of the chi-square tests of significance which will be conducted on Model A and on the SHORTAGE data, the categories will be collapsed to depict a more general evaluation. Empirically, the strategy involved "uniform or proportionate collapsing" (Bailey, 1982:400). That is, each cell contained a certain portion of the possible range of responses.

Bailey (1982:401) comments that:

While collapsing is often necessary to make tables manageable, it may unfortunately, result in a loss of information. It can also be used unscrupulously to manipulate results.

The problems pointed out by Bailey (1982:401) may be most likely to occur when the researcher "plays with different alternative groupings to see which one yields the most statistically significant test or the strongest relationship between variables" (Bailey, 1982:401). Such an approach was not considered for purposes of this study. Table 3 demonstrates the manner in which the response categories were collapsed for respondent attitudes toward GASRAT and IMPOIL. Responses which indicated a very favorable or somewhat favorable attitude toward GASRAT and IMPOIL were assigned a value of 1, which indicated a favorable attitude toward GASRAT and IMPOIL. Responses which indicated a somewhat unfavorable or very unfavorable attitude toward GASRAT and IMPOIL were assigned a value of 2, which then indicated an unfavorable attitude toward GASRAT and IMPOIL.

Table 4 shows how the response categories for respondent attitudes
Table 3. Way in which response categories were collapsed for attitudes toward GASRAT and IMPOIL

<table>
<thead>
<tr>
<th>Response categories</th>
<th>Value assigned to attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude toward: GASRAT, IMPOIL</td>
<td></td>
</tr>
<tr>
<td>1. Very favorable</td>
<td>1</td>
</tr>
<tr>
<td>2. Somewhat favorable</td>
<td>1</td>
</tr>
<tr>
<td>3. Somewhat unfavorable</td>
<td>2</td>
</tr>
<tr>
<td>4. Very unfavorable</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 4. Way in which response categories were collapsed for attitudes toward CONSG, GIVUP, and FSHAR

<table>
<thead>
<tr>
<th>Response categories</th>
<th>Value assigned to attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude toward: CONSG, GIVUP, FSHAR</td>
<td></td>
</tr>
<tr>
<td>1. Definitely</td>
<td>1</td>
</tr>
<tr>
<td>2. Probably</td>
<td>1</td>
</tr>
<tr>
<td>3. Not sure</td>
<td>2</td>
</tr>
<tr>
<td>4. Probably not</td>
<td>3</td>
</tr>
<tr>
<td>5. Definitely not</td>
<td>3</td>
</tr>
</tbody>
</table>
toward 1) CONSG, 2) GIVUP, and 3) FSHAR were collapsed. Responses which indicated that respondents held a favorable attitude toward CONSG, GIVUP, and FSHAR (response categories included were definitely or probably) were assigned a value of 1. Responses which indicated that respondents were not sure were assigned a value of 2. Responses which indicated that respondents held an unfavorable attitude toward CONSG, GIVUP, and FSHAR (response categories included were probably not or definitely not) were assigned a value of 3.

Table 5 demonstrates the way in which the response categories were collapsed for respondent attitude toward SHSEV. Responses which indicated respondent attitude toward SHSEV was very severe or severe were assigned a value of 1. Responses which indicated respondent attitude

Table 5. Way in which response categories were collapsed for attitude toward SHSEV

<table>
<thead>
<tr>
<th>Response categories</th>
<th>Value assigned to attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude toward: SHSEV</td>
<td></td>
</tr>
<tr>
<td>1. Very severe</td>
<td>1</td>
</tr>
<tr>
<td>2. Severe</td>
<td>1</td>
</tr>
<tr>
<td>3. Not too severe</td>
<td>2</td>
</tr>
<tr>
<td>4. Not severe at all</td>
<td>2</td>
</tr>
<tr>
<td>5. Don't know</td>
<td>3</td>
</tr>
</tbody>
</table>
SHSEV was not too severe or not severe at all were assigned a value of 2. Responses which indicated the respondents were not sure were assigned a value of 3.

Collapsing Categories for SHORTAGE Data

In order to construct tables from the SHORTAGE data, it was also necessary to collapse the range of responses into manageable categories. This approach was necessary too in order that the chi-square cells would have expected frequencies greater than five. Otherwise the tables presented would have been so sparse that chi-square would not have been a valid statistical test. Tables 6 through 13 demonstrate the way in which the strategy categories were collapsed. These categories were also proportionately collapsed. It was believed there would be less likelihood of distorting the findings if this approach were taken. As it can be seen from Table 6, if a respondent made the decisions not to view Strategy A (N_STRIP1), a value of 1 was assigned. If a respondent made one or more decisions to view Strategy A, a value of 2 was assigned. If a respondent made two or fewer decisions within Strategy A (N_CH1), a value of 1 was assigned. If, however, a respondent made three or more decisions within Strategy A (N_CH1), a value of 2 was assigned.

The number of times respondents decided to view Strategy A (N_STRIP1) ranged from zero to eleven, while the number of respondents who made decisions within this strategy ranged from zero to five. There was a total of six possible decisions within Strategy A. A total of twenty-nine respondents did not view Strategy A during their entire
Table 6. Breakdown of number of times respondents viewed Strategy A (N_STR1) and the number of respondents who made decisions within Strategy A (N_CH1)

<table>
<thead>
<tr>
<th>Number of times respondent viewed Strategy A</th>
<th>Number of respondents who viewed Strategy A (N_STR1)</th>
<th>Value assigned to N_STR1</th>
<th>Number of decisions respondent made in Strategy A (N_CH1)</th>
<th>Number of respondents who made decisions in Strategy A</th>
<th>Value assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>29</td>
<td>1</td>
<td>0</td>
<td>38</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>9</td>
<td>2</td>
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<td>4</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>2</td>
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<tr>
<td>5</td>
<td>7</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>2</td>
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<tr>
<td>6</td>
<td>5</td>
<td>2</td>
<td>6</td>
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<tr>
<td>7</td>
<td>6</td>
<td>2</td>
<td>7</td>
<td>--</td>
<td>--</td>
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<td>8</td>
<td>3</td>
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<td>--</td>
<td>--</td>
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<td>2</td>
<td>9</td>
<td>--</td>
<td>--</td>
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<tr>
<td>10</td>
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<td>10</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>2</td>
<td>11</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>74</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Strategy category: (N_STR1, N_CH1)

Strategy A: Attempt to obtain as much gasoline as possible for personal consumption.
participation in SHORTAGE, while forty-five respondents viewed this strategy one or more times. On the other hand, thirty-eight respondents made two or fewer decisions within Strategy A, while thirty-two respondents made three or more decisions. It might be suggested that those respondents who made two or more decisions within Strategy A (N_CHI) would be likely to hold an unfavorable attitude toward CONSG, since Strategy A encouraged respondents to obtain as much gasoline as possible for personal consumption.

Table 7 demonstrates the breakdown of responses for respondents who viewed Strategy A, illegal alternatives (N_STR2) and for those who actually made decisions within Strategy A, illegal alternatives (N_CHI2). As it can be seen from Table 7, if a respondent made the decision not to view Strategy A, illegal alternatives (N_STR2) a value of 1 was assigned. If a respondent made one or more decisions within Strategy A, illegal alternatives (N_CHI2), a value of 2 was assigned. The number of times respondents decided to view Strategy A, illegal alternatives ranged from zero to five, while the number of decisions actually made ranged from zero to three. There was a total of four possible decisions within Strategy A, illegal alternatives. A total of fifty-one respondents did not view Strategy A, illegal alternatives at all during their participation in SHORTAGE, while twenty-three respondents viewed this strategy at least once. Fifty-seven respondents did not make any decisions within Strategy A, illegal alternatives, while sixteen respondents made one or more decisions.

Table 8 demonstrates the breakdown of responses for those who
Table 7. Breakdown of number of times respondents viewed Strategy A, illegal alternatives (N_STR2) and actual number of decisions made by respondents in Strategy A, illegal alternatives (N_CHI2)

<table>
<thead>
<tr>
<th>Number of times respondents viewed Strategy A, illegal alternatives (N_STR2)</th>
<th>Number of respondents who viewed Strategy A, illegal alternatives (N_STR2)</th>
<th>Value assigned to N_STR2</th>
<th>Number of decisions respondents made within Strategy A, illegal alternatives (N_CHI2)</th>
<th>Number of respondents who made decisions within N_CHI2</th>
<th>Value assigned to N_CHI2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>51</td>
<td>1</td>
<td>0</td>
<td>57</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
<td>2</td>
<td>1</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
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<tr>
<td>3</td>
<td>1</td>
<td>2</td>
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<td>1</td>
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<tr>
<td>4</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Strategy category: (N_STR2, N_CHI2)
Strategy A, illegal alternatives: This strategy contained the illegal alternatives for Strategy A, to attempt to obtain as much gasoline as possible for personal consumption.
Table 8. Breakdown of number of times respondents viewed Strategy B (N_STR3) and actual number of respondents who made decisions within Strategy B (N_CHI3)

<table>
<thead>
<tr>
<th>Number of times respondent viewed Strategy B who viewed Strategy B (N_STR3)</th>
<th>Number of respondents Value assigned to N_STR3</th>
<th>Number of decisions respondents made within Strategy B (N_CHI3)</th>
<th>Number of respondents who made decisions within Strategy B (N_CHI3)</th>
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Total 74

Strategy category: (N_STR4, N_CHI4)

Strategy B: Make better use of the gasoline rations that are made available to you.
viewed Strategy B (N_STR3) and for those who actually made decisions within Strategy B (N_CHI3). If a respondent made the decision not to view Strategy B (N_STR3), a value of 1 was assigned. If a respondent viewed Strategy B one or more times, a value of 2 was assigned. If a respondent made two or fewer decisions within Strategy B (N_STR3), a value of 1 was assigned. If a respondent made three or more decisions within Strategy B, a value of 2 was assigned.

The number of times respondents decided to view Strategy B, ranged from zero to thirty-three, while the number of respondents who actually made decisions within Strategy B ranged from zero to twenty-seven. There was a total of four possible decisions within this strategy. One respondent who viewed Strategy B made these four decisions repeatedly. He made the decision to buy a fuel-efficient automobile more than twenty times. He indicated he wanted to do this more than anything else. He informed the researcher of the following:

If I try long enough, I will surely be allowed to buy a new car. Won't I? It wouldn't be fair otherwise.

A second respondent decided to view Strategy B sixteen different times, while repeatedly making the decision to ride an intercity or intracity bus. His logic was as follows:

If I make this decision enough times my gasoline consumption rate will eventually reach zero. Won't it?
That makes sense, you know.

This respondent could not be convinced that, as in real life, once a decision is made, it is made. That is, his decision to ride the bus had decreased his travel costs by one-third. His logic seemed to indicate that a second decision to ride the bus should decrease his travel costs by
another one-third and so on until his daily gasoline consumption rate reached zero. His logic and his decisions could have been defined as nonrational. Even more nonrational then was his decision to terminate the simulation. His reasons were as follows:

I'm sorry. This is not fair. You have made me extremely upset and frustrated. I cannot handle this. Please tell me how I can stop the game. I'm leaving.

With that response, the respondent angrily left the terminal room.

Table 9 demonstrates the breakdown of responses for those who viewed Strategy B, illegal alternatives (N_CHI4) and for those who actually made decisions within Strategy B, illegal alternatives (N_CHI4). If a respondent made the decision not to view Strategy B, illegal alternatives (N_STR4), a value of 1 was assigned. If a respondent made one or more decisions within Strategy B, illegal alternatives, a value of 2 was assigned. As it can be seen from Table 9, the number of times respondents decided to view Strategy B, illegal alternatives ranged from zero to seven, while the number of respondents who made decisions within Strategy B, illegal alternatives also ranged from zero to seven. There was a total of seven possible decisions to be made within this strategy. A total of twenty-eight respondents did not view Strategy B, illegal alternatives at all during their participation in SHORTAGE, while forty-three respondents viewed this strategy one or more times. Thirty-four respondents did not make any decisions within Strategy B, illegal alternatives, while thirty-five respondents made one or more decisions.

Table 10 demonstrates the breakdown of responses for those who viewed Strategy C (N_STR5) and for those who actually made decisions within
Table 9. Breakdown of number of times respondents viewed Strategy B, illegal alternatives (N_STR4) and actual number of respondents who made decisions within Strategy B, illegal alternatives (N_CHI4).

<table>
<thead>
<tr>
<th>Number of times respondent viewed Strategy B, illegal alternatives (N_STR4)</th>
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<th>Value assigned to N_STR4</th>
<th>Number of decisions respondents made within Strategy B, illegal alternatives (N_CHI4)</th>
<th>Number of respondents who made decisions within Strategy B, illegal alternatives (N_CHI4)</th>
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</table>

Strategy category: (N_STR4, N_CHI4)
Strategy B, illegal alternatives: This strategy contains the illegal alternatives for Strategy B, to make better use of the gasoline that is made available to you.
Table 10. Breakdown of number of times respondents viewed Strategy C (N_STR5) and actual number of respondents who made decisions within Strategy C (N_CHI5)

<table>
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<th>Number of times respondent viewed Strategy C (N_STR5)</th>
<th>Number of respondents who viewed Strategy C</th>
<th>Value assigned to N_STR5</th>
<th>Number of decisions respondents made within Strategy C (N_CHI5)</th>
<th>Number of respondents who made decisions within Strategy C</th>
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Strategy category: (N_STR5, N_CHI5)
Strategy C: Adjust travel needs in an attempt to use less gasoline.
Strategy C (N_CHI5). If a respondent made the decision not to view Strategy C (N_STR5), a value of 1 was assigned. If a respondent viewed Strategy C one or more times, a value of 2 was assigned. If, however, two or fewer decisions were made within Strategy C (N_CHI5), a value of 1 was assigned. If three or more decisions were made with Strategy C, a value of 2 was assigned.

The number of times respondents decided to view Strategy C ranged from zero to forty-nine, while the number of respondents who made decisions ranged from zero to forty-seven. There was a total of ten possible decisions within this strategy. Three of these decisions offered respondents only a marginal increase in daily gasoline consumption rate. Nonetheless, one respondent repeatedly made these decisions. His logic was as follows:

I'm just curious as to what might happen if I keep pressing the same buttons each time. Maybe, for example, they'll change the law about driving snowmobiles. I own one, you know. It really isn't fair that I wouldn't receive any gasoline to use it.

Table 11 demonstrates a breakdown of responses for those who viewed Strategy D (NSTR7) and for those who actually made decisions within Strategy D (N_CHI7). If a respondent made the decision not to view Strategy D (N_STR7), a value of 1 was assigned. If a respondent viewed Strategy D one or more times, a value of 2 was assigned. If two or fewer decisions were made within Strategy D (N_CHI7), a value of 1 was assigned. If three or more decisions were made, a value of 2 was assigned. As it can be seen from Table 11, the number of times respondents decided to view Strategy D ranged from zero to fourteen, while the number of
Table 11. Breakdown of number of times respondents viewed Strategy D (N_STR7) and number of respondents who made decisions within Strategy D (N_CHI7)

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</table>

Strategy category: (N_STR7, N_CHI7)

Strategy D: Attempt to induce the government (local, state, and/or federal levels) to change its energy policy or policies to relax rationing regulations.
respondents who made decisions within this strategy ranged from zero to twelve. There was a total of ten possible decisions within this strategy. None of these decisions offered respondents either a decrease or an increase in their daily gasoline consumption rate. The reason for this was that changes involving government intervention were believed to be long-run changes, while the situation of energy constraint confronting respondents was immediate. It was concluded that respondents might view the decisions within this strategy and surmise that none would be of any help in "getting them through the situation." Only one respondent repeatedly viewed and made decisions within this strategy, while the majority (64 respondents) made zero to two decisions before returning to the index page to select a different strategy. It is noted that the respondent who made repeated decisions within Strategy D informed the researcher of the following:

I guess I am just curious as to what sorts of feedback I might get within this strategy. Actually, the government, at any level, should be prepared to help us (consumers). After all, it was the government that got us into this mess in the first place.

As the data collection progressed, the type of response just described seemed far too rare. If one respondent, or two, or three, held this attitude, perhaps others did as well.

Table 12 demonstrates the breakdown of responses for those who viewed Strategy E (N_STR9) and for those who actually made decisions within Strategy E (N_CHI9). If a respondent made the decision not to view Strategy E (N_STR9), a value of 1 was assigned. If a respondent viewed Strategy E one or more times, a value of 2 was assigned. If two
Table 12. Breakdown showing number of times respondents viewed Strategy E (N_STR9) and actual number of decisions made by respondents within Strategy E (N_CHI9)

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<th>Number of decisions respondents made within Strategy E (N_CHI9)</th>
<th>Number of respondents who made decisions within Strategy E (N_CHI9)</th>
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</tbody>
</table>

Total: 74

Strategy category: (N_STR9, N_CHI9)

Strategy E: Reconsider the social and moral issues with respect to individual style of living, values, and behavior. Make personal changes as needed.
or fewer decisions were made within Strategy E (N_CHI9), a value of 1 was assigned. If three or more decisions were made within Strategy E, a value of 2 was assigned. As it can be seen from Table 12, the number of times respondents decided to view Strategy E (N_STR9) ranged from zero to twelve, while the number of respondents who actually made decisions within Strategy E ranged from zero to ten. With the exception of the decision to report to the authorities anyone selling counterfeit ration coupons, none of the decisions within Strategy E decreased or increased respondent daily gasoline consumption rate.

Table 13 demonstrates the breakdown of responses for those who viewed Strategy E, illegal alternatives (N_STR10) and for those who actually made decisions within Strategy E, illegal alternatives (N_CHI10). If a respondent made the decision not to view Strategy E, illegal alternatives (N_STR10), a value of 1 was assigned. If a respondent viewed Strategy E, illegal alternatives one or more times, a value of 2 was assigned. If a respondent did not make any decisions within Strategy E, illegal alternatives, a value of 1 was assigned. If a respondent made one or more decisions within Strategy E, illegal alternatives, a value of 2 was assigned. As it can be seen from Table 13, the number of times respondents decided to view Strategy E, illegal alternatives ranged from zero to three. The number of respondents who actually made decisions within this strategy also ranged from zero to three. There was a total of six possible decisions within this strategy. Each decision presented the respondent with some type of risk which might cost him 1) an automobile accident, 2) a possible jail sentence, 3) a possible fine,
Table 13. Breakdown showing number of times respondents viewed Strategy E, illegal alternatives (N_STR10) and actual number of decisions made by respondents within Strategy E, illegal alternatives (N_CHI10)

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<th>Number of times respondent viewed Strategy E, illegal alternatives (N_STR10)</th>
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<th>Number of decisions respondents made within Strategy E, illegal alternatives (N_CHI10)</th>
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</table>

Strategy category: (N_STR10, N_CHI10)

Strategy E, illegal alternatives: This strategy contains the list of illegal alternatives for Strategy E, to reconsider the social and moral issues involved with respect to individual style of living, values, and behavior. Make personal changes as needed.
4) cancellation of his ration coupons, and/or an explosion which may cost a life (see Appendix A for a description of these decisions and their possible consequences).

Method of Data Analysis: SHORTAGE Data

An analysis of the data from SHORTAGE will be conducted in a manner similar to that of the presimulation questionnaire data. The concept categories from SHORTAGE to be used in the data analysis appear in Figure 11. It is noted that in the printout of the raw data for SHORTAGE, the following categories of decisions used in the data analysis were created: 1) the number of times each strategy was viewed, 2) the number of decisions made within each strategy, 3) the number of decisions made which were legal/illegal, 4) the daily gasoline consumption rate for each respondent (this figure was computed according to respondent car type), and 5) the number of hi-risk decisions made by each respondent. However, for some unknown reason, specific alternatives and the consequences associated with them had not been stored. The computer programmer could not justify this error. It was also not possible to quantitatively chart the decision paths of each respondent. While these factors somewhat limit the complexity of the statistical analysis, they need not be interpreted as severe limitations for purposes of this investigation. That is, it seems more important to present the data that is available for analysis. This will be done using frequencies, percentages, and chi-square distributions. Figure 11 depicts the labels assigned to each strategy category used in the data analysis.
Car_type (CAR_TYPE)

Number of times respondents made decisions within Strategy A (N_CHI1)

Number of times respondents made decisions within Strategy A, illegal alternatives (N_CHI2)

Number of times respondents made decisions within Strategy B (N_CHI3)

Number of times respondents made decisions within Strategy B, illegal alternatives (N_CHI4)

Number of times respondents made decisions within Strategy C (N_CHI5)

Number of times respondents made decisions within Strategy D (N_CHI7)

Number of times respondents made decisions within Strategy E (N_CHI9)

Number of times respondents made decisions within Strategy E, illegal alternatives (N_CHI10)

Number of times respondents viewed Strategy A (N_STR1)^a

Number of times respondents viewed Strategy A, illegal alternatives (N_STR2)

Number of times respondents viewed Strategy B (N_STR3)^a

Number of times respondents viewed Strategy B, illegal alternatives (N_STR4)^a

Number of times respondents viewed Strategy C (N_CHI5)^a

Number of times respondents viewed Strategy D (N_CHI7)^a

Number of times respondents viewed Strategy E (N_CHI9)^a

Number of times respondents viewed Strategy E, illegal alternatives (N_STR10)^a

^aDenotes number of respondents who viewed each strategy.

Figure 11. Labels assigned to each strategy category used in data analysis of SHORTAGE data
Relationships to be Tested

Based on the review of the literature, the development of the theory, and the methodology adopted for this investigation, there will be an attempt to determine whether or not relationships exist between respondent attitude and actual decisions made during participation in SHORTAGE. Statistically, the chi-square tests of significance will be used. These relationships include the following:

1. Car_type and number of illegal decisions made.
2. Attitude toward GASBAT and number of illegal decisions made.
3. Car_type and attitude toward GASBAT.
4. Attitude toward CONSG and number of illegal decisions made.
5. Attitude toward GIVUF and number of illegal decisions made.
6. Attitude toward CONSG and decisions made within legal strategies (Strategies A, B, C, D, and E)

The development of hypotheses or suggestion of relationships to test is generally contingent on the review of literature. There have not been to the author's knowledge, studies done which permit a theoretical justification for the relationships just stated. In part, for this reason, no attempt will be made at this time to evaluate them. If a justification were made prematurely, it might well preclude a needed qualitative evaluation of the decision paths followed by given respondents. That is, when the raw SHORTAGE data were printed, the decision paths of each respondent were printed along with a path which depicted their daily gasoline consumption rate. If it becomes necessary to do so, those paths will be analyzed.
Postsimulation Questionnaire Data

Finally, in the data analysis paired t-tests will be conducted in order to determine whether or not there is a statistically significant difference between responses to the presimulation questionnaire and the postsimulation questionnaire. These tests may well yield information to suggest that the knowledge, awareness, and experience gained through participation in SHORTAGE led to a shift in respondent attitude toward the gasoline shortage. This finding could be invaluable to transportation researchers and policy makers if it is demonstrated that the shift in respondent attitude would narrow the gap which exists between attitude toward the gasoline rationing and actual consumer travel behavior. Such information may contribute to the development of energy policies based on consumer understanding and acceptance of the situation. Or conversely, policies based on consumer understanding and a lack of acceptance of the gasoline rationing. Either way the results of this investigation may provide insights into:

1. The point at which American consumers will actually cut back on their current levels of transportation.

2. The point at which American consumers will reduce their mobility at the cost of altering their styles of living.
CHAPTER V. RESULTS OF THE DATA ANALYSIS

In an article titled "OPEC, Down but Not Out", Cambridge Energy Research Associates (1982:6B) concluded that:

Any forecast predicting the demise of the Organization of Petroleum Exporting Countries is premature and the oil cartel could plunge the world into a third energy crisis as early as 1986. The current situation - where OPEC is struggling to maintain $34 a barrel price for its oil in the face of a worldwide glut - is not permanent. With only a modest economic recovery, the world will once again become vulnerable to that volatile mixture of oil and politics that leads to disruptions and higher prices.

It would appear that the topic under study in this investigation grows more important on a day-by-day basis. As such, the data analysis which follows has been designed in order to suggest relationships which might be expected to emerge should American consumers once again experience the constraints in travel mobility which inevitably accompany gasoline shortages. The focus will be on presenting the distribution of attitudes toward gasoline rationing and its attendant perspectives on conditions of energy constraint rather than on a search for the causes of these attitudes. In addition, there will be an attempt made to discover certain types of travel behavior patterns which might be expected to emerge in a situation of gasoline rationing as a result of the attitudes held.

The following sections will appear in this chapter: 1) frequency distributions will be presented which demonstrate respondent attitude toward the gasoline shortages prior to participation in SHORTAGE; 2) the
results of the chi-square tests of significance for relationships suggested in Model A will be evaluated (see page 164); 3) the results of the chi-square tests of significance for relationships suggested between presimulation questionnaire items and decisions made during respondent participation in SHORTAGE will be presented and evaluated; 4) frequency distributions will be presented that will demonstrate changes in respondent attitude toward the gasoline shortages following participation in SHORTAGE; and 5) the results of the paired t-tests performed to determine the degree to which respondent participation in SHORTAGE significantly altered attitudes toward the gasoline shortages will be presented.

**Frequency Distributions and Percentages:**

**Presimulation Questionnaire Items**

Respondents were asked to indicate their attitudes toward gasoline rationing (GASRAT). As it can be seen from Table 14, 51.8% of all respondents indicated a somewhat favorable (52.7%) to very favorable (5.4%) attitude toward GASRAT, while 41.9% indicated a somewhat unfavorable (36.5%) to very unfavorable (5.4%) attitude. These findings demonstrate a marked increase from the Harris Poll conducted in 1977 (see Fusso, 1978:132) in which it was found that 60% of those surveyed opposed gasoline rationing and 29% favored such a solution to the gasoline shortages. It was noted that the Harris Poll discovered consumers were opposed to 1) putting higher taxes on gasoline, and 2) letting the price of gasoline rise all it could stand. Each of these tentative stopgaps to the gasoline shortages involved a belief that "rationing by price" would
Table 14. Frequency distributions and percentages for presimulation attitude toward GASBAT

<table>
<thead>
<tr>
<th>Attitude toward GASBAT</th>
<th>N</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very favorable</td>
<td>4</td>
<td>5.4</td>
</tr>
<tr>
<td>Somewhat favorable</td>
<td>39</td>
<td>52.7</td>
</tr>
<tr>
<td>Somewhat unfavorable</td>
<td>27</td>
<td>36.5</td>
</tr>
<tr>
<td>Very unfavorable</td>
<td>4</td>
<td>5.4</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>74</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

\[\bar{x}^a = 2.419 \quad \text{Median} = 2.346 \quad \text{Mode} = 2.000\]

*In all tables, the subsequent code goes from the positive to the negative part of the scale (e.g., 1 = most favorable).

serve as a deterrent to unnecessary travel. As Businessweek magazine (1974:58) and Willenborg and Pitts (1977) pointed out, however, such an approach had already been shown to be ineffective. It might, therefore, be concluded that the American public would continue to be resistant to voluntarily reducing mileage to conserve gasoline, while at the same time professing to, as Fusso (1978:127) states, "prefer voluntary reduction in the use of gasoline, as opposed to higher taxes or rationing of gasoline."

In consideration of the mixed respondent attitude toward GASBAT, it might be expected that attitude toward importing more oil from other countries (IMPOIL) would also be mixed. However, as it can be seen from Table 15, only 10.8% of all respondents indicated a somewhat favorable (8.1%) to very favorable (2.7%) attitude toward IMPOIL, while 89.1% maintained a somewhat unfavorable (36.5%) to very unfavorable (52.7)
Table 15. Frequency distributions and percentages for presimulation attitude toward IMPOIL

<table>
<thead>
<tr>
<th>Attitude toward IMPOIL</th>
<th>N</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very favorable</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>Somewhat favorable</td>
<td>6</td>
<td>8.1</td>
</tr>
<tr>
<td>Somewhat unfavorable</td>
<td>27</td>
<td>36.5</td>
</tr>
<tr>
<td>Very unfavorable</td>
<td>39</td>
<td>52.7</td>
</tr>
<tr>
<td>Totals</td>
<td>74</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ \bar{X} = 3.392 \quad \text{Median} = 3.551 \quad \text{Mode} = 4.000 \]

attitude. These responses may well be indicative of respondent awareness of the potentially exposure relationship between dependence on foreign oil and the danger of another oil embargo. On the other hand, responses may have included a belief that the United States was not able to produce enough oil to meet its energy needs, thus creating an inevitable though negatively interpreted dependence on foreign oil. For example, in a Gallup Poll conducted during April and May of 1979, it was found that 46% of all Americans believed the United States must import foreign oil in order to meet its energy needs (Richman, 1979:579). Since Presidents Nixon, Ford, and Carter continually emphasized the need for energy independence as the primary requisite for uninterrupted energy supplies (Energy Policy, 1981:244) it would not seem surprising that respondent attitudes toward IMPOIL were overwhelmingly negative.

Based on respondent attitude toward GASRAT and IMPOIL, it might be
expected that attitude toward strictly following all laws set up to conserve energy, even at the expense of personal hardship (CONSG) would be relatively positive. As it can be seen from Table 16, 74.3% of all respondents indicated that persons probably should (59.5%) or definitely should (14.9%) follow such laws, while 13.5% were not sure and 12.2% felt persons should probably not (8.1%) or definitely not (4.1%) follow such laws. It would appear that the attitude toward CONSG ranges from one end of the continuum to the other with a majority favoring strict conformity to the law. This finding is consistent with Parson's theoretical model of the complementarity of expectations in which it has traditionally been assumed that "in social interaction men/women mutually seek approval from one another by conforming to shared norms (Wrong, 1982:108) On the other hand, Parsons' model may be neither applicable nor an adequate predictor of travel behavior, given actual conditions of energy constraint. In illustration, the question constructed to elicit respondent attitude toward CONSG was a traditionally designed "What if . . . ?" question intended to produce respondent feelings about and perceptions of the gasoline shortages. It was assumed that while respondents stated in good faith the changes in transportation behavior that "should" occur, their statements of good faith were made without an adequate understanding of the consequences involved in terms of time, privacy, and/or freedom of mobility. That is, gasoline rationing was an unknown experience to all respondents who participated in SHORTAGE. As such, it would seem quite rational that 25.7% of all respondents indicated they were uncertain of how people should respond or that people
Table 16. Frequency distributions and percentages for presimulation attitude toward GIVUP

<table>
<thead>
<tr>
<th>Attitude toward GIVUP</th>
<th>N</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitely</td>
<td>11</td>
<td>14.9</td>
</tr>
<tr>
<td>Probably</td>
<td>44</td>
<td>59.5</td>
</tr>
<tr>
<td>Not sure</td>
<td>10</td>
<td>13.5</td>
</tr>
<tr>
<td>Probably not</td>
<td>6</td>
<td>8.1</td>
</tr>
<tr>
<td>Definitely not</td>
<td>3</td>
<td>4.1</td>
</tr>
<tr>
<td>Totals</td>
<td>74</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ \bar{x} = 2.270 \quad \text{Median} = 2.091 \quad \text{Mode} = 2.000 \]

would probably not or definitely not conform to the laws set up to conserve gasoline, particularly if conformity to the law meant accepting personal hardship.

It can be seen from Table 17 that 51.3% of all respondents, perhaps more realistically, indicated that people would probably not (48.6%) or definitely not (2.7%) give up individual gasoline needs so that others would have enough to meet basic needs (GIVUP). It would appear that a discrepancy exists between what people "should do" and what people might actually do under conditions of energy constraint. This discrepancy may have been due to a lack of understanding of what gasoline rationing would demand in terms of consumer travel decision trade-offs. That is, if gasoline rationing demanded a significant change in travel behavior, it might be expected that attitude toward GIVUP would be relatively negative.
It might also be expected that if people believed they would get their "fair share" should gasoline rationing be enacted into law (FSHAR), there would be less resistance to potential concerns of mobility constraints. The responses for attitude toward FSHAR were mixed, with 50% of all respondents indicating they probably would (43.2%) or definitely would (6.8%) receive a fair share, and 50% indicating they were either not sure (27.8%), would probably not (17.6%) or definitely not (5.4%) get a fair share. It might be expected that respondent attitude toward FSHAR would be related to the degree that gasoline rationing was believed to restrict transportation mobility and force the individual to make trade-offs, for example, between social activities and work-related activities. That is, respondents who drove fuel efficient automobiles --those getting 28-38 miles per gallon--might be more likely to believe

<table>
<thead>
<tr>
<th>Attitude toward GIVEUP</th>
<th>N</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitely</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>Probably</td>
<td>24</td>
<td>32.4</td>
</tr>
<tr>
<td>Not sure</td>
<td>10</td>
<td>13.5</td>
</tr>
<tr>
<td>Probably not</td>
<td>36</td>
<td>48.6</td>
</tr>
<tr>
<td>Definitely not</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>Totals</td>
<td>74</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ \bar{X} = 3.162 \quad \text{Median} = 3.528 \quad \text{Mode} = 4.000 \]
they would get a fair share than would those who drove gasoline guzzlers --those getting 9-16 miles per gallon (see page 210 for a discussion of the results of the chi-square test for presimulation attitude toward FSHAR and car_type). In assessing Table 18, it is further suggested that those individuals who were unaware of the fuel efficiency of their automobiles might logically have responded to the question by stating they were not sure whether or not they would receive their fair share.

Table 18. Frequency distributions and percentages for presimulation attitude toward FSHAR

<table>
<thead>
<tr>
<th>Attitude toward FSHAR</th>
<th>N</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitely</td>
<td>5</td>
<td>6.8</td>
</tr>
<tr>
<td>Probably</td>
<td>32</td>
<td>43.2</td>
</tr>
<tr>
<td>Not sure</td>
<td>20</td>
<td>27.8</td>
</tr>
<tr>
<td>Probably not</td>
<td>13</td>
<td>17.6</td>
</tr>
<tr>
<td>Definitely not</td>
<td>4</td>
<td>5.4</td>
</tr>
<tr>
<td>Totals</td>
<td>74</td>
<td>100.0</td>
</tr>
</tbody>
</table>

$\bar{x} = 2.716$  Median = 2.500  Mode = 2.000

The data collected for this study were collected during and shortly following the "long dry summer of 1979" (Newsweek, 1979:22). At that time, shortages were most severe "in urban areas and in the Northeast" (Energy Crisis, Volume 2, 1974-75:68). Respondents in the sample drawn for this study were primarily from the state of Iowa, and, as such, did
not encounter the degree of severity experienced by those living, for example, in New Jersey "where two to three hour waits at gasoline stations were common" (Energy Crisis, Volume 2, 1974-75:68). This may account, at least in part, for the fact that for 81.1% of all respondents, the gasoline shortages were perceived as being either not too severe on individual households (54.1%) or not severe at all (27.0%) (see Table 19 for presimulation attitude toward SHSEV). On the other hand, when respondents were asked to indicate whether or not the shortages would worsen, stay the same, or get better over the next ten years (SHWORS), 71.6% indicated they believed it would get worse. These findings demonstrate a significant shift in attitude toward SHWORS since the 1974 study conducted by Murray et al., in which it was found that a

Table 19. Frequency distributions and percentages for presimulation attitude toward SHSEV

<table>
<thead>
<tr>
<th>Attitude toward SHSEV</th>
<th>N</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very severe</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Severe</td>
<td>12</td>
<td>16.2</td>
</tr>
<tr>
<td>Not too severe</td>
<td>40</td>
<td>54.1</td>
</tr>
<tr>
<td>Not severe at all</td>
<td>20</td>
<td>27.0</td>
</tr>
<tr>
<td>Don't know</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>Totals</td>
<td>74</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ \bar{X} = 3.162 \quad \text{Median} = 3.125 \quad \text{Mode} = 3.000 \]
majority of those surveyed believed the energy crisis would be solved within five years. It was also a significant attitude change from Richman's 1979 findings which indicated that 86% of those surveyed were somewhat optimistic (43%) to very optimistic (43%) about the ability of the United States to solve the energy crisis within five to ten years (Richman, 1979:581). Because the response categories for respondent attitude toward SHWORS were considered discrete, the mean and the median were not included in Table 20. It was noted, however, that the mode was 1.000 indicating a majority of respondents believed the shortages would worsen over the next ten years.

Richman (1979:581) comments that during the gasoline shortages, "those individuals who had difficulties in getting gasoline were less convinced gasoline shortages were 'real' than were those who had no difficulty". Those who had experienced difficulties in obtaining gasoline appeared also to be more likely to blame the president for the scarcity than those who had no difficulty (see Table 21). An evaluation of Richman's findings (1979) might well be interpreted to mean that as the gasoline shortages intensified, as contradictory information continued to be disseminated to the American public, and as gasoline prices continued to rise, the public's annoyance and anger rose as well. Responses given within the context of this study, however, appear to contradict those found by Richman. They also stand opposite those presented by Shippee (1981:35) who pointed out that:

Several recent polls suggest that the majority of U.S. citizens simply do not believe in the reality of present energy supply problems, nor future availability problems.
Table 20. Frequency distributions and percentages for presimulation attitude toward SHWORS

<table>
<thead>
<tr>
<th>Attitude toward SHWORS</th>
<th>N</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get worse</td>
<td>53</td>
<td>71.6</td>
</tr>
<tr>
<td>Stay the same</td>
<td>15</td>
<td>20.3</td>
</tr>
<tr>
<td>Get better</td>
<td>4</td>
<td>5.4</td>
</tr>
<tr>
<td>Don't know</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>Totals</td>
<td>74</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 21. CBS/New York Times findings: Who is to blame for the gasoline shortages? Experiences in getting gasoline (July 9-11, 1979)

<table>
<thead>
<tr>
<th>Belief about oil shortages</th>
<th>Difficulty (34% of the public) (%)</th>
<th>Difficulty (55% of the public) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real</td>
<td>24</td>
<td>29</td>
</tr>
<tr>
<td>Not real</td>
<td>70</td>
<td>62</td>
</tr>
<tr>
<td>No opinion</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Blame president for shortages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A lot</td>
<td>41</td>
<td>30</td>
</tr>
<tr>
<td>Not much</td>
<td>53</td>
<td>63</td>
</tr>
<tr>
<td>No opinion</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>
On the other hand, the study conducted by Shippee (1981) was a stratified random sample of all Americans, while the sample drawn for this investigation was a convenience sample, using the closest live persons as respondents. This question, too, contained discrete response categories.

Table 22. Frequency distributions and percentages for presimulation attitude toward SHREAL

<table>
<thead>
<tr>
<th>Attitude toward SHREAL</th>
<th>N</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is not and never was a &quot;real&quot; shortage</td>
<td>12</td>
<td>16.2</td>
</tr>
<tr>
<td>There probably was a shortage for a while, but it is over now</td>
<td>14</td>
<td>18.9</td>
</tr>
<tr>
<td>There is still a shortage, but I am sure the problem will be solved</td>
<td>25</td>
<td>33.8</td>
</tr>
<tr>
<td>There is a severe shortage, but it can be solved in the future</td>
<td>22</td>
<td>29.7</td>
</tr>
<tr>
<td>The shortage is so severe that nothing can be done about it</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>74</td>
<td>100.0</td>
</tr>
</tbody>
</table>

which precluded the use of the mean and the median (SHREAL). However, the mode was 3.000 indicating that 33.8% of all respondents believed there was still a shortage but that it would be solved. By the time of the data collection, it was also noted that American consumers were well aware of President Carter's concern over the energy crisis. As it was pointed out in Energy Policy (1981:96) "energy policy was one of President Carter's earliest priorities. With rationing, however, the government would be telling millions of people how to manage their lives."
Had American consumers accepted the reality of the gasoline shortages as a problem that would be long term in nature, it might be expected that they would also have needed to bear part of the burden of resolving the problem. With this in mind, it might have been expected that respondents would have been divided as to who would be most responsible for solving the gasoline shortages (SHRESP). Reasoning for this assumption is as follows:

American consumers, in 1979, were "striving to maintain their materialistic, energy driven lifestyles (Henderson, 1978a:15) which were still being encouraged by big business as it promoted energy intensive products such as recreational vehicles. The energy crisis had only recently begun to magnify in both intensity and complexity, and, as such, was difficult even for the politician, the academician, and the economist to grasp (Wirth, 1975; Henderson, 1978a; Richman, 1979; Shippee, 1981; Orr, 1981). This, however, was also a time period in which gasoline prices as well as shortages were at their peak. Prices, for example, had risen steadily from approximately fifty-eight cents per gallon in January of 1978 to ninety-three cents per gallon in July of 1979. This was, in addition, a time when many service stations were limiting, in some areas of the country, the total number of gallons of gasoline purchased, and "a number of other states had implemented a form of rationing that based distribution on odd and even numbered license plates" (Energy Crisis, Volume 2, 1974-75:68). Realizing this, it seems logical that 58.3% of all respondents in this study believed the primary responsibility for solving the gasoline shortages rested with someone
other than themselves (see Tables 23, 24, and 25).

Tables 23, 24, and 25 show the frequency distributions and percentages for respondent presimulation attitude toward who is most responsible for solving the gasoline shortages (SHRESP). There are three tables for this questionnaire item for the following reason. For the 1979 questionnaire, the response categories for SHRESP included 1) government, 2) business and industry, 3) individual consumers, 4) don't know, and 5) others (please specify). When the questionnaire was filled out using pencil and paper, respondents took the liberty of circling more than one response, indicating, for example, that government and individual consumers were responsible for solving the gasoline shortages. Because of this, an additional four response categories were added. However, as it was pointed out in the Methods Chapter (see pages 119, 120), for the 1980 data collection the questionnaire was programmed into PLATO. The response categories for attitude toward SHRESP then were 1) government, 2) business and industry, 3) individual consumers, and 4) don't know. As it can be seen from Table 24, five respondents (16%) asked to combine the responses to include government, business and industry, and individual consumers. Because no respondents indicated they "did not know" where to place primary responsibility for solving the gasoline shortages, that response category was recoded to mean government, business and industry, and individual consumers. As it can be seen from Tables 23 and 24, 58.3% of respondents from the 1979 data set and 45.1% from the 1980 data set indicated someone other than the individual consumer was primarily responsible for solving the gasoline
Table 23. Frequency distributions and percentages for presimulation attitude toward SHRESP: 1979 data set (N=43)

<table>
<thead>
<tr>
<th>Attitude toward SHRESP</th>
<th>N</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>14</td>
<td>32.6</td>
</tr>
<tr>
<td>Business and industry</td>
<td>6</td>
<td>14.0</td>
</tr>
<tr>
<td>Individual consumers</td>
<td>10</td>
<td>23.2</td>
</tr>
<tr>
<td>Don't know</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Government, business and industry, and individual consumers</td>
<td>2</td>
<td>4.6</td>
</tr>
<tr>
<td>Government and business and industry</td>
<td>5</td>
<td>11.7</td>
</tr>
<tr>
<td>Government and individual consumers</td>
<td>4</td>
<td>9.3</td>
</tr>
<tr>
<td>Totals</td>
<td>43</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 24. Frequency distributions and percentages for presimulation attitude toward SHRESP: 1980 data set (N=31)

<table>
<thead>
<tr>
<th>Attitude toward SHRESP</th>
<th>N</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>5</td>
<td>16.1</td>
</tr>
<tr>
<td>Business and industry</td>
<td>9</td>
<td>29.0</td>
</tr>
<tr>
<td>Individual consumers</td>
<td>10</td>
<td>32.3</td>
</tr>
<tr>
<td>Government, business and industry, and individual consumers</td>
<td>6</td>
<td>19.3</td>
</tr>
<tr>
<td>No response</td>
<td>1</td>
<td>3.3</td>
</tr>
<tr>
<td>Totals</td>
<td>31</td>
<td>100.0</td>
</tr>
</tbody>
</table>
shortages. When Tables 23 and 24 were combined, it was demonstrated that 52.8% of all respondents believed someone other than the individual consumer was primarily responsible for solving the gasoline shortages. These findings differ somewhat from those presented by Murray et al. (1974:184) as they found that:

Sixty-seven percent of those surveyed expressed the belief that the gasoline shortages could be solved if individual consumers cut down on gasoline consumption.

The findings from this study, however, do seem to parallel those in a CBS/New York Times study (see Richman, 1979:581) in which the following

Table 25. Frequency distributions and percentages for presimulation attitude toward SHRESP: Combined data sets

<table>
<thead>
<tr>
<th>Attitude toward SHRESP</th>
<th>N</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>19</td>
<td>25.7</td>
</tr>
<tr>
<td>Business and industry</td>
<td>15</td>
<td>20.3</td>
</tr>
<tr>
<td>Individual consumers</td>
<td>20</td>
<td>27.0</td>
</tr>
<tr>
<td>Government, business and industry, and individual consumers</td>
<td>6</td>
<td>8.1</td>
</tr>
<tr>
<td>Government and business and industry</td>
<td>5</td>
<td>6.8</td>
</tr>
<tr>
<td>Government and individual consumers</td>
<td>4</td>
<td>5.4</td>
</tr>
<tr>
<td>Business and industry and individual consumers</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>No response</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td>Don't know</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>Totals</td>
<td>74</td>
<td>100.0</td>
</tr>
</tbody>
</table>
question was asked:

We are interested in who or what is to blame for the oil shortages we hear about. Would you place a lot of blame or not much for the problem on... (For July of 1979, the poll question read "... we are interested in who or what is responsible for the energy problem we are facing. Would you place a lot of the blame or not much for the energy problem, on... ")

Responses appear on Table 26.

Table 26. Results of a CBS/New York Times poll emphasizing who is to blame for the gasoline shortages

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>American oil companies</td>
<td>65.0</td>
<td>69.0</td>
<td>57.0</td>
</tr>
<tr>
<td>Middle East oil producing countries</td>
<td>56.0</td>
<td>47.0</td>
<td>44.0</td>
</tr>
<tr>
<td>Waste by people like yourself</td>
<td>--</td>
<td>58.0</td>
<td>62.0</td>
</tr>
<tr>
<td>The President</td>
<td>35.0</td>
<td>33.0</td>
<td>19.0</td>
</tr>
<tr>
<td>Congress</td>
<td>--</td>
<td>59.0</td>
<td>51.0</td>
</tr>
</tbody>
</table>

In summary of this section, it was noted that 1) respondent attitude toward GASBAT was mixed with 58.1% favoring rationing and 41.9% opposing rationing; 2) respondent attitude toward IMPOIL was overwhelmingly unfavorable (89.2%); 3) respondent attitude toward CONSG was relatively positive with 74.4% indicating persons probably should or definitely should comply with laws set up to conserve gasoline, even at the expense of personal hardship; 4) respondent attitude toward GIVUP was mixed with 35.1% of all respondents indicating people probably or
definitely would give up some of their individual gasoline needs so that others would be able to meet basic needs and 51.3% indicated people probably would not or definitely would not do so; 5) respondent attitude toward FSHAR was mixed with 50% indicating they would probably to definitely get a fair share of ration coupons if rationing were set up and 50% indicating either they did not know or that they might not receive a fair share; 6) respondent attitude toward SHSEV indicated that 81.1% of all respondents had not severely experienced the effects of gasoline shortages of the past year or so; 7) respondent attitude toward SHWORS indicated that 71.6% believed the shortages would worsen over the next ten years; 8) respondent attitude toward SHREAL indicated that 16.2% of all respondents believed the shortages were real but would eventually be solved; and finally 9) respondent attitude toward SHRESP indicated that 52.8% of all respondents believed someone other than the individual consumer was responsible for a solution to the gasoline shortages.

Results of Model A: Crosstabulations within Presimulation Questionnaires

The general theoretical model depicting the relationship between presimulation attitude toward GASRAT and IMPOIL, CONSG, GIVUP, SHSEV, FSHAR, SHREAL, SHWORS, and SHRESP, has been diagrammed in Figure 10, page 164. Chi-square tests of significance were performed in order to establish the existence of relationships between these various attitude items. A discussion of the results follows. For the crosstabulation between presimulation attitude toward GASRAT and CONSG, two out of the six
Table 27. Crosstabulation between presimulation attitude toward GASRAT and CONSG

<table>
<thead>
<tr>
<th>Attitude toward GASRAT</th>
<th>Attitude toward CONSG (%)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Don't know</td>
</tr>
<tr>
<td>Favorable</td>
<td>44.5</td>
<td>5.4</td>
</tr>
<tr>
<td>Unfavorable</td>
<td>29.7</td>
<td>8.1</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 1.69 \quad \text{d.f.} = 2 \quad \text{N.S.} \]

(33.3\%) valid cells had expected cell frequencies of less than five. As such, it could be suggested that the chi-square distribution provided an inadequate approximation to the action distribution of \( \chi^2 \). Ott et al. (1978) indicated:

> The chi-square approximation should be quite good if no expected cell count is less than 1 and no more than twenty percent are less than five.

Because of the inadequate cell frequencies for this and other crosstabulations performed for this study, the focus of the evaluation will be on the distributions of responses given certain attitudes. This may yield information helpful in understanding not only the attitudes held by respondents toward the gasoline shortages, but also information about the types of decisions and/or strategies to which respondents might be drawn during their participation in SHORTAGE.

A majority of respondents (74.3\%), irrespective of attitude toward GASRAT, indicated a positive attitude toward CONSG, while only 12.2\% indicated a negative attitude. This may have been an indication that
respondents held strong intentions of strictly conforming to all laws set up to conserve gasoline. However, it was noted that neither the presimulation attitude toward GASRAT nor toward CONSG, could be expected to serve as adequate predictors of actual decisions made during SHORTAGE.

The results of the crosstabulation between presimulation attitude toward GASRAT and GIVUP also indicate that a statistically significant relationship does not exist. However, the results of this test show that 64.8% of all respondents, regardless of attitude toward GASRAT, indicated an ambiguous or negative attitude toward GIVUP, while 35.2% indicated a positive attitude. An assessment of Table 28 may permit the

Table 28. Crosstabulation between presimulation attitude toward GASRAT and GIVUP

<table>
<thead>
<tr>
<th>Attitude toward GASRAT</th>
<th>Attitude toward GIVUP (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>Favorable</td>
<td>20.3</td>
</tr>
<tr>
<td>Unfavorable</td>
<td>14.9</td>
</tr>
</tbody>
</table>

Χ² = 2.43  d.f. = 2  N.S.

suggestion that an element of the unknown was operating. That is, ideally speaking, respondents believed people should cooperate with rationing regulations by strictly following all laws set up to conserve gasoline, even at the expense of personal hardship. However, for the attitude toward GIVUP, the responses appeared more randomly distributed,
suggesting that the issue of willingness to give up individual gasoline needs raised the issue of restrictions in privacy, and transportation mobility. In addition, if it became necessary to give up individual gasoline needs, the inevitability of trade-offs in the decision-making process would emerge (e.g., trade-offs between time spent in traveling to and from work in a car pool versus that which would be afforded if individual automobiles were used). Again, rationing was, for the respondents in this study, an unknown quantity. It could be suggested then that they responded quite rationally, irrespective of their attitude toward GASRAT, CONSG, and/or GIVUP.

In Table 29, the calculated chi-square indicates that relative to respondent attitude toward GASRAT, there is a statistically significant relationship between attitude toward GASRAT and FSHAR. Of those who favored GASRAT, 36.5% also held a positive attitude toward FSHAR, while 50% of those respondents regardless of attitude toward GASRAT indicated an ambiguous to negative attitude toward FSHAR. It might be expected

Table 29. Crosstabulation between presimulation attitude toward GASRAT and FSHAR

<table>
<thead>
<tr>
<th>Attitude toward GASRAT</th>
<th>Attitude toward FSHAR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>Favorable</td>
<td>36.5</td>
</tr>
<tr>
<td>Unfavorable</td>
<td>13.5</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 7.53 \]  
\[ \text{d.f.} = 2 \]  
Significant at .05 level.
that respondent car_type would have been an influencing factor. Because of this, a crosstabulation was performed between car_type and presimulation attitude toward FSHAR. As it can be seen from Table 30, based on respondent car_type, the attitude toward FSHAR may seem nonrational.

Table 30. Crosstabulation between car_type and presimulation attitude toward FSHAR

<table>
<thead>
<tr>
<th>Car_type</th>
<th>Attitude toward FSHAR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>Low mileage</td>
<td>12.16</td>
</tr>
<tr>
<td>Medium mileage</td>
<td>9.46</td>
</tr>
<tr>
<td>Gasoline guzzler</td>
<td>27.03</td>
</tr>
</tbody>
</table>

\[ X^2 = .091 \quad \text{d.f.} = 4 \quad \text{N.S.} \]

That is, 27% of all respondents whose automobiles were gasoline guzzlers indicated a positive attitude toward FSHAR. While this may be an indication that respondent driving needs were minimal, it might further suggest that the full impact of gasoline rationing would not be felt for some individuals until it actually happened in the "real" world, or perhaps in a "realistically designed" simulation. Thus, it might be expected that SHORTAGE would provide respondents with added knowledge about gasoline rationing which might lead them to alter their presimulation attitude toward FSHAR.

It was suggested in an earlier discussion that consumer experiences with gasoline shortages were inversely related to attitude toward GASRAT.
However, as it can be seen from Table 31, relative to respondent attitude toward GASBAT, there was a statistically significant relationship between presimulation attitude toward GASBAT and SHSEV. A majority of respondents (54%) appeared to be unaware or ignorant of the effects of the gasoline shortages on their individual households regardless of their attitude toward GASBAT. This may have been, in part, because of their student status. That is, Iowa State University is located in a relatively small community. Its population including some 25,000 students totals less than 50,000 people. The Campus town area, the downtown area, shopping malls, and restaurants are geographically spaced to demand a minimum of travel. Thus, it could be suggested that even at the peak of the gasoline shortages, the respondents drawn for this sample may not have been severely affected by limited sales of gasoline or by service stations that closed evenings and weekends.

Table 31. Crosstabulation between presimulation attitude toward GASBAT and SHSEV

<table>
<thead>
<tr>
<th>Attitude toward GASBAT</th>
<th>Attitude toward SHSEV (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Severe</td>
</tr>
<tr>
<td>Favorable</td>
<td>5.4</td>
</tr>
<tr>
<td>Unfavorable</td>
<td>10.8</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 6.51 \quad \text{d.f.} = 2 \]

Significant at .05 level.
Table 32 indicates that the chi-square test did not yield evidence that a relationship exists between presimulation attitude toward GASRAT and SHWORS. This test did, however, demonstrate that 71.6% of all respondents, regardless of their attitude toward GASRAT believed the gasoline shortages would worsen over the next ten years. Some respondents appeared concerned over the possibility of other gasoline shortages. A number of them indicated to the researcher that, while they were not sure how "real" the shortages were, or would be, they would not be surprised to see more of them. One person stated, previous to his participation in SHORTAGE:

The oil companies are there to make big profits. The shortages appear for no real reason. Then prices go up. Then the shortages go away. But the prices stay up. That's the only way to make sense of it. I know they've got plenty of oil.

Table 33 indicates that the chi-square tests did not yield evidence that a relationship exists between presimulation attitude toward GASRAT and SHREAL. It was noted, however, that a majority of respondents who

<table>
<thead>
<tr>
<th>Attitude toward GASRAT</th>
<th>Attitude toward SHWORS (%)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Get worse</td>
<td>Stay the same</td>
<td>Get better</td>
<td>Don't know</td>
</tr>
<tr>
<td>Favorable</td>
<td>41.9</td>
<td>5.4</td>
<td>4.1</td>
<td>1.4</td>
</tr>
<tr>
<td>Unfavorable</td>
<td>29.7</td>
<td>5.4</td>
<td>1.4</td>
<td>1.4</td>
</tr>
<tr>
<td>$\chi^2 = 3.263$</td>
<td>d.f. = 1</td>
<td>N.S.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Table 33. Crosstabulation between presimulation attitudes toward GASRAT and SHREAL

<table>
<thead>
<tr>
<th>Attitude toward GASRAT</th>
<th>There is not and never was a &quot;real&quot; shortage</th>
<th>There probably was a shortage for a while, but it is over now</th>
<th>There is still a shortage, but I am sure the problem will be solved</th>
<th>There is a severe shortage, but it can be solved in the future</th>
<th>The shortage is so severe that nothing can be done about it</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Favorable</td>
<td>6.8</td>
<td>6.8</td>
<td>23.0</td>
<td>20.3</td>
<td>1.4</td>
</tr>
<tr>
<td>Unfavorable</td>
<td>9.5</td>
<td>12.2</td>
<td>10.8</td>
<td>9.5</td>
<td>0.0</td>
</tr>
</tbody>
</table>

$X^2 = 6.85$  d.f. = 4  N.S.
favored GASBAT (43%) believed a shortage or a severe shortage did exist, but that it would be solved eventually. Ironically, of the 16.2% of respondents who indicated there was not and never had been a "real" shortage, 6.8% indicated a favorable attitude toward GASBAT. Any evaluation of these seemingly contradictory attitudes must be made with caution. Perhaps the attitude toward GASBAT held by these five individuals was a result of President Carter's evaluation of the paradox of the energy crisis. That is, the gasoline shortages may or may not have been a direct result of the "oil company conspiracy" theory presented by Richman (1979). Gasoline shortages, nonetheless, if and when they occurred, were real regardless of the reasoning given. As President Carter stated in an energy address to the nation in 1979 (Energy Policy, 1981:252):

I know that many of your have suspected that some supplies of oil and gas are being withheld. You may be right, but suspicions about the oil companies cannot change the fact that we are running out of petroleum. Sometime in the 1980s demand will overtake production.

On the other hand, 63.5% of all respondents, regardless of presimulation attitude toward GASBAT indicated there was still a shortage, however severe it might have been. It was suggested that the responses to attitude toward SHREAL may have been encouraged because of the title of the simulation--SHORTAGE--or because of its obvious emphasis on gasoline shortages. In addition, the energy crisis and its varying dimensions was in the news on a daily basis. Perhaps then, responses conformed to the standardized expectancies concept discussed in Chapter Three. Such a problem could, of course, not be ruled out in an absolute sense of the
Table 34. Results of crosstabulations between presimulation attitude toward GASRAT and SHRESP

<table>
<thead>
<tr>
<th>Attitude toward GASRAT</th>
<th>Government</th>
<th>Business and industry</th>
<th>Individual and individual consumers</th>
<th>Government and business and industry</th>
<th>Government and individual and individual consumers</th>
<th>Business and industry and individual and individual consumers</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Favorable</td>
<td>12.2</td>
<td>9.5</td>
<td>18.9</td>
<td>6.8</td>
<td>2.7</td>
<td>4.1</td>
<td>2.7</td>
</tr>
<tr>
<td>Unfavorable</td>
<td>13.5</td>
<td>10.8</td>
<td>8.1</td>
<td>1.4</td>
<td>0.0</td>
<td>2.7</td>
<td>2.7</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 9.49 \quad \text{d.f.} = 8 \quad \text{N.S.} \]
term. However, as respondents were observed during their participation in the project, it appeared from their actions and their comments that many of their responses to the questionnaire items were far from "expected". Their actions and verbal responses, as it will be seen throughout the data analysis ranged from passivity to open anger and from nonrational to rational on a wide continua of perspectives.

The crosstabulation between presimulation attitudes toward GASRAT and SHRESP indicated that twelve out of eighteen (66.7%) of the valid cells had expected cell frequencies of less than five. However, as the distribution of percentages was examined, it was believed some important insights could be gained. That is 48.6% of all respondents regardless of attitude toward GASRAT indicated someone other than the individual consumer was primarily responsible for solving the gasoline shortages, while 47.3% regardless of attitude toward GASRAT indicted the individual consumer was wholly or in part responsible. The responses appear to be consistent with much of the literature reviewed for this study. That is, acceptance of an individual conservation ethic—in this case a favorable attitude toward GASRAT—may have been an indication that consumers are beginning to recognize the finite nature of nonrenewable resources. Also, although it cannot be determined within this study, respondents may have believed that the alternative to accepting individual responsibility for solving the gasoline shortages would be a continued increase in the cost of gasoline and/or the potential for interrupted gasoline supplies as the result of another oil embargo.

Finally, Table 35 indicates that the chi-square test did not yield
Table 35. Crosstabulation between presimulation attitude toward GASBAT and IMPOIL

<table>
<thead>
<tr>
<th>Attitude toward GASBAT</th>
<th>Attitude toward IMPOIL (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Favorable</td>
</tr>
<tr>
<td>Favorable</td>
<td>6.7</td>
</tr>
<tr>
<td>Unfavorable</td>
<td>4.1</td>
</tr>
</tbody>
</table>

\( \chi^2 = 3.35 \quad d.f. = 1 \quad N.S. \)

evidence that a significant relationship exists between presimulation attitude toward GASBAT and IMPOIL. However, it can be seen that, irrespective of respondent attitude toward GASBAT, there was an unfavorable attitude toward IMPOIL. To reiterate, this might indicate an awareness of the ramifications of continued dependence on foreign oil.

In summary of this section, presimulation attitude toward GASBAT appears to be significantly related to FSAR and SHSEV. That these were the only two relationships established as statistically significant was not surprising. That is, the attitude evaluation provided by the questionnaire items included an assessment of only the affective and cognitive components of attitude. Following participation in SHORTAGE, it may be that a more adequate evaluation of all three attitude components can be carried out. Thus, the findings contained in the following section of this chapter may yield important insights into the behavioral component of respondent attitude toward the gasoline shortages and hence permit a better understanding of the types of strategies and actual
decisions American consumers might make given conditions of energy con­
straint.

Results of Crosstabulations Between Presimulation Attitude Items and SHORTAGE Data

The following section contains an evaluation of the results of crosstabulations between the presimulation questionnaire items discussed in the previous sections of this chapter and the SHORTAGE data. Of the fifteen chi-square tests that were performed, no statistically signifi­cant relationships were established. There are reasons why this may have occurred. For example, as was pointed out earlier, it may have been due to sampling error and/or small sample size. On the other hand, re­spondents' professed attitudes toward the gasoline shortages and their actual behavior given conditions of energy constraint may not be closely related at all. It is suggested that the latter factor may be of equal importance with the former in understanding the types of strategies and actual decisions made as respondents participated in SHORTAGE. Conse­quently, rather than attempting to give reasons why statistically sig­nificant relationships were not established, the author will present and evaluate the percentage distributions which emerged given respondent attitude toward the gasoline shortages. These too may provide important insights into the decision-making process.
Results of Crosstabulations for Respondent Car_type and Decisions Made Within Illegal Strategy Categories

There were three strategies within which there were illegal decisions presented. These were Strategy A, to attempt to gain as much gasoline as possible for personal consumption (hereafter referred to as N_CHI2), Strategy B, to make better use of the gasoline that is available to you (hereafter referred to as N_CHI4), and Strategy E, to reconsider the social and moral issues involved with respect to style of living, values, and behavior (hereafter referred to as N_CHI10). The first crosstabulation to be evaluated was between car_type and number of illegal decisions made within N_CHI2. As it can be seen from Table 36, 47.03% of all respondents, irrespective of car_type did not make

Table 36. Crosstabulation between car_type and decisions made within N_CHI2

<table>
<thead>
<tr>
<th>Car_type</th>
<th>Respondents who did not make decisions within N_CHI2</th>
<th>Respondents who made one or more decisions within N_CHI2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline guzzler</td>
<td>18.92%</td>
<td>5.41%</td>
</tr>
<tr>
<td>Medium mileage</td>
<td>16.22%</td>
<td>4.05%</td>
</tr>
<tr>
<td>Gasoline guzzler</td>
<td>11.89%</td>
<td>13.51%</td>
</tr>
</tbody>
</table>

\[X^2 = 0.127 \quad \text{d.f.} = 2 \quad \text{N.S.}\]
any decisions within N_CHI2. On the other hand, 13.5% of the respondents who drove low-mileage automobiles made one or more decisions within N_CHI2, while only 5.4% who drove gasoline guzzlers did so. It would seem that respondent car_type may or may not be an important factor to consider. It might be expected, however, that those individuals who drove fuel-efficient automobiles were more energy conscious and thus more aware of their daily gasoline consumption rate than were their counterparts who drove gasoline guzzlers. As such they may also have had a desire to obtain as much gasoline as possible for personal consumption to assure a "deserved" freedom in transportation mobility. The reason for suggesting this is as follows. The author observed all respondents as they participated in SHORTAGE. Those respondents who drove fuel-efficient automobiles seemed at times preoccupied with making decisions that would reduce their daily gasoline consumption rate. Conversely, those respondents whose car_types placed them in a gasoline guzzler category had a tendency to read the lists of decisions more slowly and deliberately, often concentrating on strategies which offered little, if any, opportunity to decrease daily gasoline consumption rate (e.g., Strategy D which offered no changes whatsoever in daily gasoline consumption rate).

The results of the crosstabulation between car_type and decisions made within N_CHI4 are shown in Table 37. Regardless of car_type, 45.9% of all respondents did not make any decisions within N_CHI4. On the other hand, a majority of those who made one or more decisions within N_CHI4 drove low-mileage automobiles. While these findings are
consistent with those for the relationship between car_type and N_CHI2, it was noted that Strategy B presented decisions (both legal and illegal) that would permit respondents to make better use of the gasoline rations available to them. Thus, such decisions may have been perceived as more desirable and less "greedy" than decisions made with N_CHI2. However, when the results of the crosstabulation between car_type and decisions made within N_CHI10 were examined, it was demonstrated that those respondents who drove low-mileage automobiles were still somewhat more likely to make one or more decisions within N_CHI10 than were those who drove either medium-mileage or gasoline guzzler car_types. It might have been expected that the reverse would have occurred. That is, respondents who drove gasoline guzzlers might have been more likely to attempt to "beat the system" by reconsidering the social and moral issues involved much more readily than would their counterparts whose transportation mobility might not have been so restricted should gasoline

Table 37. Crosstabulation between car_type and decisions made within N_CHI4

<table>
<thead>
<tr>
<th>Car_type</th>
<th>Respondents who did not make decisions within N_CHI4 %</th>
<th>Respondents who made one or more decisions within N_CHI4 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline guzzler</td>
<td>12.16</td>
<td>12.16</td>
</tr>
<tr>
<td>Medium mileage</td>
<td>10.81</td>
<td>9.46</td>
</tr>
<tr>
<td>Low mileage</td>
<td>22.97</td>
<td>32.43</td>
</tr>
<tr>
<td>$X^2 = 0.78$  d.f. = 2</td>
<td>N.S.</td>
<td></td>
</tr>
</tbody>
</table>
Table 38. Crosstabulation between car_type and decisions made within N_CHI10

<table>
<thead>
<tr>
<th>Car_type</th>
<th>Respondents who did not make decisions within N_CHI10 %</th>
<th>Respondents who made one or more decisions within N_CHI10 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline guzzler</td>
<td>21.62</td>
<td>2.75</td>
</tr>
<tr>
<td>Medium mileage</td>
<td>12.16</td>
<td>8.11</td>
</tr>
<tr>
<td>Low mileage</td>
<td>39.19</td>
<td>16.22</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 0.78 \quad d.f. = 1 \quad N.S. \]

Rationing occur. On the other hand, a qualitative evaluation of each respondent's decision paths demonstrated that the decisions made within N_CHI10 were, for the most part, decisions involving traffic violations and not decisions that would involve serious infractions of the law (e.g., such as storing large quantities of gasoline in a garage).

Results of Crosstabulations for Presimulation Attitude Toward GASRAT and Decisions Made Within Illegal Strategy Categories

It can be seen from Table 39 that 77% of all respondents, regardless of attitude toward GASRAT did not make any decisions within N_CHI2. It was also noted that more respondents whose attitude toward GASRAT was favorable made decisions within N_CHI2, than did those whose attitude was unfavorable. Before evaluating Table 39, it might be valuable to examine Tables 40 and 41 which show the results of the crosstabulation between presimulation attitudes toward GASRAT and N_CHI4 and N_CHI10.
### Table 39. Crosstabulation between presimulation attitude toward GASBÂT and decisions made within N_CHI2

<table>
<thead>
<tr>
<th>Attitude toward GASBÂT</th>
<th>Respondents who did not make decisions within N_CHI2 %</th>
<th>Respondents who made one or more decisions within N_CHI2 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favorable</td>
<td>44.6</td>
<td>14.9</td>
</tr>
<tr>
<td>Unfavorable</td>
<td>32.4</td>
<td>8.1</td>
</tr>
<tr>
<td>$X^2 = 0.252$</td>
<td>d.f. = 1</td>
<td>N.S.</td>
</tr>
</tbody>
</table>

### Table 40. Crosstabulation between presimulation attitude toward GASBÂT and decisions made within N_CHI4

<table>
<thead>
<tr>
<th>Attitude toward GASBÂT</th>
<th>Respondents who did not make decisions within N_CHI4 %</th>
<th>Respondents who made one or more decisions within N_CHI4 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favorable</td>
<td>27.03</td>
<td>32.43</td>
</tr>
<tr>
<td>Unfavorable</td>
<td>18.92</td>
<td>21.62</td>
</tr>
<tr>
<td>$X^2 = 0.011$</td>
<td>d.f. = 1</td>
<td>N.S.</td>
</tr>
</tbody>
</table>

### Table 41. Crosstabulation between presimulation attitude toward GASBÂT and decisions made within N_CHI10

<table>
<thead>
<tr>
<th>Attitude toward GASBÂT</th>
<th>Respondents who did not make decisions within N_CHI10 %</th>
<th>Respondents who made one or more decisions within N_CHI10 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favorable</td>
<td>47.30</td>
<td>12.16</td>
</tr>
<tr>
<td>Unfavorable</td>
<td>25.68</td>
<td>14.86</td>
</tr>
<tr>
<td>$X^2 = 2.377$</td>
<td>d.f. = 1</td>
<td>N.S.</td>
</tr>
</tbody>
</table>
Table 40, for example, shows a few more respondents whose attitude toward GAS RAT was unfavorable made one or more decisions within N_CHI4 than within N_CHI2. However, in Table 41, a slightly different trend emerged. That is, more respondents whose attitude toward GAS RAT was unfavorable made decisions within N_CHI10 than those whose attitude toward GAS RAT was favorable. Because N_CHI10 involved making decisions which would encourage a reconsideration of the social and moral issues involved in the decision-making process as it related to gasoline rationing, it may have been more carefully scrutinized by respondents who favored GAS RAT. As was shown in Table 13 (see page 185), forty-nine respondents (66.2%) did not view this list of illegal decisions at all during their participation in SHORTAGE. It was also noted that the maximum number of decisions made within N_CHI10 was three out of a possible six. While some of these decisions involved breaking traffic laws, others carried severe consequences (see Appendix A). As the researcher observed respondents participating in SHORTAGE, a pattern of behavior seemed to emerge. That is, in general, respondents would look around to see how closely they were being watched before viewing any illegal alternatives. The researcher made it clear that she would leave the room at any time, for any reason, if asked to do so. However, it might be speculated that respondents hesitated to ask the researcher to leave. This may have decreased the degree to which decisions were made or even viewed within N_CHI10. One conclusion drawn from this observation was that individuals who held an unfavorable attitude or a favorable attitude toward GAS RAT might have been willing to bend the law or attempt to beat
the system only if it did not involve a serious violation of the law. This unwillingness to break the law might not have been that fundamentally different with the researcher in the room than it would have been in a "real life" situation. On the other hand, it might also have been concluded that respondents used in this study appeared to work at coping with and adjusting to conditions of energy constraint presented to them. This was shown to have been the case when a qualitative examination of the decision paths of each respondent yielded information that demonstrated Strategy B, to make better use of the gasoline available was the strategy of first choice for most respondents. It was also the strategy to which respondents returned if they found that they were not getting desired results from other strategies. Finally, it seemed to be the strategy (Strategy B) that led to the most frustration due to respondent inability to purchase a fuel-efficient automobile under any circumstances.

Perhaps one of the keys to understanding the link between attitude toward GASBÂT and choice of decisions within illegal strategy categories has been pinpointed by SHORTAGE. That is, past studies which have uncovered unfavorable consumer attitudes toward GASBÂT (Murray et al., 1974; Wirth, 1975; Henderson, 1978a; Richman, 1979; Shippee, 1981; Ott et al., 1978; Martin, 1981) have not emphasized the travel trade-offs involved in transportation decisions. Rather, their emphasis has been on consumer "demand" for transportation mobility, privacy, speed, personal comfort, and freedom to choose one's own route of travel. Actual conditions of energy constraint, such as those presented by SHORTAGE may have yielded a more realistic picture of what "real" people might do in "real"
situations should their gasoline supplies be controlled through rationing.

Crosstabulations Between Presimulation Attitude Toward CONSG and Decisions Made Within Illegal Strategy Categories

Table 42 shows that more respondents who indicated a positive attitude toward CONSG made one or more decisions within N_CHI2 than did those whose attitude toward CONSG was negative. These findings—as well as those shown in Tables 16 and 17 (frequency distributions for presimulation attitudes toward CONSG and GIVEUP)—demonstrate the "disconnectedness of behavior" (Meyer, 1978:15) associated with the loosely coupled nature of society (Weick, 1976). That is, respondents may well have recognized what "should have been done" by them to alleviate the gasoline shortages. However, as actual conditions of energy constraint were presented to them, there may have been a slippage between their intentions and their actions as it became difficult or impossible to carry out their intentions—in this case to not make illegal decisions.

Intervening factors such as the inability to make the apparently rational decision to purchase a fuel-efficient automobile (within N_CHI3) to reduce gasoline consumption may have rendered attainment of a rational goal—to make only legal decisions—impossible.

Table 44 shows the results of the crosstabulation between presimulation attitude toward CONSG and decisions made within N_CHI10. N_CHI2 and N_CHI10 remain the least chosen strategies of respondents regardless of presimulation attitude toward CONSG. N_CHI4 was the strategy within which most illegal decisions were made. N_CHI4, of course, contained
Table 42. Crosstabulation between presimulation attitude toward GASRAT and decisions made within N_CHI2

<table>
<thead>
<tr>
<th>Attitude toward CONSG</th>
<th>Respondents who did not make decisions within N_CHI2</th>
<th>Respondents who made one or more decisions within N_CHI2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favorable</td>
<td>58.11</td>
<td>16.22</td>
</tr>
<tr>
<td>Unfavorable</td>
<td>18.92</td>
<td>6.76</td>
</tr>
<tr>
<td>$X^2 = 0.161$</td>
<td>d.f. = 1</td>
<td>N.S.</td>
</tr>
</tbody>
</table>

Table 43. Crosstabulation between presimulation attitude toward GASRAT and decisions made within N_CHI4

<table>
<thead>
<tr>
<th>Attitude toward CONSG</th>
<th>Respondents who did not make decisions within N_CHI4</th>
<th>Respondents who made one or more decisions within N_CHI4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favorable</td>
<td>31.08</td>
<td>43.24</td>
</tr>
<tr>
<td>Unfavorable</td>
<td>14.86</td>
<td>10.81</td>
</tr>
<tr>
<td>$X^2 = 1.470$</td>
<td>d.f. = 1</td>
<td>N.S.</td>
</tr>
</tbody>
</table>

Table 44. Crosstabulation between presimulation attitude toward CONSG and decisions made within N_CHI10

<table>
<thead>
<tr>
<th>Attitude toward CONSG</th>
<th>Respondents who did not make decisions within N_CHI10</th>
<th>Respondents who made one or more decisions within N_CHI10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>56.76</td>
<td>17.57</td>
</tr>
<tr>
<td>Negative</td>
<td>16.22</td>
<td>9.46</td>
</tr>
<tr>
<td>$X^2 = 1.249$</td>
<td>d.f. = 4</td>
<td>N.S.</td>
</tr>
</tbody>
</table>
the illegal decisions for Strategy B, to make better use of the gasoline that was available. It may well have been that respondents, regardless of attitude toward CONSG, interpreted this as the most acceptable strategy within which to make decisions.

As it can be seen from Tables 45, 46, and 47, those respondents whose presimulation attitude toward GIVUP was negative were more likely to make decisions within N_CHI2, N_CHI4, and N_CHI10 than were those who held a positive attitude toward GIVUP. While these relationships were not statistically significant, the decisions made relative to respondent attitudes toward GIVUP may be important, nonetheless. That is, nearly twice as many respondents who indicated a favorable attitude toward GIVUP made decisions within N_CHI4 as did those whose attitudes were negative. It was also noted that, irrespective of attitude toward GIVUP, more respondents made decisions within N_CHI4—to make better use of gasoline that is made available—than in either of the other two illegal strategy categories.

Results of Crosstabulations Between Presimulation Attitudes Toward CONSG and Decisions Made Within Legal Strategies

The following section contains an evaluation of respondent's decisions made within the five legal strategies relative to their attitudes toward CONSG. These strategies include Strategy A (hereafter referred to as N_CHI1), Strategy B (hereafter referred to as N_CHI3), Strategy C (hereafter referred to as N_CHI5), Strategy D (hereafter referred to as N_CHI7), and Strategy E (hereafter referred to as N_CHI9). It was
Table 45. Crosstabulation between presimulation attitude toward GIVUP and decisions made within N_CHI2

<table>
<thead>
<tr>
<th>Attitude toward GIVUP</th>
<th>Respondents who did not make decisions within N_CHI2 %</th>
<th>Respondents who made one or more decisions within N_CHI2 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>25.68</td>
<td>8.11</td>
</tr>
<tr>
<td>Negative</td>
<td>51.35</td>
<td>14.86</td>
</tr>
<tr>
<td>$X^2 = 0.023$</td>
<td>d.f. = 1</td>
<td>N.S.</td>
</tr>
</tbody>
</table>

Table 46. Crosstabulation between presimulation attitude toward GIVUP and decisions made within N_CHI4

<table>
<thead>
<tr>
<th>Attitude toward GIVUP</th>
<th>Respondents who did not make decisions within N_CHI4 %</th>
<th>Respondents who made one or more decisions within N_CHI4 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>14.86</td>
<td>18.92</td>
</tr>
<tr>
<td>Negative</td>
<td>31.08</td>
<td>33.14</td>
</tr>
<tr>
<td>$X^2 = 0.058$</td>
<td>d.f. = 1</td>
<td>N.S.</td>
</tr>
</tbody>
</table>

Table 47. Crosstabulation between presimulation attitude toward GIVUP and decisions made within N_CHI10

<table>
<thead>
<tr>
<th>Attitude toward GIVUP</th>
<th>Respondents who did not make decisions within N_CHI4 %</th>
<th>Respondents who made one or more decisions within N_CHI4 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>24.32</td>
<td>9.46</td>
</tr>
<tr>
<td>Negative</td>
<td>48.65</td>
<td>17.57</td>
</tr>
<tr>
<td>$X^2 = 0.018$</td>
<td>d.f. = 1</td>
<td>N.S.</td>
</tr>
</tbody>
</table>
believed that respondent presimulation attitude toward CONSG might be related to the choice of legal strategies. Chi-square tests of significance performed for these relationships, however, indicated that there were no statistically significant relationships between presimulation attitude toward CONSG and choice of strategy. An evaluation of the response distributions does, however, demonstrate that irrespective of attitude toward CONSG, respondents made more decisions within Strategy A and Strategy B than in Strategies C, D, or E.

Table 48 shows the distributions of responses for presimulation attitude toward CONSG and number of decisions made within N_CHII. It was noted that Strategy A contained decisions which might encourage respondents to obtain as much gasoline as possible for personal consumption. Table 5 demonstrated that 22.3% of all respondents made one or two decisions within N_CHII, while 22.9% of all respondents regardless of

<table>
<thead>
<tr>
<th>Attitude toward CONSG</th>
<th>Respondents who made two or fewer decisions within N_CHII</th>
<th>Respondents who made three or more decisions within N_CHII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>58.11</td>
<td>16.22</td>
</tr>
<tr>
<td>Negative</td>
<td>18.92</td>
<td>6.76</td>
</tr>
</tbody>
</table>

\[ X^2 = 0.161 \]  \[ d.f. = 1 \]  \[ N.S. \]
attitude toward CONSG made three or more decisions within N_CHI1. A majority of those who made two or fewer decisions within this strategy held a positive attitude toward CONSG. These findings may suggest that while people "should" follow all laws set up to conserve gasoline, even at the expense of personal hardship, such laws may present a real threat to mobility, leading people to at least attempt to "beat the system". It was also shown that while respondents may be likely to make legal decisions within N_CHI1, the illegal decisions contained within this strategy were somewhat less likely to be made (see Table 42).

While a majority of respondents made two or fewer decisions within N_CHI1 regardless of attitude toward CONSG, Table 49 demonstrates that 64.8% of all respondents, regardless of presimulation attitude toward CONSG made three or more decisions within N_CHI3. In a qualitative examination of each respondent's decision path, it was, to reiterate, found that N_CHI3 was the first strategy chosen for a majority of respondents. This may be an indication that making better use of the gasoline that is available to you would be the most desirable, if not the most profitable strategy. It was noted that of the thirty-six respondents who made three or more decisions within N_CHI3, fifteen made the same decisions more than once. One respondent, for example, made the decision to purchase a fuel-efficient automobile twenty-four times. As the researcher observed him, the respondent became visibly more and more angry each time he made the decision. He eventually told the researcher that it was not fair that he was not allowed to purchase a fuel-efficient car, especially since it was obvious that his "gasoline guzzler" would
Table 49. Crosstabulation between presimulation attitude toward CONSG and decisions made within N_CHI3

<table>
<thead>
<tr>
<th>Attitude toward CONSG</th>
<th>Respondents who made two or fewer decisions within N_CHI3</th>
<th>Respondents who made three or more decisions within N_CHI3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>25.68</td>
<td>48.65</td>
</tr>
<tr>
<td>Negative</td>
<td>9.46</td>
<td>16.22</td>
</tr>
<tr>
<td>$X^2 = 0.033$</td>
<td>d.f. = 1</td>
<td>N.S.</td>
</tr>
</tbody>
</table>

not permit him the freedom in mobility he needed. He had made the assumption that if he was persistent enough, SHORTAGE would eventually allow him to buy the new automobile. An attempt was made, unsuccessfully, to convince the respondent that in real life situations, if the bank turned him down for an automobile loan on a Monday, it would probably also turn him down on Tuesday, Wednesday, and so on. The respondent seemed totally unaware that his gasoline gauge was dropping, the days left to him in the simulation were passing, and his daily gasoline consumption rate remained in the gasoline guzzler range (the respondent was using 2.27 gallons of gasoline per day). By the time he realized that his time was running out, it was too late for him to complete the simulation without running out of gasoline. It was observed, however, that the few remaining decisions he made before finishing did permit him to reduce his daily consumption rate to 1.94 gallons per day. As he completed the game, the respondent replied, "That just wasn't fair." It seemed that this respondent needed to make decisions in a straight line. That is, he saw only
one way of getting from point "A" to point "B" and he continued to pursue this course of action irrespective of the wider consequences—in this case, running out of gasoline. It might be suggested that his decisions were nonrational. However, it might also be suggested that he was an individual who was unable to understand the implications of his behavior in terms of how it might constrain or preclude subsequent decisions.

An evaluation of Table 50 shows that slightly over one half (56.7%) of all respondents, irrespective of presimulation attitude toward CONSG, made three or more decisions within N_CHI5. There was a total of ten possible decisions to make within N_CHI5 without repeating decisions. One respondent, however, made forty-seven decisions within this strategy. Three of these decisions marginally increased his daily gasoline consumption rate. Nonetheless, this individual continued to make the decision to ride a bicycle, indicating that he was correlating the number of times the decision was made with the number of days remaining in the

Table 50. Crosstabulation between presimulation attitude toward CONSG and decisions made within N_CHI5

<table>
<thead>
<tr>
<th>Attitude toward CONSG</th>
<th>Respondents who made two or fewer decisions within N_CHI5 %</th>
<th>Respondents who made three or more decisions within N_CHI5 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>32.43</td>
<td>41.89</td>
</tr>
<tr>
<td>Negative</td>
<td>10.81</td>
<td>14.86</td>
</tr>
</tbody>
</table>

$X^2 = 0.013$  \ d.f. = 1  \ N.S.
simulation. His reasoning was that eventually his gasoline consumption rate would decrease to zero because he was not driving his automobile. The respondent's car_type indicated that his automobile received fourteen miles per gallon of gasoline for a daily gasoline consumption rate of 2.64 gallons. While he did run out of gasoline before he finished the simulation, he was able to eventually make decisions that decreased his daily consumption rate to 1.90 gallons per day. While the respondent's repeated decisions within N_CHI5 may have indicated he had a desire to adjust to using less gasoline, his motivation to act appeared non-rational. It might be suggested that individuals who do not see the wider implications of the decisions made during the course of everyday interaction may be less likely to be able to cope with the frustrations that conditions of energy constraint would present to them. This particular respondent, as did others, indicated his feelings about his participation in SHORTAGE by saying that "the experience was extremely frustrating."

Table 51 shows the crosstabulations for presimulation attitude toward CONSG and decisions made within N_CHI7. While N_CHI7 contained a total of ten possible decisions, only 13.5% of all respondents, regardless of attitude toward CONSG, made three or more decisions within this strategy, none of which had been designed to increase or decrease respondent daily gasoline consumption rate. Each was, however, designed to make respondents aware that perhaps the most effective decisions they could make would be those which permitted them to actively participate in the reduction of gasoline consumption. This approach was used in
order to make respondents aware that the decisions they made which demonstrated their active participation in adjusting to gasoline rationing would benefit them far more than would sitting back and expecting the government to resolve their problems/dilemmas. Only one respondent made all of the decisions within this strategy, while two respondents made eight decisions, and four made seven decisions. A majority viewed N_CHI7 only once, made the decisions of relevance to them, and did not return to N_CHI7 again. A number of respondents also observed that none of the decisions they made rewarded them. Two respondents commented that if anything was going to "get done", it surely won't have been because the government acted on it.

Table 52 shows the crosstabulation between presimulation attitude toward CONSG and decisions made within N_CHI9. It would appear that, while this relationship was not statistically significant, those respondents who indicated a favorable presimulation attitude toward CONSG were most likely to make decisions encouraging a reconsideration of morals,
Table 52. Crosstabulation between presimulation attitude toward CONSG and decisions made within N_CHI9

<table>
<thead>
<tr>
<th>Attitude toward CONSG</th>
<th>Respondents who made two or fewer decisions within N_CHI9</th>
<th>Respondents who made three or more decisions within N_CHI9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>50.00</td>
<td>24.32</td>
</tr>
<tr>
<td>Negative</td>
<td>16.22</td>
<td>9.46</td>
</tr>
</tbody>
</table>

\[X^2 = 0.107 \quad d.f. = 1 \quad N.S.\]

values, and behavior. However, it was discovered that decisions made within N_CHI9 did not include those that would involve serious infractions of the law.

Summary of Evaluations of Crosstabulations Between Presimulation Attitudes Toward Gasoline Shortages and SHORTAGE Data

It was demonstrated by the chi-square tests that there were no statistically significant relationships between 1) car_type and decisions made within illegal strategy categories, 2) presimulation attitude toward GASRAT and decisions made within illegal strategy categories, or 3) presimulation attitude toward CONSG and GIVUP and decisions made within illegal strategy categories. It was also found that no statistically significant relationships existed between presimulation attitude toward CONSG and respondent choice of legal strategy categories. However, an evaluation of the distribution of decisions made relative to respondent presimulation attitudes toward GASRAT, CONSG, and GIVUP did permit an
assessment of certain types of strategies and decisions which might be considered under conditions of energy constraint.

For purposes of this investigation, it was assumed that respondents who participated in SHORTAGE, were, for the most part, motivated to conform and adjust to the situation of energy constraint presented to them. Therefore, if respondents indicated a favorable attitude toward CONSG, for example, it might have been expected that their decisions would reflect that attitude. Strategy B and/or Strategy C "should have" contained most, if not all, of the decisions needed for acceptance of an individual conservation ethic. However, as was predicted, as respondents examined their possible options and the processes through which an adjustment could be made to rationing, they frequently discovered that 1) rational or wise decisions did not always profitably benefit them; 2) many decisions, particularly those within Strategy D, might have benefited them in the long run, but the problem was immediate--the problem of "getting through" the ninety-day period of time without running out of gasoline; 3) decisions made within illegal strategy categories had the potential of getting respondents into trouble with the law; 4) each decision made had at least the potential of constraining or even precluding subsequent decisions; and/or 5) the possible consequences of each decision were unknown, encouraging respondents to be wary of or hesitate in making certain decisions (e.g., hi_risk decisions such as siphoning gasoline out of parked cars and/or storing large quantities of gasoline in a garage). Because of these five factors, it would seem that the respondent's "practical reasoning" (Kinloch, 1981:136) and their "limited
rationality" (Perrow, 1981:2-9) influenced both their motivation and their ability to comply with rationing regulations. As was pointed out in an earlier discussion, there were two respondents who made the same decision as many as twenty-three to forty times in order to decrease daily gasoline consumption rates. While these respondents appeared obsessed with a single decision, it was noted that others too made the same decisions two, three, even four times before moving on to other decisions/strategy categories. As a result of this observation, it might be suggested that American consumers who are indeed motivated to comply with society's moral order may turn instead to decisions traditionally defined as anomic and nonrational out of sheer frustration. Or they may do so out of a belief that the attainment of a rational goal--strictly following all laws set up to conserve gasoline, even at the expense of personal hardship--is not possible. As such, it might be expected that illegal decisions would be made.

The theoretical assumption of rationality in social action—that individuals calculate risks and potential benefits and then make the rationally "best" decision—may be an unwarranted assumption if it refers to the "judgmental dope" model discussed in Chapter Three. If however, the rationally "best" decisions refer to decisions made as a result of the past experiences of individuals and of the situations they are currently encountering, the interpretation of the "rationally best decision" must change. It must change from what the researcher expects it to be based on traditionally defined "standardized expectancies" (Kinloch, 1981: 139) to practical expectancies which take account of the thoughts and
actions of "real" people in "real" situations who must live with the limits of human knowledge and the realization they often must settle for the first acceptable solution to come along. It is important to note that, for the most part, the illegal decisions made by respondents in this study did not involve widespread and serious infractions of the law. Rather, irrespective of respondent car_type, attitude toward GASBAT, CONSG, or GIVUP, illegal decisions were primarily limited to breaking traffic laws, building a still, or decisions that would create potentially dangerous automobile accidents (e.g., turning off the automobile's engine to coast down hill, rolling through stop signs to reduce the amount of gasoline consumed by a full stop, or illegally double-parking to save the gasoline consumed by driving around looking for a parking place).

Frequency Distributions and Percentages for Presimulation and Postsimulation Attitudes Toward the Gasoline Shortages

The next section to be discussed within this chapter will include an evaluation of the frequency distributions of the postsimulation questionnaire items. The postsimulation questionnaire was administered in order to determine whether or not respondent participation in SHORTAGE produced a change in attitude toward the gasoline shortages and the potentially restrictive regulations associated with gasoline rationing. The frequency tables were set up so that the reader would be able to compare the postsimulation responses to the questionnaire items with the presimulation responses.

Table 53 demonstrates the frequency distributions and percentages
Table 53. Frequency distributions and percentages for presimulation and postsimulation attitudes toward GASRAT

<table>
<thead>
<tr>
<th>Attitude toward GASRAT</th>
<th>Presimulation</th>
<th>Postsimulation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Very favorable</td>
<td>5.4</td>
<td>(4)</td>
</tr>
<tr>
<td>Somewhat favorable</td>
<td>58.1</td>
<td>(43)</td>
</tr>
<tr>
<td>Somewhat unfavorable</td>
<td>36.5</td>
<td>(27)</td>
</tr>
<tr>
<td>Very unfavorable</td>
<td>5.4</td>
<td>(4)</td>
</tr>
<tr>
<td>No response</td>
<td>0.0</td>
<td>(0)</td>
</tr>
<tr>
<td>Totals</td>
<td>100.0</td>
<td>(74)</td>
</tr>
</tbody>
</table>

Presimulation mean = 2.419 Median = 2.346 Mode = 2.000
Postsimulation mean = 2.149 Median = 2.105 Mode = 2.000

for the presimulation and postsimulation attitudes toward GASRAT. It was noted that the number of respondents who indicated a somewhat favorable (58.1%) to very favorable (13.5%) attitude toward GASRAT increased to 71.6% following participation in SHORTAGE. It might be speculated that the information presented to respondents during the course of their experience with gasoline rationing clarified some of the ambiguity and unknown dimensions of gasoline rationing and the inevitable restrictions on transportation mobility. For example, the gasoline rationing guidelines presented respondents with clear and concise information about what rationing would legally demand of them (see Appendix B). Many of the respondents who drove fuel-efficient automobiles expressed satisfaction with their car_type because it seemingly assured them their sometimes expensive investment would reward them (e.g., their investment in a fuel-
efficient automobile). It was also noted that those respondents whose daily gasoline consumption rate was greater than or equal to 1.7 gallons per day were almost certain not to run out of gasoline before the simulation ended. It might thus be assumed that awareness of this factor led to a more favorable attitude toward GAS RAT.

Table 54 demonstrates the frequency distributions and percentages for the presimulation and postsimulation attitudes toward IMPOIL. The number of respondents who indicated a somewhat favorable (8.1%) to very favorable (5.4%) attitude toward IMPOIL increased slightly from the pre-simulation questionnaire in which 10.8% of respondents expressed a favorable attitude. This might have been expected to be related to the degree to which respondents believed they would get their "fair share"
should gasoline rationing be set up. Table 55 does indicate that the
shift in attitudes became more positive following participation in
SHORTAGE—from 50% who believed they probably would or definitely would
receive their fair share prior to their exposure to SHORTAGE to 64.9%
who believed so following SHORTAGE. These findings were somewhat sur­
prising since six of the respondents owned motorcycles as well as auto­
mobiles. Each of the six expressed anger at the rationing regulation
which indicated that motorcycles would receive only one-tenth the ration
allotment of automobiles for the same ninety-day period of time. Three
of the respondents informed the researcher that this was unfair because
their motorcycles received mileage ratings comparable to fuel-efficient
automobiles (about 45-50 miles per gallon).

Positive attitude toward CONSG dropped slightly from 74.4% to 67.6%

Table 55. Frequency distributions and percentages for presimulation and
postsimulation attitudes toward FSHAR

<table>
<thead>
<tr>
<th>Attitude toward FSHAR</th>
<th>Presimulation %</th>
<th>N</th>
<th>Postsimulation %</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitely</td>
<td>6.8 (5)</td>
<td></td>
<td>5.4 (4)</td>
<td></td>
</tr>
<tr>
<td>Probably</td>
<td>43.2 (44)</td>
<td></td>
<td>59.5 (44)</td>
<td></td>
</tr>
<tr>
<td>Not sure</td>
<td>27.8 (20)</td>
<td></td>
<td>24.3 (18)</td>
<td></td>
</tr>
<tr>
<td>Probably not</td>
<td>17.6 (13)</td>
<td></td>
<td>8.1 (6)</td>
<td></td>
</tr>
<tr>
<td>Definitely not</td>
<td>5.4 (2)</td>
<td></td>
<td>2.7 (2)</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>100.0 (74)</td>
<td></td>
<td>100.0 (74)</td>
<td></td>
</tr>
</tbody>
</table>

Presimulation mean = 2.716  Median = 2.500  Mode = 2.000
Postsimulation mean = 2.432 Median = 2.250  Mode = 2.000
Table 56. Frequency distributions and percentages for presimulation and postsimulation attitudes toward CONSG

<table>
<thead>
<tr>
<th>Attitude toward CONSG</th>
<th>Presimulation</th>
<th>Postsimulation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Definitely</td>
<td>14.9</td>
<td>(11)</td>
</tr>
<tr>
<td>Probably</td>
<td>59.5</td>
<td>(44)</td>
</tr>
<tr>
<td>Not sure</td>
<td>13.5</td>
<td>(10)</td>
</tr>
<tr>
<td>Probably not</td>
<td>8.1</td>
<td>(6)</td>
</tr>
<tr>
<td>Definitely not</td>
<td>0.0</td>
<td>(0)</td>
</tr>
<tr>
<td>Totals</td>
<td>100.0</td>
<td>(74)</td>
</tr>
</tbody>
</table>

Presimulation mean = 2.270  Median = 2.091  Mode = 2.000
Postsimulation mean = 2.243 Median = 2.100  Mode = 2.000

following participation in SHORTAGE (see Table 56). This may well have been the result of the frustration experienced during participation in SHORTAGE which led respondents to make decisions to break the law or decisions which seemed wise or rational but did not yield consequences in kind. For example, the rationing guidelines informed respondents that:

Unredeemed ration coupons are freely transferable. If you do not need or do not use all of your ration coupons for the ninety-day period you may give them to someone or sell them. It is hoped that this will promote a more efficient use of all available gasoline.

However, when a respondent made the decision to buy coupons from someone who did not use all of his/her coupons, the two consequences that appeared with random probability were as follows:

It has just been announced over the radio that Mr. Edwin James has been arrested for selling counterfeit ration coupons. The serial numbers of the coupons you have been buying match those of the counterfeit coupons. You are
now stuck with $220 worth of unusable ration coupons.

The man who has been selling you his unused ration coupons at a 10% markup has just increased his markup by another 30% because of demand and inflation. You cannot afford to buy from him anymore.

The change in respondent attitude toward GIVUP seems to have been negligible. While 51.3% of all respondents held an unfavorable attitude toward GIVUP prior to their participation in SHORTAGE, this percentage decreased by only 1.3% to 50% following SHORTAGE. It might be suggested that while the question had been phrased to read:

Do you think most people are willing to give up some of their own gasoline needs so that others will be sure to have enough gasoline to meet basic needs?

respondents may have read most people to mean themselves as much as or more than others. On the other hand, if the decisions made within SHORTAGE did not yield significantly negative and/or costly consequences, the attitude toward GIVUP might not have been expected to change significantly. Also, to reiterate, most respondents who made illegal decisions stayed away from those decisions which might involve a jail sentence (e.g., hi_risk decisions).

Ironically, there was a slight change in attitude toward SHSEV following respondent participation in SHORTAGE. As Table 58 shows, prior to their participation in SHORTAGE, twelve respondents (16.2%) indicated that the effects of the gasoline shortages of the past year or so had been severe, while that number dropped to 10.8% for their postsimulation responses. While only one respondent changed his response to indicate the effects of his household were very severe following exposure to SHORTAGE, there was a drop of 5.4% of respondents who indicated the
Table 57. Frequency distributions and percentages for presimulation and postsimulation attitudes toward GIVUP

<table>
<thead>
<tr>
<th>Attitude toward GIVUP</th>
<th>Presimulation %</th>
<th>N</th>
<th>Postsimulation %</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitely</td>
<td>2.7 (2)</td>
<td></td>
<td>2.7 (2)</td>
<td></td>
</tr>
<tr>
<td>Probably</td>
<td>32.4 (24)</td>
<td></td>
<td>33.8 (25)</td>
<td></td>
</tr>
<tr>
<td>Not sure</td>
<td>13.5 (10)</td>
<td></td>
<td>13.5 (10)</td>
<td></td>
</tr>
<tr>
<td>Probably not</td>
<td>48.6 (36)</td>
<td></td>
<td>43.2 (32)</td>
<td></td>
</tr>
<tr>
<td>Definitely not</td>
<td>2.7 (2)</td>
<td></td>
<td>6.8 (5)</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>100.0 (74)</td>
<td></td>
<td>100.0 (74)</td>
<td></td>
</tr>
</tbody>
</table>

Presimulation mean = 3.162
Median = 3.528
Mode = 4.000

Postsimulation mean = 3.500
Median = 3.500
Mode = 4.000

Table 58. Frequency distributions and percentages for presimulation and postsimulation attitudes toward SHSEV

<table>
<thead>
<tr>
<th>Attitude toward SHSEV</th>
<th>Presimulation %</th>
<th>N</th>
<th>Postsimulation %</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very severe</td>
<td>0.0 (0)</td>
<td></td>
<td>1.4 (1)</td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>16.2 (12)</td>
<td></td>
<td>10.8 (8)</td>
<td></td>
</tr>
<tr>
<td>Not too severe</td>
<td>54.1 (40)</td>
<td></td>
<td>58.1 (43)</td>
<td></td>
</tr>
<tr>
<td>Not severe at all</td>
<td>27.0 (20)</td>
<td></td>
<td>27.0 (20)</td>
<td></td>
</tr>
<tr>
<td>Don't know</td>
<td>2.7 (2)</td>
<td></td>
<td>2.7 (2)</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>100.0 (74)</td>
<td></td>
<td>100.0 (74)</td>
<td></td>
</tr>
</tbody>
</table>

Presimulation mean = 3.162
Median = 3.125
Mode = 3.000

Postsimulation mean = 3.189
Median = 3.151
Mode = 3.000
shortage was severe. These changes appear to be negligible. However, they may have been viewed as resulting from respondent awareness of the reality of gasoline rationing. That is, rationing need not be defined as an inflexible method of conservation. Rather it may be viewed as an encouragement to the individual to more consciously and deliberately make his travel decisions. Perhaps for the few respondents who shifted their attitudes toward SHSEV, gasoline rationing provided them with more freedom in transportation mobility than maximum purchases of $10 and irregular service station hours had during the summer of 1979.

The frequency distributions and percentages for presimulation and postsimulation attitudes toward SHWORS are presented in Table 59. These findings also indicate that respondent attitudes toward SHWORS changed only slightly following participation in SHORTAGE. Prior to participation in SHORTAGE only 2.7% of all respondents indicated they did not

<table>
<thead>
<tr>
<th>Attitude toward SHWORS</th>
<th>Presimulation</th>
<th>Postsimulation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Get worse</td>
<td>71.6</td>
<td>(53)</td>
</tr>
<tr>
<td>Stay the same</td>
<td>20.3</td>
<td>(15)</td>
</tr>
<tr>
<td>Get better</td>
<td>5.4</td>
<td>(4 )</td>
</tr>
<tr>
<td>Don't know</td>
<td>2.7</td>
<td>(2 )</td>
</tr>
<tr>
<td>Totals</td>
<td>100.0</td>
<td>(74)</td>
</tr>
</tbody>
</table>

Table 59. Frequency distributions and percentages for presimulation and postsimulation attitudes toward SHWORS
know whether or not the shortages would worsen, while the postsimulation responses indicated 9.5% did not know. It might be suggested that for a few respondents, the information gained from SHORTAGE coupled with previous knowledge and experiences with gasoline shortages served only to cloud the energy issue. As was pointed out in an earlier discussion:

> Individuals cannot process large amounts of information, but only limited bits and pieces, and these slowly. Information is distorted as it is processed. Individuals cannot gather information very well even if they could process it; they do not always know what is relevant information insomuch as they do not always understand how things work. (March and Simon, 1958:136-171)

In other words, the mass of information presented to these few respondents in a relatively short period of time may have been more than they could adequately digest and evaluate. Response categories for attitude toward SHWORS were considered as discrete. As such, the measures of central tendency were not presented. However, it was noted that the mode was 1.000 indicating a majority of respondents for both the presimulation and postsimulation questionnaire believed the shortages would get worse over the next ten years.

Respondent attitude toward SHREAL also shifted slightly, although, as it can be seen from Table 59, 16.2% of all respondents indicated prior to their participation in SHORTAGE that there is not and never was a "real" shortage, and 16.2% also indicated this attitude following exposure to SHORTAGE. On the other hand, the percentage of respondents who indicated prior to SHORTAGE that there probably was a shortage, but that it was over decreased from 18.9% to 8.1% following SHORTAGE, indicating an increase in those who believed the shortage was still there but would
Table 60. Frequency distributions and percentages for presimulation and postsimulation attitudes toward SHREAL

<table>
<thead>
<tr>
<th>Attitude toward SHREAL</th>
<th>Presimulation</th>
<th>Postsimulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is not and never was a &quot;real&quot; shortage</td>
<td>16.2 (12)</td>
<td>16.2 (12)</td>
</tr>
<tr>
<td>There probably was a shortage, but it is over now</td>
<td>18.9 (14)</td>
<td>8.1 (6)</td>
</tr>
<tr>
<td>There is still a shortage, but I am sure the problem will be solved</td>
<td>33.8 (25)</td>
<td>36.5 (27)</td>
</tr>
<tr>
<td>There is a severe shortage, but it can be solved in the future</td>
<td>29.7 (22)</td>
<td>36.5 (27)</td>
</tr>
<tr>
<td>The shortage is so severe that nothing can be done</td>
<td>1.4 (1)</td>
<td>1.4 (1)</td>
</tr>
<tr>
<td>Totals</td>
<td>100.0 (74)</td>
<td>100.0 (74)</td>
</tr>
</tbody>
</table>

be solved or that the shortage was severe but would be solved in the future (for a total of 73%). It might be suggested that those respondents who indicated that the gasoline shortages are not and never were "real", would not have altered their attitudes regardless of the information presented to them. Those whose opinions and attitudes have been crystallized through past experiences, contact with the media, advertising, or other influential sources might be expected to selectively filter all subsequent information, retaining only that which agrees with them and ignoring the rest (Sullivan et al., 1980:38-39).

The final frequency table shows the changes in respondent attitudes toward SHRESP. Prior to participation in SHORTAGE, 27% of all respondents believed the individual consumer was most responsible for solving
Table 61. Frequency distributions and percentages for presimulation and postsimulation attitudes toward SHRESP

<table>
<thead>
<tr>
<th>Attitude toward SHRESP</th>
<th>Presimulation %</th>
<th>N</th>
<th>Postsimulation %</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>25.7</td>
<td>(19)</td>
<td>13.5</td>
<td>(10)</td>
</tr>
<tr>
<td>Business and industry</td>
<td>20.3</td>
<td>(15)</td>
<td>17.6</td>
<td>(13)</td>
</tr>
<tr>
<td>Individual consumers</td>
<td>27.0</td>
<td>(20)</td>
<td>33.8</td>
<td>(25)</td>
</tr>
<tr>
<td>Government, business and industry, and individual consumers</td>
<td>8.1</td>
<td>(6 )</td>
<td>14.9</td>
<td>(11)</td>
</tr>
<tr>
<td>Government and business and industry</td>
<td>6.8</td>
<td>(2 )</td>
<td>1.4</td>
<td>(1 )</td>
</tr>
<tr>
<td>Government and individual consumers</td>
<td>5.4</td>
<td>(5 )</td>
<td>8.1</td>
<td>(6 )</td>
</tr>
<tr>
<td>Business and industry and individual consumers</td>
<td>2.7</td>
<td>(4 )</td>
<td>2.7</td>
<td>(2 )</td>
</tr>
<tr>
<td>Don't know</td>
<td>2.7</td>
<td>(2 )</td>
<td>4.1</td>
<td>(3 )</td>
</tr>
<tr>
<td>No response</td>
<td>1.4</td>
<td>(1 )</td>
<td>4.1</td>
<td>(3 )</td>
</tr>
<tr>
<td>Totals</td>
<td>100.0</td>
<td>(74)</td>
<td>100.0</td>
<td>(74)</td>
</tr>
</tbody>
</table>

the gasoline shortages, while the postsimulation responses indicated that 33.8% held this attitude. On the other hand, prior to participation in SHORTAGE, 52.8% of all respondents indicated that the responsibility for solving the gasoline shortages rested with someone or some agency other than the individual consumer, while following exposure to SHORTAGE this dropped to 32.5% who believed it was someone else's responsibility. Again, while these changes in attitude appear negligible, they may indicate a greater awareness of the gasoline shortages on the part of some respondents. Also, it may be suggested that the decisions which were most likely to provide incentive to conserve gasoline were those which
altered individual travel behavior as opposed to those which relied on the government for needed change.

Results of Paired t-tests Performed on Presimulation and Postsimulation Questionnaire Data

The next step in the data analysis involved using paired t-tests in order to determine whether or not the differences between the presimulation and postsimulation questionnaire items were statistically significant. As was suggested earlier, it was believed that the knowledge and experience presented by SHORTAGE might lead to more realistic attitudes toward the gasoline shortages in general and toward gasoline rationing in particular. As such, a direct pair by pair comparison was made for presimulation attitudes toward GASSAT (GASBAT1), IMPOIL (IMPOIL1), CONSG (CONSG1), GIVUP (GIVUP1), FSHAR (FSHAR1), and SHSEV (SHSEV1) and postsimulation attitudes toward GASSAT (GASBAT2), IMPOIL (IMPOIL2), CONSG (CONSG2), GIVUP (GIVUP2), FSHAR (FSHAR2), and SHSEV (SHSEV2). Because of the discrete response categories for attitudes toward SHWORS, SHREAL, and SHRESP, these items were not included in the statistical testing.

As it can be seen from Table 62, the paired t-tests yielded evidence that attitudes toward GASBAT and FSHAR were significantly different following respondent participation in SHORTAGE. That is, the differences were both statistically significant at the .01 level with 73 degrees of freedom. While the paired t-tests did not yield evidence that the remaining questionnaire items differed significantly due to respondent
Table 62. Differences in means for presimulation and postsimulation attitudes toward GASBAT and FSHAR: Results of paired t-tests

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Difference</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>GASBAT1</td>
<td>2.4189</td>
<td>0.2568</td>
<td>.01**</td>
</tr>
<tr>
<td>GASBAT2</td>
<td>2.1622</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSHAR1</td>
<td>2.7162</td>
<td>0.2838</td>
<td>.01**</td>
</tr>
<tr>
<td>FSHAR2</td>
<td>2.4324</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**p. < .01.

exposure to SHORTAGE, this need not be considered problematic. Attitude toward IMPOIL, for example, was and remained primarily unfavorable with 89.2% of respondents opposed to IMPOIL prior to SHORTAGE and 85.1% opposed following SHORTAGE. Had the sample size been larger and had more respondents been assigned car_types in the "gasoline guzzler" category, this shift in attitude might have been expected to be somewhat more significant. On the other hand, the literature generated both during and after the data sets had been collected emphasized a growing awareness of the dangers inherent in continued dependence on foreign oil. It might further be suggested that, while the American hostage incident in Iran was not shown conclusively to be energy related, an anti-Middle East sentiment did exist during that time period.

In reference to attitude toward CONSG, it was not expected that participation in SHORTAGE would alter respondents' basic value structures.
It was assumed that, for the most part, respondents would attempt to cope with and adjust to the conditions of energy constraint presented to them. This was demonstrated as their responses were evaluated. That is, from presimulation to postsimulation questionnaire, respondent attitude toward CONSG became only slightly less favorable as it dropped from 74.4% to 67.6%. This too might have been more significant had more respondents driven "gasoline guzzlers". On the other hand, following exposure to SHORTAGE, some respondents, more than others, may have become more sensitive to the number and kinds of illegal decisions made. As such, a shift in attitude might have been necessary for them to correct the slippage between intentions and behavior which emerged during participation in SHORTAGE.

The presimulation and postsimulation attitudes toward GIVUP remained nearly the same. This too, however, might have been expected. It was assumed that respondent car_type would be closely related to transportation mobility in a situation of gasoline rationing. Given this assumption, it might not have been unwarranted to assume that respondents who drove gasoline guzzlers believed their counterparts who drove fuel-efficient automobiles would satisfy the need to give up individual needs so that others, like themselves, would have enough gasoline to meet basic needs. The reason for stating this is as follows. There were two PLATO terminals in the room in which the data were collected. Thus, the researcher often worked with two respondents simultaneously. On numerous occasions, before the simulation began, but following respondent declaration of car_type, those whose automobiles were the least fuel-efficient
expressed disdain over the efficiency of other respondent's car_types.

One person remarked:

It would be nice to drive a newer, more efficient car. I think it (rationing) will be harder on me than on people like him (referring to the respondent whose car_type had placed him in a fuel-efficient category).

With the exception of a slight shift from severe to not too severe (4%), respondent attitude toward SHSEV did not change. As it was pointed out in an earlier discussion, however, this shift in attitude may have been due, in part, to an increased respondent awareness of the actual demands gasoline rationing would create. That is, prior to participation in SHORTAGE, the rationing guidelines were an unknown element. An inadequate knowledge base may lead to a negative opinion on an issue—in this case, attitude toward SHSEV. Once the respondent had been given adequate information, his opinion may have shifted as did his attitude toward SHSEV.

It is suggested that the significant changes in attitude toward GASBAT and FSHAR may be the most important factors influencing travel behavior under conditions of energy constraint. As was shown in the postsimulation frequency tables (see Tables 52 and 54) the presimulation attitudes toward GASBAT were mixed, with 63.5% of respondents favoring GASBAT and 41.9% opposed. The postsimulation attitudes toward GASBAT became more favorable (71.6%) with the unfavorable responses dropping from 41.9% to 27.1%.

The presimulation attitudes toward FSHAR were also mixed, with 50% indicating they believed they would get their "fair share" should rationing be set up and 50% indicating they were either not sure (27.8%) or
would probably or definitely not receive a fair share. Following ex-
posure to SHORTAGE, however, it was demonstrated that 64.9% of all re-
spondents believed they would get a fair share. Because of the signif-
icant changes in attitude toward both GASRAT and FSHAR, it was decided
to perform a chi-square test in order to determine whether or not these
two attitude items were significantly related to each other. It was
shown that five out of nine (55.6%) of the valid cells had expected
cell frequencies of less than five. As such, the chi-square test may not
have provided an adequate approximation to the actual distribution of
$X^2$. However, an evaluation of the distribution of responses for atti-
tude toward FSHAR given attitude toward GASRAT, may yield important in-
sights. For the reader's clarification and comparison, the results of
the presimulation crosstabulation for these attitude items have been
included in Table 63. There was an increase of 17.6% in respond-
ents whose attitudes toward both GASRAT and FSHAR were positive. This
demonstrates a positive change in attitude for 17.6% of respondents. A
number of factors may have contributed to this attitude change. For ex-
ample, the gasoline rationing guidelines may have clarified a previously
unknown factor for respondents, for example, "how much gasoline would I
have at my disposal should rationing become a reality." Second, a number
of respondents responded positively to the concept of a "white market"
coupon exchange center. This was interpreted as acceptable, and hence,
the antithesis of the black market exchange which operated during World
War II. As Burnett (1978:46) pointed out, during World War II:
Table 63. Crosstabulations between presimulation attitudes toward GASBAT and FSHAR

<table>
<thead>
<tr>
<th>Attitude toward GASBAT</th>
<th>Attitude toward FSHAR (%)</th>
<th>Presimulation</th>
<th>Postsimulation</th>
<th>Don't know</th>
<th>Don't know</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favorable</td>
<td>36.5</td>
<td>13.5</td>
<td>8.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unfavorable</td>
<td>10.8</td>
<td>13.5</td>
<td>5.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No response</td>
<td>0.0</td>
<td>0.0</td>
<td>1.4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$X^2 = 7.53$  d.f. = 4  Significant at .05 level.

Table 64. Crosstabulations between postsimulation attitudes toward GASBAT and FSHAR

<table>
<thead>
<tr>
<th>Attitude toward GASBAT</th>
<th>Attitude toward FSHAR (%)</th>
<th>Presimulation</th>
<th>Postsimulation</th>
<th>Don't know</th>
<th>Don't know</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favorable</td>
<td>54.1</td>
<td>13.5</td>
<td>4.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unfavorable</td>
<td>10.8</td>
<td>10.8</td>
<td>5.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No response</td>
<td>0.0</td>
<td>0.0</td>
<td>1.4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$X^2 = 16.61$  d.f. = 4  Significant at .01 level

The Office of Defense Transportation, which controlled commercial vehicles, was much too generous at first in issuing "certificates of war necessity", which could be turned in for ration coupons. The resulting excess of coupons led to the emergence of a black market. The Office of Price Administration (OPA) was extremely fierce in enforcing the law against counterfeiters, black marketeers, and the gas stations that cooperated with them. The OPA used every device available:
publicity, close inspection, civil actions, criminal proceedings, and the cutting of gas supplies to service stations that were involved in the black market. In general, unless people thought that others were complying with the law, the thing would have broken down.

Providing a white market coupon exchange might be expected to reduce the demand for illegal ration coupons. As a result, consumers might not respond as negatively to rationing today as they did in 1942, when as Burnett (1978:48) comments, "many Americans thought the use of their cars was even more vital to happiness than food."

It would seem important to assess the primary reason given for intense opposition to gasoline rationing. It has been argued that the American people would not accept gasoline rationing, and hence, would not cooperate if it were enacted into law (Brunner and Bennett, 1978; Henderson, 1978a). However, the results of this study seemed to indicate that 1) an understanding of the reality of gasoline rationing and its accompanying restrictions served to reduce the element of the unknown and 2) for the most part, led to decision patterns that demonstrated a willingness to adapt to conditions of energy constraint using decision paths which reflected an individual conservation ethic. In short, some minor abuses of rationing would be logically expected, but not necessarily nonrational. As Paul O'Leary, the OPA's deputy administrator wrote just after World War II, "Americans are not a docile people. But they are reasonably cooperative when they see reasonable grounds for being asked to make sacrifices" (see Burnett, 1978:46). In addition, as Henderson (1978a) and Burnett (1978) have alluded, the public might well accept gasoline rationing because studies have repeatedly demonstrated
that its number one concern is inflation. The emphasis then might be most logically placed on establishing a relationship between gasoline rationing and the control of inflation. In sum, as Burnett (1978:46) comments:

The reason for continued increases in OPEC oil, according to Kuwait's oil minister, has been the declining value of the dollar. OPEC threatens to raise prices because of a loss of value of the dollar that has been caused primarily by their past price increase. Of course they aren't going to raise prices now, because there is a short-term glut of oil. But in a few years we are sure to be confronted again by OPEC's insane logic. And there is always danger of another embargo.
CHAPTER VI. CONCLUSION

SHORTAGE: A Summation

The objectives of this study have been to provide new insights into the travel options and actual decisions American consumers might make in the event of gasoline rationing. While there is no need to detail the information presented in the development of this dissertation, it might be helpful to point out that the multimethod approach used provided a means by which 1) respondent attitudes toward gasoline shortages of relatively unknown boundaries could be assessed, 2) a serious problem could be approached by simulating a social environment—an environment of gasoline rationing, 3) a theoretical orientation—phenomenology—could be used that was temporally dynamic rather than static, and 4) it was possible to consider the complicated mixture of attitudinal and situational factors which work together to produce actual behavior.

The Theory

Using the phenomenological alternative encouraged the author to move away from the traditional assumptions of rationality in social action—assumptions that have become reified over the years in social science research. As a result, it was possible to realize that she was studying a world that had already been preselected and preinhabited by thinking and acting individuals. Inevitably, then, it was assumed that the respondents under study would socially construct and, if need be,
socially negotiate their experiences during participation in SHORTAGE. The task of the author became one of developing a model that "might" resemble actual conditions of gasoline rationing, knowing full well that the basic components included in SHORTAGE would be, so to speak, constructs of the second degree. That is, as Schutz (1967:6) comments, "constructs of the constructs made by the subjects under study, whose behavior the social scientist observes and tries to explain in accordance with the procedural rules of science." The use of phenomenology as a descriptive method which permitted an emphasis on the varying nature of rationality in social action made this a feasible goal. As it was discussed in an earlier chapter, there are those who would argue that phenomenology is neither as impressive nor as scientific as are the rational positivist orientations. However, as Raser (1969:72) comments:

Many of these social science theories would crumble if put to the test (of simulation building) because assumptions must be clearly stated. This can be a painful consequence for the social scientist who has put his trust in impressive sounding but vague generalizations or in overwhelming piles of data connected by nothing more tangible than his own interest in them.

The Methodology

The simulation developed for this study was not highly sophisticated, and, as such, was not capable of generating complex statistical interrelationships between the questionnaire data and the SHORTAGE data. Thus, it would be highly inappropriate to suggest that an absolute resolution to the conflicts and contradictions inherent in extant energy policy has been generated. Rather the objective has been to examine
SHORTAGE for its utility in providing transportation researchers and policy makers with an alternative to the attitude evaluations which have singularly been used in assessing consumer perception of the gasoline shortages. Attitudes are not simplistic determinants of transportation behavior. Confronting this basic fact necessarily involved the creation of a social environment in which situational variables/categories could be presented. It is believed that SHORTAGE may have opened the door to future research in this area—research that may make it possible to generate a more adequate understanding of consumer travel behavior and, hence, a more accurate set of predictions about that behavior. In illustration, Model B (see Figure 12) demonstrates the manner in which SHORTAGE may have provided respondents with the knowledge of gasoline rationing needed to alter attitudes. The model considers the interaction between the affective and cognitive components of attitude (Rosenberg and Hovland, 1960) before participation in SHORTAGE. Following exposure to SHORTAGE, as it was demonstrated in the results chapter, the changes in respondent attitude toward GASBAT and FSHAR were statistically significant at the .01 level with 73 degrees of freedom. Because of the knowledge gained from SHORTAGE, then, the affective and cognitive components of attitude may have shifted to the degree that behavior would be more accurately predicted.

While SHORTAGE, its theoretical and methodological underpinnings are unique and innovative, it would seem important to consider its implications for further research. Perhaps one of the primary and most important contributions of this study was the problems encountered.
Affect: respondent's feelings about the gasoline shortages (how he feels about constraints in transportation mobility)

Stimulus (the gasoline shortages)

Cognition: respondent's perceptions and interpretations of the gasoline shortages (e.g., reconciliation of conflicting reports of an energy shortage and a world oil glut)

Behavior (may gain better ability to predict)

Cognition: respondent's perceptions of the gasoline shortages are more accurate, realistic, and well-founded

Figure 12. Modification of the Rosenberg and Hovland (1960) three-component attitude model demonstrating the potential impact of participation in shortage on attitude and behavior.
Future researchers may well profit from an understanding of these problems and be better able to be aware of or avoid them altogether.

In addition, in an address to the National Academy of Sciences, Landsberg (1980:71) indicated that:

Energy policy involves very large social and political components that are much less understood than the technical factors. . . . There will remain an irreducible element of conflicting values and political interests that cannot be resolved except in the political arena.

It would seem that the new techniques developed for this study are badly needed to develop a comprehensive, yet effective energy policy. The implication of Landsberg's (1980:71) statement seems to be that such a policy is not yet within reach. Past policies have, after all, spanned the continuum from President Nixon's "project independence" (Landsberg 1980:71), to President Carter's emphasis on the energy crisis as the "moral equivalent of war" (Energy Policy, 1981:251), and President Reagan's present policy of "total reliance on the magic of the market place" (Eisenstat, 1982:14A). Perhaps Landsberg's statement on the irreducible elements of conflicting values and political interests could be seen as the primary stumbling blocks to an effective energy policy. When the literature is reviewed, for example, and presidential stands on energy are assessed, two very basic, yet confusing energy goals emerge. The first involves the attempts made by Presidents Nixon, Ford, and Carter to scare the American consumer into reducing his driving needs through warnings that a failure to do so will result in an energy catastrophe of unknown proportions before the end of the twentieth century. The second involves giving those same consumers the assurance that
American genius and know-how will most certainly provide a solution to the gasoline shortages—a solution that will assure continued growth and mobility. Such contradictions appear ludicrous to say the least. To reiterate, in the words of one critic, "the government's energy program resembles the captain of the Titanic asking the passengers to close their portholes for fear of getting wet" (Orr, 1981:7). Past solutions to gasoline shortages have called only for minimal sacrifices in both lifestyle and economic growth (e.g., Trim It To The Limit and SAVAGALLONOF-GASADAY). While such policies may encourage some measure of conservation, they have largely failed. One reason for this failure may be that it has been traditionally assumed that the role of policy makers is to pass on knowledge of an issue—in this case the seriousness of the gasoline shortages—to "rational" people who will respond by altering their behavior as needed. Consumer travel behavior, however, when it has been voluntarily and "self" controlled, has tended to sway with the price of gasoline. As Yergin (1982:14A) comments, "in the four weeks ending May 7, 1982, the demand for gasoline was six percent above the level of a year earlier." Particularly since the shortages of 1979, consumer demand for gasoline has not necessarily done what it was "supposed to do" (Yergin, 1982:14A).

Based on the discussion above, it would seem that the question may one day be not whether American consumers "want" gasoline rationing, rather it may be that rationing will become the necessary and inevitable resolution to runaway inflation, dwindling oil reserves, and future oil embargoes (Ball, 1977; Henderson, 1978a; Burnett, 1978; Orr, 1981.
Consumers may well be initially resistant to a program of gasoline rationing, but it has been pointed out and argued quite convincingly by Ball (1977), Henderson (1978a, b), Martin (1981), Orr (1981), Shippee (1981), Yergin (1982), and Eisenstat (1982) that unless government, business and industry, and individual consumers work together "we will mortgage our future to the temporary pleasures of another oil glut, and again confront national tragedy" (Eisenstat, 1982:14A). While statements by researchers such as Orr (1981) and Eisenstat (1982) may seem tinged with subjectivity, the objective reality is that the world lives in the twilight of the crude oil era. American and OPEC energy production is unlikely to rise dramatically. We must prepare now for a future with scarce crude oil (Eisenstat, 1982:14A).

The development and execution of this study has provided three fundamental, yet significant contributions to social science research. First, in using Weber's approach to the objective and scientific study of social action in conjunction with the theoretical versatility of phenomenology, it became feasible to widen the parameters of social action of relevance to the social scientist. That is, the emphasis was on understanding a "real world" situation where the subjects under study clearly possessed the conscious capacity to create and negotiate the dynamics of the gasoline rationing setting imposed upon them. Second, because the phenomenological method is neither objectivist, static, nor abstractly empirical, it became possible to develop a methodology—in the form of simulation SHORTAGE— which would permit the researcher to narrow the gap which exists between the more or less stable objective
world of empirical social forces and the subjective beliefs people hold about them (Johnson, 1981:60). Such a focus led the researcher away from the traditional approaches to simulation research which assume rationality in social action and permitted an emphasis on limited and practical rationality. This was done in order to more adequately understand and evaluate the complex and often confusing responses to the gasoline shortages exhibited by American consumers. Third, this study yielded important new insights into the point at which American consumers might alter and/or cut back on their current levels of transportation mobility. In conclusion, a reexamination of the methods of sociological inquiry may well permit the development of models of social action which 1) differ fundamentally from those which have traditionally been used and 2) possess a greater degree of predictive power.
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My thanks are extended to Gwen Ethington, my typist, whose patience and indulgence with my many self-caused errors have been greatly appreciated.

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Collection of the data used in this study was approved by the Human Subjects Committee in accordance with university regulations.
APPENDIX A: TEST OF SHORTAGE: LIST OF STRATEGIES, DECISIONS, AND CONSEQUENCES, SKELETON DIAGRAM OF DECISION PATHS, STRATEGY B IN DIAGRAM FORM, FLOW CHART, AND CONSEQUENCES FOR DECISIONS MADE
The following appendix contains the text of SHORTAGE including the following: 1) the beginning page of SHORTAGE which presents respondents with options; 2) reasons why gasoline rationing must be implemented; 3) a list of the strategies which will be made available; 4) the Economic Regulatory Administration's guidelines for gasoline ration allotments (the entire text of President Carter's Contingency Gasoline Rationing Plan may be found in Appendix B; 5) the scenario developed to convince respondents of the severity of the gasoline shortages; 6) issuance of gasoline ration coupons; 7) respondent car_type; 8) parental or self-income; 9) index page one for strategies; 10) strategies A through E, their decisions and consequences including illegal strategy categories; 11) a skeleton diagram of SHORTAGE which demonstrates the decision paths for each of the five strategies; 12) a flow chart which demonstrates the process used by respondents as they participated in SHORTAGE; and 13) a complete diagram of Strategy B and Strategy B, illegal decisions which shows the manner in which decisions both legal and illegal were made.

Choose an Option by pressing the corresponding letter:

a. Introduction to SHORTAGE
b. SHORTAGE instructions
c. Gasoline rationing regulations
d. Begin the simulation

Note: You are encouraged to make comments at any time and may do so by pressing the key marked SHIFT/LAB.
The known reserves of oil are limited. New supplies may be found, but even so, this country is experiencing shortages, which range from 5% to 20%. Lesson "SHORTAGE" is a simulation of a gas rationing plan which could very soon be implemented in the United States if the supply of gasoline fails to meet public demand. In some areas of the U.S. such as Pennsylvania, California, and New York, this is already happening. The result has been long lines at service stations, outbreaks of violence due to heightened tensions, irregular hours at service stations, and mass confusion on the part of the American people.

Any gasoline rationing plan will cause hardships to many people and will inconvenience large numbers of gasoline consumers. Nonetheless, in a period of serious shortage, the rationing of gasoline will assure access to some gasoline by all motorists at a reasonably controlled price, reduce or eliminate long waiting lines, reduce incidences of violence, and stabilize the market for gasoline. There will be costs to adapting to gasoline rationing. Given a level of spendable income and certain self-defined needs, you will be given the options of 1) paying additional costs in mobility (e.g., through buying extra ration coupons from someone who does not need or use them or from an exchange market such as a bank) or 2) altering your lifestyle so that you will be able to reduce your gasoline consumption (e.g., moving closer to your job, cutting down on social activities which require driving, etc.). Either option will represent a substantial change in your present travel patterns.

A number of strategies will be presented to you. Several alternatives within each strategy will be given and you will be asked to make decisions based on these alternatives. These strategies are as follows:

1. **Strategy A**: Attempt to gain as much gasoline as possible for personal consumption.

2. **Strategy B**: Make better use of the gasoline rations that are made available to you.

3. **Strategy C**: Adjust individual travel needs in an attempt to use less gasoline.

4. **Strategy D**: Attempt to induce the government (local, state, and/or federal) to change its energy policy or policies to relax rationing limitations.

5. **Strategy E**: Reconsider the social and moral issues involved with respect to individual style of living, values, and behavior. Make personal changes as necessary.
The following is a list of the proposed rationing rules.

The Economic Regulatory Administration has determined eligibility for ration allotments using the following guidelines:

1. Your basic eligibility for ration allotments will be determined by the number of gasoline-powered vehicles which you own. In order to insure that some individuals are not abusing this rule, it has been determined that each household will be allowed a maximum of three vehicle registrations for purposes of obtaining ration coupons.

2. Ration checks will be issued to you upon your presentation of satisfactory identification.

3. These ration checks will be mailed to you on a quarterly (90-day) basis, with the appropriate allotment amount printed on each check.

4. Ration coupons will be issued in 5-gallon amounts and in 1-gallon amounts.

5. Ration coupons will have identification numbers and expiration dates.

6. A registration cut-off date prior to the effective date of rationing has been implemented to prevent the registration of fictitious, junked, or inoperable vehicles for the sole purpose of obtaining rationing rights.

7. Passenger cars have been found to travel an average of 10,100 miles per year with a fuel efficiency of 13.5 miles per gallon yielding an average annual gasoline consumption of 758 gallons. It is hereby noted that all passenger cars in a given state will receive the same 120 gallons for each 90-day period of time, regardless of fuel efficiency. This will give a significant advantage to fuel efficient vehicles and will hopefully provide an incentive to their use.

8. Motorcycles and other gasoline-powered motorbikes will receive .1 of the ration allotment to automobiles (12 gallons of gasoline for each 90-day period of time).

9. Recreational vehicles (e.g., snowmobiles, campers) will receive NO allotment whatsoever.

10. Unredeemed ration rights are freely transferable. If you do not need or do not use all of your ration coupons for the 90-day period, you may give them to someone or sell them. It is hoped
that this will promote a more efficient use of all available gasoline.

11. Any person who violates any provision of these regulations or any order issued shall be subject to the penalties as set forth in section 5 of the Emergency Petroleum Allocation Act of 1973, which has established several categories of civil penalties with fines ranging as high as $40,000 depending on the category of the violation. The maximum criminal penalty for such willful violation is one year imprisonment.

Attention:

There has been a nuclear explosion in one of the largest oil fields in the Middle East. As a result of the explosion, it will be from six months to one year before workers can safely enter the area. As you know, a large percentage of U.S. oil is imported from the Middle East.

The Department of Energy and the Economic Regulatory Administration hereby informs you that the President of the United States sent a gasoline rationing contingency plan to the Congress. Each House of Congress has since passed a resolution approving a gasoline rationing plan which will become effective in 60 days. Rationing will be implemented for a period not to exceed 9 months. As of today the federal government has informed us that a cutback of 25% in fuel consumption will be needed in order to assure this country that it will not run out of fuel altogether.

While it is recognized that in the past many people believed that fuel shortages were created by large oil corporations in an attempt to drive up the price of gasoline, this country has not reached the point at which it is critical that all Americans recognize the seriousness of this sudden cutback in the availability of gasoline.

You have just been issued ration checks for your car totaling 120 gallons of gasoline. Use them wisely. Remember, we all have to live with and/or cope with the decisions we make.

Before you begin we need some basic information about you.

What type of car do you drive? (How many miles per gallon of gasoline do you receive?)

Note: (See the sheet with the list of cars provided by the researcher. Tell the researcher what your gasoline mileage is and you will be assigned a car_type)
Approximately, what is your yearly income? If you are single, please estimate your parents income.

Income Increments

a. 0 - $ 4,999
b. 5,000 - $ 9,999
c. 10,000 - $14,999
d. 15,000 - $19,999
e. 20,000 - $24,999
f. 25,000 - $29,999
g. 30,000 - $34,999
h. above $35,000

Presentation of strategies:

There are a number of decisions you may make within each strategy. It is, however, understood that because the amount of gasoline available is limited, some of the decisions necessarily border on the line between legal and illegal. Press the letter key to select the strategy you wish to choose. After each decision is made, you will be presented with a consequence that will reward or cost you either verbally or in terms of a change in your daily gasoline consumption rate. When you finish reading each consequence, press the key marked NEXT to return for more decisions or to try another strategy.

Strategy A: Attempt to obtain as much gasoline as possible for personal consumption. (N_CH11)

List of Decisions and Consequences

15. You can purchase old low value cars from the junkyard and use their registrations to receive more ration coupons.

a. A routine check on the registrations of the cars you own revealed that they are not operable. In fact, one has no motor in it. You may be subject to a $500 fine and 30 days in the county jail.

b. Remember you are only allowed three registered vehicles for the purpose of obtaining ration coupons. If you attempt to register more than three cars you will be subject to arrest.
16. You may buy coupons from someone who does not use all his/her coupons.
   a. It has just been announced over the radio that Mr. Edwin James has been arrested for selling counterfeit ration coupons. The serial numbers of the coupons you have been buying match those of the counterfeit coupons. You are now stuck with $220 worth of unusable ration coupons.
   b. The man who has been selling you his unused ration coupons at a 10% mark-up has just increased his mark-up margin by another 30% because of demand and inflation.

17. You may consider buying a car which uses diesel fuel, which is not rationed; such as a Mercedes Benz, a Volkswagen Rabbit, or a new diesel burning Oldsmobile.
   a. Have you priced cars recently? Particularly those which run on diesel fuel? A VW Rabbit diesel using vehicle now sells for $13,500. Volkswagen does it again!!!
   b. It doesn't really matter whether or not diesel fuel is rationed when there is none available. You now have a $13,500 automobile for which you have no gasoline.

18. You might think about asking your elderly parents to move in with you. You would then be eligible to receive a "hardship" fuel allocation in their names.
   a. Is it really worth all the extra work it will create?
   b. It was a nice gesture to invite your parents to live with you. However, the increased cost of having them live with you is going to place quite a strain on your household budget.

19. You could buy a large truck and use its fuel allocation in your other vehicles.
   a. The neighbors have signed a petition forcing you to move that "ugly truck" out of their neighborhood. Where are you going to park it?
   b. Good choice. Because trucks net fewer miles per gallon of gasoline than cars, your ration allotment for your truck will be three times that given for passenger vehicles. Your problem is solved.

20. You could form or join a volunteer fire department and apply for the unlimited ration to "emergency services" groups.
a. You drove to a local fire to participate in a volunteer fire department call and sparks from the fire ruined the paint on your new automobile. Repair estimates range from $400 to $600.

b. In order to retain your status as a volunteer fire department member you are required to use your vacation this summer to participate in the Iowa State University Fire Training Extension Program.

c. If choice was (a) there is x% probability that this will occur! Because you were convicted of illegally registering automobiles you now have a criminal record and cannot form a volunteer fire department.

Strategy A, illegal decisions. (N_CH12)

21. You could steal coupons from mailboxes in large apartment buildings.

   a. The owner of the filling station where you buy your gasoline became suspicious of you when his attendant mentioned you seemed to be buying more gasoline than usual. A check of the serial numbers of the stolen coupons you just cashed in were on a hot sheet in all service stations. You have just been arrested and if convicted you could go to jail for up to 2 years.

   b. All mailboxes in the apartment buildings have locks on them and there is a closed circuit TV set-up. Don't be a fool! Tampering with the U.S. mail is a federal offense.

   c. You now have enough gasoline to last for a while, but the poor widow you stole the coupons from was selling most of her coupons for extra money to live on and using the rest for important trips to the doctor and the grocery store. As a result of your actions, she had to stop seeing her doctor and became ill since she wasn't receiving her medication. Last week she died alone and her body wasn't found until yesterday. Feel proud of yourself now?

   d. Well, you got by with it; this time! But who knows about next time?

22. You could form a fake construction company and apply for an "off-highway" fuel allocation.

   a. This just isn't your lucky day; you have been caught. You could receive a fine of $10,000 and serve up to 1 year in jail.
b. So far you have been lucky. Sooner or later you will probably be caught.

23. You could set up a still in your basement to make alcohol to burn in your car.

a. You have been caught. If convicted you will be subject to a $10,000 fine and up to 1 year in jail.

b. The price of sugar has just gone up to $2.00 a pound. It seems that a lot of people are buying large amounts of sugar all of a sudden. The Economic Regulatory Administration has gotten wind of the fact that people are operating stills in their homes. If this price increase does not lower the demand for sugar they will instigate random house checks looking for these stills.

c. It is a well-known fact that sugar is a prime ingredient in home brewed moonshine. Due to the increase in the demand for sugar in large quantities, the price has risen to $2.00 per pound. If this does not lead to a decrease in the consumption of sugar those persons who purchase it will be asked to sign their names on a government form when buying more than 10 pounds at a time. These persons will then be viewed as suspicious persons who may be breaking the law.

d. Good idea! But if you are caught, remember moonshining is a federal crime.

24. You could siphon gasoline out of cars in parking lots.

a. You were just caught siphoning gasoline out of your neighbor's car and he has threatened to report you to the authorities unless you turn over half of your ration coupons to him for the next 6 months.

b. This time you were lucky. But don't you feel guilty?

c. Amateurs can get hurt. You swallowed quite a bit of gasoline while you were sucking it up the siphon hose. The doctors say you might have permanently damaged your lungs.

\[\text{HI risk.}\]
Strategy B: Make better use of the gasoline rations that are made available to you. (N_CHI3)

List of Decisions and Consequences

25. Purchase a very fuel efficient car.
   a. The Blue Book value of your present car has decreased by 30% because there is little demand for fuel inefficient automobiles. You just can't afford a new car at this time.
   b. The bank at which you have applied for a loan has just informed you that you will be able to obtain your loan at a reduced percent as an incentive to purchase a fuel efficient automobile. However, your insurance company has informed you that because of the risk of serious injury or death in case of an accident is 30% higher in a small car your premium will be twice what you were paying before. And with the price of small cars skyrocketing, you just can't afford one now.

26. Purchase a mo-ped or a motorcycle.
   a. Your ration allotment for your mo-ped or motorcycle is one-tenth that of a passenger vehicle, which means instead of a ration allotment of 120 gallons for the 90-day period you will receive only 12 gallons.
   b. Your motorcycle collided with a car at the intersection of Lincoln Way and Duff. You have a broken leg and a possible concussion. This means you may miss work for as long as a month.
   c. Due to the increase in the number of motorcycle and mo-ped accidents the State of Iowa has just passed a law requiring you to carry both liability and collision insurance. These rates will be inordinately high because of the high risk involved in operating these vehicles.
   d. This is fine in good weather, but sub-zero weather and rain make travel uncomfortable and dangerous.
   e. You have made a wise decision in that you will be getting from 90 to 125 miles to a single gallon of gasoline.
   f. Four thousand people in this country have been killed in motorcycle accidents within the past 5 months.

27. Ride an intracity or intercity bus (if available).
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a. The bus is so crowded that by the time it reaches your stop you find you must stand the entire 10 miles to and from work each day. Do you still want to ride the bus? Press the letter "y" for yes, "n" for no.

If respondent pressed "y" for yes, the consequence was:

b. Your cost of traveling to and from work has been cut by one-third. It looks as if this was a good choice.

If respondent pressed "n" for no, the consequence was:

c. I don't blame you, but if you run out of gasoline before 120 days are up, don't blame us.

28. Join or form a car or van pool.

a. One of the members of your car pool has a tendency to exceed the speed limit. This is the third time in two weeks he has been stopped by the State Patrol. It looks as if you will be late to work again today.

b. One of the members of your car pool seems to be shoving her driving days off on you. Every time it is her turn to drive, it seems she claims her car is "in the garage" for repairs.

c. One of the members of your car pool smokes cigars. The days he drives he feels it is his car and if he wants to smoke he does. Your asthma is bothering you because of this (more doctor bills).

d. The car pool group set down a set of rules or guidelines to which each member of the car pool must adhere if he wants to remain a member. It should work.

e. This was a good idea. You are not only relieved of the responsibilities of driving every day, but it also saves wear and tear on your car.

f. You have been given a discount rate for monthly parking because you have joined a car pool.

g. The Internal Revenue Service has been authorized by the Economic Regulatory Administration to give an added tax break to those persons who are participating members of car and van pools.
Strategy B, illegal alternatives. (N_CHI4)

29. Purchase an electric powered automobile.
   a. O.K. They cost about $3,000 and have a maximum range of 50 miles. They have a top speed of 25 miles per hour, and carry from two to four people.
   
   Note: Manufacturers are working on the concept of the electric automobile. Some are on the market and selling for about $8,000. Maybe this wasn't such a bad idea after all.

30. Purchase an electric powered bike.
   a. This is a good idea if you can find someone to build it for you. However, its top speed would not be much over 15 miles per hour.

31. Ride a horse for some travel needs.
   a. Where will you park it when you go shopping or when you work an 8-hour day?
   b. You have just been fined $25 for creating a public health hazard. Your horse was caught "relieving" himself in the middle of the business section of town.

32. Turn all emission control equipment off on your automobile to increase gasoline mileage.
   a. You have been stopped in a routine safety check and the Iowa State Patrolman who just checked your car has routinely checked to see if your emission control device is working. You have just been issued a warrant to appear in court to answer to the charge. If convicted you may lose your driver's license and/or receive a $100 fine and/or 30 days in jail.
   b. It is against the law to turn off emission control equipment. You may be subject to a fine if you are caught. Garage mechanics have been alerted to the fact that this is being done and are required by law to report anyone guilty of this crime.

33. Roll through stop signs to reduce the fuel consumption required for a full stop.
   a. Because so many people are doing this the police department has issued a notice that persons taking down license numbers of those individuals who break this law will be rewarded by receiving ration coupons worth 3 gallons of gasoline.
b. No one was around so you decided to take the chance, didn't you? However, you didn't see the County Patrol car sitting behind the billboard, did you? Sorry. If you are convicted you will lose your driver's license, receive a $500 fine, and a 30-day stay in the county jail.

c. Because you already have three other convictions for traffic offenses your driver's license has been taken away for 6 months.

d. Do you realize this is against the law? Shame on you!

34. Purchase oil or gasoline treatment additives to increase your gasoline mileage (e.g. STP).

a. Good idea. However, Consumer Report just issued a notice that STP and other oil additives do not increase gas mileage. But you may increase the life of your car by taking better care of it.

35. Drive without air conditioning in the summer to increase your gas mileage.

a. Driving without an air conditioner may save gasoline, but it is also very hot. Although, considering that you seem to be using your 90-day allocation quite rapidly, you might try it for a time.

Strategy C: Adjust individual travel needs in an attempt to use less gasoline. (N_CHI5)

List of Decisions and Consequences

36. Ride a bike or walk to work.

a. The traffic on the highway is heavy both ways and cars are often inconsiderate of bicycles and pedestrians.

b. You just had a flat tire and you now have to walk the bike to work. It is still about two miles. You are going to be late again.

c. This is good exercise, but you will work up quite a sweat by the time you get to work. Your job requires you to wear a suit/dress and you will be all hot and sticky when you arrive.

d. The sun was shining when you left for work this morning with no chance of rain. However, the weather forecast was revised at 10 A.M. It is raining and the wind is blowing at speeds up to 30 miles per hour. It looks like you are going to get wet today.
e. You forgot to lock your bike this morning. Someone just stole it.

37. Make the children walk or ride bikes to school and other activities.
   a. It will be good for them. If only they felt that way about it.
   b. If their activities are important to them, they will manage. If not, then let them stay home. You really cannot afford the expenditure of the extra gasoline.

38. Shop from a catalog and have the goods delivered to your home.
   a. Those stores which put out catalogs generally do not sell high-quality products.
   b. You ordered a suit/dress to wear and when it came it looked horrible on you. Nothing ever seems to fit when you buy from a catalog.
   c. By the time you pay postage, it costs more to buy through the catalog than from a store in town. Besides, clothing always looks better in the book than it does when you get it home.
   d. Looks like it is working out fine so far. You have gotten every item you have ordered with no hassles and have saved time and gasoline too.

   a. This usually costs more and the quality of the products you can buy from door-to-door peddlers is often low.
   b. There has been an increase in door-to-door peddlers who convince potential customers they can save large sums of money on clothing, cosmetics, and kitchen utensils. However, it has come to the attention of the local police that many of these peddlers do not deliver the goods. You just paid out $150 for two new suits/dresses and have been notified that the persons who sold them to you are confidence artists and have been arrested.

40. Order groceries by telephone based on an advertisement(s) in the newspaper.
   a. The grocery store delivered, but it cost you 15% more than if you had done your own shopping. And at the price of groceries today no one can afford this.
b. It would save you money if you would shop just once a month at a Warehouse Food Market. The savings amounts to about 15%.

41. Pay bills and do your banking by telephone.
   a. This will save you both time and money. Good choice!

42. Watch cable television and cassette home movies instead of going out for entertainment.
   a. A Beta-Max sells for about $1,000. That is a lot of money.
   b. For about $10-15 per month, you can have cable television installed where it is available. Most of the movies that are shown are uncut versions of movies which have only recently been shown in movie theaters. The price of a movie is between $3.00 and $4.00. In a year's time that really does add up.

43. Stop going snowmobiling.
   a. This is not really a choice. Remember! Government regulations state that NO allotment will be given to recreational vehicles.

44. Write letters or phone instead of traveling to visit people, even those who live close by.
   a. Your mother just does not understand. She only lives twenty miles away and is heartbroken that you cannot make the trip to see her.
   b. You could phone your mom every day and talk for a few minutes. She might enjoy that as much as your once a week or once a month "duty" visits.

45. Have someone in the family or a neighbor cut your hair instead of going to a barber shop or beauty salon.
   a. Your spouse just cut your hair and it looks like someone put a bowl on your head and cut around it.

Strategy D. Attempt to induce the government (local, state and/or federal levels) to change its policy or policies to relax rationing regulations. (N_CH17)

List of Decisions and Consequences

46. Stop mowing grass and weeds along the highway.
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a. A school bus loaded with kindergarten children collided with a stationwagon on a county road. Weeds had grown out of control. The driver of the car did not see the bus coming. Two children were killed and 17 were seriously injured.

b. This will force large numbers of lay-offs within the Department of Transportation increasing the already high unemployment rate which might well force the country into a recession.

c. This could save an estimated 50 million barrels of gasoline per year.

47. Stop picking up trash along the highway.

a. A bill has been introduced in the Legislature to increase the fine for littering from $100 to $1,000 and 30 days in jail.

NEWS FLASH

A stationwagon carrying seven children and two adults was just involved in a one-car crash on Highway I-35 near Des Moines, Iowa. Investigators at the scene of the accident indicated that the driver of the car, C. R. Budney, apparently swerved to avoid hitting a large object in the road and crashed into a telephone pole. The object turned out to be a case of empty beer bottles which were dumped or fell from a moving vehicle. Budney and four of his children are reported dead. His wife and three more children are in critical condition in a Des Moines hospital. This type of accident rarely happened when the highway crews kept the roadsides clear.

b. Workers from the Department of Transportation estimate that they pick up 700,000 tons of trash from primary highways each year. Looks like the highways are going to get cluttered, but it will conserve gasoline.

48. Stop patching potholes in the roads.

a. You just hit a pothole in the road which threw your car out of control. You hit a fire hydrant and flooded the area with water. You were driving home from work and your car pool has five members, four of whom were still in the car. Three of them suffered only minor injuries but your next door neighbor was thrown through the windshield. He is in the intensive care unit in Mary Greeley Hospital.

b. Because minor road repairs are no longer being made, the Department of Transportation has been forced to layoff 20,150 men and women across the country. One-third of them have applied for state aid because they have been unable to find other work.
This has placed a strain on our nation's economy. Therefore, the federal withholding tax will be increased by 5% across the board beginning September 1, 1979.

c. Due to heavy spring rains, many rural roads have been closed. Underground springs have caused deep rutting and deterioration of a large number of these roads many of which lead into and out of heavily populated subdivisions.

49. Cancel trucking regulations which force trucks to run empty in one direction.

a. This will save an estimated 250,000 gallons of gasoline per month nationwide. This will increase the state reserves and decrease the chances of another cut in ration allotments for passenger cars.

50. Enact stricter laws to enforce the speed limit.

a. Those persons who are stopped for violating the 55-mile per hour speed limit will automatically lose their driving privileges for 90 days.

51. Break consolidated schools up into one-room schools so children can walk to school.

a. Most secondary education teachers (e.g. grades 7-12) receive their college educations in specialty areas. In order for such a split in schools to occur these teachers would have to attend classes at a college or university for a minimum of 30 hours or 1 year. A large number of teachers are planning a march on Washington, D.C. in protest of this which could close all high schools in the country for the remainder of this school year.

b. This could conceivably lower the quality of education your children would receive.

c. This would leave schools around the country empty and virtually useless. The tax dollars invested and the bonds sold to build these modern teaching facilities would have to be stored away and thousands of people from maintenance men to principals would lose their jobs.

52. Delete all school activities requiring travel.

a. Students are refusing to attend school and are picketing in protest.

b. The rate of juvenile delinquency has risen 35% in the 2 months since school activities requiring travel have been cancelled.
c. Great! The grown-ups waste the fuel until the crisis hits. Now the kids have to pay for it. This is not fair.

d. This would save hundreds of thousands of gallons of fuel each year. However, it will also put thousands of school bus drivers out of work which will also add to an already strained economy.

53. Eliminate most postal delivery and use telephone and television-type communication to replace letters.

a. The cost to the economy involved here would be monumental and the individual costs would be high as well. This would hurt a lot of people, particularly the elderly and the poor who represent nearly 50% of the total population.

b. This is a good idea for long-run projections but it would take at least two years and millions of dollars to implement it.

NEWS FLASH

Thousands of unemployed postal workers who staged a protest against the elimination of all postal delivery converged on Washington, D.C. today. One violent confrontation between police and protesters has left two men dead and 18 more critically injured. One of the dead men was your next door neighbor who went along as a concerned citizen.

NEWS FLASH

Postal workers are picketing television stations all over the country that have agreed to become involved in this "sabotage" of the U.S. economy. Employees of television stations across the country have agreed to honor the picket lines. The top administrators of ABC, NBC, CBS, and the PBS have expressed their fears that all four networks may shut down permanently unless this terrible threat to the nation's economy is removed.

54. Construct housing and factories around existing shopping centers to create urban villages.

a. Building construction costs have risen 30% in the past month. It does not seem feasible at this point to consider this as a working alternative.

b. Central city areas in Boston, Chicago, New York City, Pittsburgh: the list is endless; have reached the point of bankruptcy. Unless people can be motivated to once again shop in these areas these cities may die.
c. Good idea! The problem lies in the fact that the areas around these large shopping centers are already inhabited by single and multiple residence dwellings.

d. This is ideal for long-range forecasting but in the short-run it is not a feasible alternative. These things take time.

55. Lay off government employees to reduce driving of government-owned vehicles.

a. This will increase the unemployment rate across the country by another 1.5% which will bring the total unemployment rate in the U.S. to 14.7%, an all time high.

Strategy E: Reconsider the social and moral issues involved with respect to individual style of living, values, and behavior. Make personal changes as necessary. (N_CHI9)

List of Decisions and Consequences

56. You may buy surplus coupons from a local bank or exchange market.

a. The First National Bank buys coupons from persons who do not need the full 90-day allotment. The bank then sells these coupons for 10% over the price of gasoline. However, you may only buy twenty gallons worth of coupons during each 90-day period from this source.

57. You could buy ration coupons from someone who does not need all of his coupons.

a. ATTENTION! James Gabel was just arrested for selling what could turn out to be as much as $50,000 worth of counterfeit ration coupons. The serial numbers of the coupons you bought yesterday match those of the counterfeit coupons. You are now stuck with $400 worth of unusable coupons.

b. You do realize, don't you, that there are a large number of counterfeit ration coupons in circulation? If you are caught spending them you will be arrested. Ignorance of the law is no excuse for breaking it. If you are going to buy extra ration coupons "on the street", be careful.

c. Most of the persons who sell unneeded ration coupons are charging exhorbitant prices.

58. Stop using your personal vehicle on business errands.
a. You could save as much as ten gallons of gasoline in a 90-day period of time if you stop using your car to run business errands.

b. Good idea! The company you work for may as well pick up the tab.

59. Buy a ten-acre farm and apply for an off-highway allocation.

a. Have you priced farm land recently? It is selling for as much as $5,000 per acre.

b. In most states tractors used for farming are not registered with the Department of Motor Vehicles. The provision for off-highway vehicles will provide you with fuel to run your tractor. You do have a tractor don't you? Because if you don't you are not eligible for extra coupons and are breaking the law.

c. You could buy a lot of ration coupons with the $30,000 you just paid for those 10 acres of land out in the country.

60. Buy a large truck and use its ration coupons in your car.

a. Good idea! Your truck is allowed three times the ration allotment (360 gallons) of a passenger vehicle for the 90-day period of time.

b. The neighbors have just gotten up a petition to force you to move that "ugly truck" out of the neighborhood and it is going to cost you a bundle to park it somewhere else.

61. Drive no faster than 50 miles per hour on the highway to conserve gasoline.

a. You will save an average of 3 miles per gallon of gasoline if you lower your speed to 50 mph.

62. Sell your unexpired ration coupons.

a. To whom will you sell them? The bank offered you 5% over the cost of gasoline. On the other hand, some people are selling them on the street for as much as 20% over cost. And it is all legal.

63. Report to the authorities anyone selling counterfeit ration coupons.

a. The federal government has offered a reward of $1,000 for information leading to the arrest and conviction of anyone who prints or sells counterfeit coupons because the country is
being flooded with counterfeits. If this continues, the U.S. reserve supply of fuel may be gone within six months. You have just found out that your next door neighbor has been involved in selling these counterfeit coupons. Are you going to turn him in?

IF YES: The evidence against your neighbor was circumstantial and the charges levied against him have been dropped. He had since threatened to "get you" for turning him in.

IF NO: The flood of counterfeit ration coupons has reached serious proportions in this area of the country. Thirty percent of the fuel reserves in the Midwest have been used up. You are hereby informed that gasoline ration allotments have been cut from 120 gallons every 90 days to 100 gallons for that same time period. If this crisis situation is not relieved, the free world as we have known it since 1945 may one day soon no longer exist.

Strategy E, illegal alternatives. (N_CHI10)

List of Decisions and Consequences

64. Falsely report that your ration coupons were not delivered in order to obtain a second set of coupons.

   a. A computer check of cashed coupons turned up your "alleged" missing coupons. Your automobile ration booklet has been cancelled and it will be at least sixty days before a new one will arrive. It is hoped that this will provide an incentive for you to keep track of your ration coupons in the future.

65. Turn off all emission control equipment on your vehicle(s) if instructions are available in order to increase gas mileage.

   a. You have just broken the law. You will be subject to a fine if you are caught.

   b. You have been stopped in a routine safety check and the Iowa State Patrolman who just checked your car has routinely checked to see if your emission control device is working. You have just been issued a warrant to appear in court to answer to the charge. If convicted you may lose your driver's license and/or receive a $100 fine and 30 days in jail.

   c. It is against the law to turn off emission control equipment. You may be subject to a fine if you are caught. Garage mechanics have been alerted to the fact that this is being done and are required by law to report anyone guilty of this crime.
66. Roll through stop signs to reduce fuel consumed by a full stop.
   a. The Police Department has just issued a public notice that be-
      cause of an increase in traffic accidents there will be severe
      penalties imposed upon those who violate traffic laws.

67. Illegally double park rather than driving around the block several
     times to find a parking place.
   a. Your car has just been towed away. To reclaim it will cost you
      $50.00 in towing fees plus a $25.00 ticket for illegal parking.

68. Turn off your engine and coast down long hills to save gasoline.
   a. Because so many people are doing this the Police Department has
      issued a notice that persons taking down license numbers of
      those individuals who break this law will be rewarded by re-
      ceiving ration coupons worth three gallons of gasoline.
   b. No one was around so you decided to take the chance. However,
      there was a County Patrol car sitting behind the billboard to
      your left. Sorry, you just got caught. If convicted, you will
      lose your driver's license and receive a $500 fine.
   c. Do you realize this is against the law? Shame on you.
   d. Because you already have three other convictions for traffic
      offenses, you just lost your license for six months.

69. If I had ration coupons which were to expire tomorrow and the fuel
     tanks on my vehicles were full, I would use the coupons to fill cans
     to be stored in my garage.
   a. It is against the law to store large quantities of gasoline
      within 40 feet of a building. Your next door neighbor just
      turned you in to the authorities. He said he was afraid for
      the safety of his family.
   b. Your son was playing with matches in the garage. He dropped
      a lighted match on the floor too close to your gasoline cans.
      There was an explosion and he was severely burned over 70% of
      his body.
Costs/Rewards Associated with Decisions within Strategy Categories: SHORTAGE Data

This section of the appendix will focus on the consequences associated with certain decisions within SHORTAGE. As it was pointed out in the Methods Chapter, SHORTAGE was modified somewhat before the 1980 data collection began. The modifications seemed necessary in order that more realistic costs could be attached to some of the decisions, particularly the hi_risk, illegal decisions. Table A.1 shows a list of each consequence that contained a reward/penalty in terms of gasoline consumption rate. For the reader's clarification, the rewards/penalties attached to consequences are presented both before (listed as 1979) and after (listed as 1980) SHORTAGE had been modified.

As it can be seen from Table A.1, most of the consequences led to a decrease in respondent's daily gasoline consumption rate. For example, the decision to join or form a car or van pool added a total of six gallons of gasoline to a respondent's ration allotment, at the time a decision was made, while the decision to falsely report that ration coupons were not delivered resulted in a loss of thirty gallons of whatever gasoline was left at the time of the decision.

As the data were analyzed, it became apparent that the research group had perhaps focused too strongly on the hi_risk, illegal decisions while ignoring other decisions which might have been altered. That is, the respondents might have been more acutely aware of the passing of time and of their daily gasoline consumption rate had more decisions been designed to significantly penalize or reward them. It might also
have been feasible to build into the simulation delayed reactions by SHORTAGE, so that respondents would not have immediately felt the impact of their decisions, but rather, as in "real" life that impact would be felt days or even weeks later.
Table A.1. List of decisions and costs of consequences for 1979 and 1980 SHORTAGE data

<table>
<thead>
<tr>
<th>Decision made</th>
<th>Reward/penalty in gallons</th>
<th>1979</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ride an intercity/intracity bus</td>
<td>+5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Siphon gasoline out of parked cars</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Join or form a car or van pool</td>
<td>+6</td>
<td>+6</td>
<td></td>
</tr>
<tr>
<td>Ride a horse for some travel needs</td>
<td>+5</td>
<td>+5</td>
<td></td>
</tr>
<tr>
<td>Purchase oil or gasoline treatment additives to increase your gasoline mileage</td>
<td>+2</td>
<td>+2</td>
<td></td>
</tr>
<tr>
<td>Drive without air conditioning in the summer to increase your gasoline mileage</td>
<td>+2</td>
<td>+2</td>
<td></td>
</tr>
<tr>
<td>Ride a bike or walk to work</td>
<td>+5</td>
<td>+5</td>
<td></td>
</tr>
<tr>
<td>Shop from a door-to-door peddler</td>
<td>+1</td>
<td>+1</td>
<td></td>
</tr>
<tr>
<td>Order groceries by telephone based on advertisement(s) in the newspaper</td>
<td>+1</td>
<td>+1</td>
<td></td>
</tr>
<tr>
<td>Stop using your personal vehicle on business errands</td>
<td>+2</td>
<td>+2</td>
<td></td>
</tr>
<tr>
<td>Drive no faster than 50 mph on the highway to save gasoline</td>
<td>+1</td>
<td>+1</td>
<td></td>
</tr>
<tr>
<td>Report to the authorities anyone selling counterfeit ration coupons</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Falsely report that your ration coupons were not delivered in order to obtain a second set of coupons</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Respondent loses one-half of whatever gasoline he had at the time of this decision.

- if respondent ressed "y" for yes, then +5, otherwise no change.

- Respondent loses 22% of total number of remaining gallons of gasoline for failing to turn in anyone guilty of counterfeiting.

- Respondent loses 30 gallons of whatever gasoline he has left at the time of this decision.
Respondent enters simulation
Enter personal data (income, car_type)
Respondent chooses information levels desired prior to activating the simulation which provide information needed to participate in SHORTAGE
Respondent receives ration allotment (120 gallons of gasoline for the ninety-day time period)

Respondent is presented with operational strategies. He is asked to select a strategy to operate SHORTAGE.
SHORTAGE presents respondent with a list of decisions subsumed within each strategy.

no—Respondent makes a decision if he chooses to.
yes
SHORTAGE presents a consequence associated with decision which is made (consequences appear with random probability cost increment of consequence). Respondent reads consequence, presses key marked NEXT to return to list of decisions.

yes—Want to make more decisions within present strategy? (Legal decisions/illegal decisions?)
no

yes—Want to pursue a new strategy?
Stop
no

Figure A.1. SHORTAGE: Simulation flowchart
Figure A.2. Skeleton diagram of SHORTAGE

(Data for strategies and illegal alternatives)

Denotes high risk decision.
Strategy A: Attempt to gain as much gasoline as possible for personal consumption.

Strategy B: Make better use of the gasoline rations that are available to you.

Strategy C: Adjust individual travel needs in an attempt to use less gasoline.

Strategy D: Attempt to induce the government (local, state, and/or federal) to change its energy policy or to relax its gasoline rationing limitations.

Strategy E: Reconsider the social and moral issues involved with respect to individual style of living, values, and behavior. Make personal changes as necessary.
Strategy B: Make better available

a. (25)

- Purchase a very fuel-efficient automobile.

Consequences appear with random probability.

1. You went to the VW sales outlet and were told that the Blue Book value of your present car has decreased by 30% because there is little demand for gas guzzling cars. Besides that you cannot afford to buy a new car at this time.

2. The bank at which you have applied for a loan has just informed you that you will be able to obtain your loan at a reduced cost as an incentive to purchase a fuel-efficient car. However, your insurance agent informed you that because of the risk of serious injury or death in case of an accident is 30% higher in a small car. Thus your insurance premium will be twice what you were paying for your gas guzzler. You discovered that you just cannot afford both the cost of a new car and increased insurance rates. Sometimes you just cannot win.

b. (26)

- Purchase a mo-ped or a motorcycle.

Consequences appear with random probability.

1. Your ration allotment for your mo-ped or motorcycle is one-tenth that of a passenger vehicle. This means instead of a ration allotment of 120 gallons for the 90-day period, you will receive only 12 gallons.

2. Your motorcycle collided with a car at the intersection of Lincoln Way and Duff. You have a broken leg and a possible concussion. This means you may miss work for as long as a month.

3. Due to the increase in the number of motorcycle and mo-ped accidents, the State of Iowa has just passed a law requiring you to carry both liability and collision insurance. These rates will be inordinately high because of the high risk involved in operating these vehicles.

4. This is weather, weather, weather travel un dangerous

5. You have made decision to be getting miles too of gasol

6. Four thousand the Unit been kil cycle ac the past

If respondent makes fewer than two decisions, he will not be offered the set of Illegal Decisions. If he makes two or more choices within Strategy B, then the simulation will present him with the decision of whether or not to look at Illegal Decisions and also of whether he may want to make decisions which are illegal. To see this list, the respondent must press the key on the computer marked DATA.

a. (29)

- Purchase an electric powered automobile.

Consequences appear with random probability

1. O.K. They cost about $3,000 and have a maximum range of 50 miles. They have a top speed of 25 mph, and carry from two

b. (30)

- Ride a horse for some travel needs.

Consequences appear with random probability

1. Where will you park it when you go shopping or when you work an 8-hour day?

2. You have just been fined $25

C. (31)

- Turn all emission control off on your automobile to increase gasoline mileage.

Consequences appear with probability

1. You have been stopped for a routine safety check at Iowa State Patrolman who checked your car and re
C (27)  
Ride an intercity or intracity bus (if available).  
Consequences appear with random probability:  
1. The bus is so crowded that by the time it reaches your stop you have been standing for the entire 10-mile ride.  
2. Your cost of traveling to and from work has been cut by one-third. It looks as if this was a good choice.  

D (28)  
Join or form a car or van pool.  
Consequences appear with random probability:  
1. One of the members of your car pool has a tendency to exceed the speed limit. This is the third time in two weeks he has been stopped by the State Patrol. It looks as if you will be late to work again today.  
2. One of the members of your car pool seems to be showing her driving days off on you. Every time it is her turn to drive it seems she claims her car is in the garage for repairs.  
3. One of the members of your car pool smokes cigars. The days he drives, he feels it is his car and if he wants to smoke he does. Your asthma is bothering you because of this (more doctor bills).  
4. The car pool group set down a set of guidelines to which each member of the car pool must adhere if he wants to remain a member. It should work.

E (33)  
Purchase oil or gasoline treatment additives to increase your gasoline mileage (e.g., STP).  
Consequences appear with random probability:  
1. Good idea! However, Consumer Report just issued a notice that STP and other oil additives do not increase gasoline mileage.
Join or form a car or van pool.

Consequences appear with random probability

1. One of the members of your car pool has a tendency to exceed the speed limit. This is the third time in two weeks he has been stopped by the State Patrol. It looks as if you will be late to work again today.

2. One of the members of your car pool seems to be shoving her driving days off on you. Every time it is her turn to drive it seems she claims her car is in the garage for repairs.

3. One of the members of your car pool smokes cigars. The days he drives, he feels it is his car and if he wants to smoke he does. Your asthma is bothering you because of this (more doctor bills).

4. The car pool group set down a set of guidelines to which each member of the car pool must adhere if he wants to remain a member. It should work.

5. This was a good idea. You are not only relieved of the responsibilities of driving every day, but it also saves wear and tear on your car.

6. You have been given a discount rate for monthly parking because you have joined a car pool.

7. The Internal Revenue Service has been authorized by the Economic Regulatory Administration to give an added tax break to those persons who are participating members of car and van pools.

Purchase oil or gasoline treatment additives to increase your gasoline mileage (e.g., STP).

Consequences appear with random probability

1. Good idea! However, Consumer Report just issued a notice that STP and other oil additives do not increase gasoline mileage.
ever, your insurance agent informed you that because of the risk of seri­
out injury or death in case of an acci­
dent is 30% higher in a small car.
Thus your insurance premium will be twice what you were paying for your gas guzzler. You discovered that you just cannot afford both the cost of a new car and increased insurance rates. Sometimes you just cannot win.

3. Due to the increase in the number of motorcycle and mo-ped accidents, the State of Iowa has just passed a law requiring you to carry both liability and collision insurance. These rates will be inordinately high because of the high risk involved in operating these vehicles.

If respondent makes fewer than two decisions, he will not be offered the set of Illegal Decisions. If he makes two or more choices within Strategy B, then the simulation will present him with the decision of whether or not to look at Illegal Decisions and also of whether he may want to make decisions which are illegal. To see this list, the respondent must press the key on the computer marked DATA.

Strategy B: Illegal

a (29)
Purchase an electric powered automobile.

- Consequences appear with random probability
  1. O.K. They cost about $3,000 and have a maximum range of 50 miles. They have a top speed of 25 mph, and carry from two to four people.

Note: Manufacturers are working on the concept of the electric automobile. Some are on the market and selling for about $8,000. Maybe this wasn't such a bad idea after all.

b (30)
Ride a horse for some travel needs.

- Consequences appear with random probability
  1. Where will you park it when you go shopping or when you work an 8-hour day?
  2. You have just been fined $25 for creating a public health hazard. Your horse was caught "relieving" himself in the middle of the business section of town.

Note: Maybe this wasn't such a bad idea after all.

c (31)
Turn off emission control.

- Consequences appear with random probability
  1. You have been stopped for routine safety check. Iowa State Patrolman checked your car and found you had just been issued a ticket for not having your emission control device working properly. The charge may appear in court to a jury. If convicted you will lose your driver's license and/or receive a $100 fine and/or 30 days in jail.
  2. It is against the law to turn off emission control. You may be subject to a fine if you are caught. Mechanics have been forbidden to do this crime.

Figure A.3. Breakdown of decisions and consequences for Strategy B, to make better use of gasoline that is made available to you.
Five thousand people in the United States have killed in motor accidents within the last five months.

1. Because so many people are doing this, policy departments have issued a notice that persons taking down license numbers of those individuals who break the law will be rewarded by receiving ration coupons worth three gallons of gasoline.

2. No one was around so you decided to take the chance, didn't you? However, you didn't see the County Patrol car sitting behind the billboard, did you? Sorry. If you are convicted, you will lose your driver's license, receive a $500 fine, and a 30-day stay in the county jail.

3. Because you already have three other convictions for traffic offenses, your driver's license has been taken away for six months.

4. Do you realize this is against the law? Shame on you!

5. You have a hard time getting a parking space at work again today.

6. You have been classified as a heavy user of parking at the same time that you have joined a van pool.

7. The Interstate has been overcrowded by the Ec Administrators. The added tax to personal vehicles will be paid by the van pools.
speed limit. This is the third time in two weeks he has been stopped by the State Patrol. It looks as if you will be late to work again today.

2. One of the members of your car pool seems to be shoving her driving days off on you. Every time it is her turn to drive it seems she claims her car is in the garage for repairs.

3. One of the members of your car pool smokes cigars. The days he drives, he feels it is his car and if he wants to smoke he does. Your asthma is bothering you because of this (more doctor bills).

4. The car pool group set down a set of guidelines to which each member of the car pool must adhere if he wants to remain a member. It should work.

5. You have been given a discount rate for monthly parking because you have joined a car pool.

7. The Internal Revenue Service has been authorized by the Economic Regulatory Administration to give an added tax break to those persons who are participating members of car and van pools.

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e (33)

Purchase oil or gasoline treatment additives to increase your gasoline mileage (e.g., STP).

Consequences appear with random probability

f (34)

Drive without air conditioning in the summer to increase your gas mileage.

Consequences appear with random probability

1. Driving without an air conditioner may save gasoline, but it is also very hot. Although, considering that you seem to be using your 90-day allocation quite rapidly, you might try it for a while.
APPENDIX B: DEPARTMENT OF ENERGY ECONOMIC REGULATORY ADMINISTRATION
CONTINGENCY GASOLINE RATIONING PLAN
SUMMARY: The Economic Regulatory Administration (ERA) of the Department of Energy (DOE) hereby gives notice of a proposed rulemaking and public hearing. Following promulgation as a final rule, this plan would be submitted to Congress for approval. Upon approval by Congress, these regulations would remain in effect until approved by Congress or on registered vehicles or in the event of a severe energy supply interruption or in order to fulfill obligations of the United States under the International Energy Program; and (2) the President transmits a request to Congress to put the rationing plan into effect; and (3) neither house of Congress disapproves such a request in accordance with the procedures specified in the Energy Policy and Conservation Act (Pub. L. 94-163) (EPCA). Accordingly, this plan would become effective only upon (1) a finding by the President that the rationing of motor gasoline to end-users is required by "a severe energy supply interruption or in order to fulfill obligations of the United States under the International Energy Program;" and (2) the President transmits a request to Congress to put the rationing plan into effect. This proposed rationing plan attempts to strike a reasonable balance between equity and administrative feasibility. However, any gasoline rationing plan necessarily will be costly and administratively complex, will cause hardships to many. users, and will inconvenience large numbers of gasoline consumers. Nonetheless, in a period of serious shortage, gasoline rationing would assure access to some gasoline by all motorists at a reasonable, controlled price, reduce or eliminate long waiting lines, stabilize the market for gasoline, and would significantly mitigate the economic dislocations caused by a severe energy supply interruption.

DATES: Comments by August 31, 1978, 4:30 p.m.; requests to speak by July 21, 1978, 4:30 p.m.


HEARING LOCATIONS: Washington hearing: Room 3000A, 12th and Pennsylvania Avenue, NW., Washington, D.C. 20461; Hartford hearing: Hartford College for Women, Science Auditorium, 1265 Asylum Avenue, Hartford, Conn. 06105; Detroit hearing: Federal Building, Courtroom 13, 231 West Lafayette, Detroit, Mich. 48226; Atlanta hearing: Atlantic Civic Center, 365 Piedmont Avenue NE., Room 201, Atlanta, Ga. 30308; Dallas hearing: Department of Energy, Training Room 303, 2626 West Mockingbird Lane, Dallas, Tex. 75235; Kansas City hearing: Federal Office Building, 601 East 12th Street, Room 140, Kansas City, Mo. 64106; Denver hearing: Main Post Office Building, Room 269, 18th and Stout Streets, Denver, Colo. 80268; Los Angeles hearing: Department of Water and Power Auditorium, 111 North Hope Street, Los Angeles, Calif. 90051; Spokane hearing: Post Office Building, 3rd Floor, Countryside, 600 West 804 Riverside, Spokane, Wash. 99210.

FEDERAL REGISTER, VOL 43, NO. 125—WEDNESDAY, JUNE 28, 1978

PROPOSED RULES

I. BACKGROUND

II. STATUTORY REQUIREMENTS OF THE EPCA AND BRIEF DESCRIPTION OF THE PROPOSED PLAN

III. THE PROPOSED GASOLINE RATIONING REGULATIONS

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B. GENERAL DEFINITIONS
C. GENERAL PROVISIONS RELATING TO THE DETERMINATION, ISSUANCE, AND DISPOSITION OF ALLOTMENTS
D. CALCULATION OF RATION ALLOTMENTS
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VI. STAKEHOLDER ACCOUNTS

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1. PROCEDURE FOR REQUEST TO MAKE ORAL PRESENTATION
2. CONDUCT OF THE HEARINGS

I. BACKGROUND

Section 203(a) (11) of the Energy Policy and Conservation Act (Pub. L. 94-163) (EPCA) requires the President to prescribe by rule a contingency plan for the end-use rationing of gasoline and diesel fuel used in motor vehicles.
Sections 201 (a) and (b) of the EPCA require the President to transmit the rationing contingency plan to the Congress for approval. Section 523(a) of the EPCA provides that, before the plan becomes effective as a contingency plan, each House of Congress must pass a resolution approving the rationing contingency plan within sixty (60) calendar days of continuous session of Congress following transmittal of the plan. The plan would then remain in standby status until the President finds that putting the plan into effect is required by a severe energy supply interruption or in order to fulfill obligations of the United States under the international energy program and transmits such finding to the Congress, together with a statement of the proposed effective date and manner for exercise of such plan. Pursuant to section 203(b) of the EPCA, the President would also be required, in order to implement the standby rationing plan, to find that such plan is necessary to the maximum extent practicable, the objectives specified in section 4(b)(1) of the Emergency Petroleum Allocation Act of 1973 (Pub. L. 93-159), as amended (EPAA). For the rationing contingency plan to become effective and be converted from standby status, the President's request to the Congress to put the plan into effect must not be disapproved by either House of Congress under the procedures prescribed in section 501 of the EPCA. Section 501 provides that gasoline rationing would take effect unless between the date of transmittal and the end of 19 calendar days of continuous session of Congress following such transmittal, either House passes a resolution stating in substance that such House does not favor such action. After these steps are completed, the rationing contingency plan would be implemented for the period specified in the plan but for not more than 9 months. On January 18, 1977, a rationing contingency plan was adopted after public comment, but its transmittal by President Ford to the Congress was not perfected. The current administration subsequently decided to redraft the numerous rationing systems that appeared feasible within the constraints of the EPCA and to propose a new rationing plan which would be subject to public comment through the rulemaking process and promulgation as a final rule for submission to the Congress.

The Department of Energy Organization Act (Pub. L. 95-91) transferred all functions previously performed by the EEA to the DOE. Delegation Order No. 0204-4 (42 FR 30225, November 29, 1977) transferred the prescription of energy conservation and rationing contingency plans to the Administrator of the ERA. By this notice, we hereby set forth our proposed gasoline rationing contingency plan and give notice that we will hold public hearings about the United States and receive written comments with respect to the plan.

Because the regulation proposed here requires affirmative Congressional approval before it becomes effective and may be in a standby status for a substantial period before it would have to be implemented, the regulation is general in its terms in order to permit flexibility to meet changing circumstances. It is contemplated that further rules, orders and guidelines would have to be issued at the time rationing is implemented in order to give the rationing plan and give notice of the maximum extent practicable, the objectives specified in section 4(b)(1) of the Emergency Petroleum Allocation Act of 1973 (Pub. L. 93-159), as amended (EPAA). For the rationing contingency plan to become effective and be converted from standby status, the President's request to the Congress to put the plan into effect must not be disapproved by either House of Congress under the procedures prescribed in section 501 of the EPCA. Section 501 provides that gasoline rationing would take effect unless between the date of transmittal and the end of 19 calendar days of continuous session of Congress following such transmittal, either House passes a resolution stating in substance that such House does not favor such action. After these steps are completed, the rationing contingency plan would be implemented for the period specified in the plan but for not more than 9 months. On January 18, 1977, a rationing contingency plan was adopted after public comment, but its transmittal by President Ford to the Congress was not perfected. The current administration subsequently decided to redraft the numerous rationing systems that appeared feasible within the constraints of the EPCA and to propose a new rationing plan which would be subject to public comment through the rulemaking process and promulgation as a final rule for submission to the Congress.
entitlement only if they possessed sufficient and predefined ration rights. A base period purchaser would be assured of receiving gasoline from its base period suppliers in an amount equal to its predefined ration rights, but no greater than its allocation entitlement. If a base period customer has more predefined ration rights than its allocation entitlement, it would be eligible to bid for surplus gasoline from (1) its supplier, and (2) from other suppliers which have excess gasoline because their customers had insufficient predefined ration rights to purchase their full allocation entitlement.

Under the proposed plan, ration coupons that become redeemable would be freely transferrable on a "white market." The ERA would not regulate the purchases and sales of ration coupons, including the prices at which they are transferred.

The ERA would issue supplemental allotments of ration rights to certain "priority classes," such as law enforcement, fire fighting, emergency medical services, mass public transportation, and sanitation services.

The ERA would also issue supplemental allotments to "designated firms" on the basis of a percentage of historical usage. The percentage would be determined at the time of rationing and would depend upon the total supply of gasoline available. Users of vehicles which are determined by the ERA to qualify as "off-highway" vehicles would receive supplemental allotments as "designated firms" if such vehicles account for a substantial portion of that user's total gasoline consumption. The ERA believes such a provision would enable farmers and construction equipment operators (which consume significant portions of gasoline) to receive supplemental allotments.

Allotments to businesses that own registered vehicles would be on the same basis as allotments for individuals, but the ERA would have authority to designate classes of owners of commercial vehicles or any individual commercial vehicle owner as a "designated firm" to receive supplemental allotments. While it is not contemplated that this provision would be used at the initiation of rationing, this provision would allow the ERA to convert businesses to a percentage of base period use if it appeared to be required after a time to reduce economic dislocations.

III. THE PROPOSED GASOLINE RATIONING REGULATIONS

A. GENERAL PROVISIONS

The proposed rationing regulations provide that gasoline rationing would be effective on a date to be specified and published by the ERA, subject to the provisions of section 201 (b) and (c) of the EPCA (see discussion in Part I above). It is our intention that gasoline rationing, if imposed, would be effective in all fifty States and the District of Columbia. We have made no determination at this time whether it would also be necessary to impose gasoline rationing in Puerto Rico and the territories and possessions of the United States. Accordingly, the proposed regulations provide that gasoline rationing would be effective in all or such parts of the United States as specified by the ERA. Under this provision, the Administrator could exempt some or all of the territories and possessions of the United States from gasoline rationing.

The proposed regulations provide that 10 CFR Part 205 (Administrative Procedures and Sanctions) and the EPCA-based petroleum price regulations found in 10 CFR Part 212 would be applicable to gasoline rationing. Thus, all requests for interpretations, rulings, applications for exception relief (other than those applications for hardship relief filed with the States), or modification of a classification shall be governed by the administrative procedures contained in Part 205.

Any person who violates any provision of these proposed regulations or any further regulations or orders issued under them would be subject to the penalties set forth in section 5 of the EPCA and Subpart P of 10 CFR Part 205. The proposed regulations would also impose a duty upon all firms having custody, care or control of ration coupons or Government ration checks. All necessary precautions against the use of counterfeit and altered ration coupons or Government ration checks, as well as a duty to safeguard ration coupons and Government ration checks from embezzlement, loss, theft, damage or unauthorized destruction.

Section 500.4 of the proposed regulations would permit the ERA to require such reports as it deems necessary to administer the Contingency Gasoline Rationing Program.

Section 500.5 would permit the ERA to impose a uniform fine on each gallon sold during the period for which rationing is in effect. As noted above, under EPCA such a fine could be imposed only to the extent necessary to defray administrative and initial distribution costs.

B. GENERAL DEFINITIONS

In the period immediately preceding the effective date of rationing, it is anticipated that the ERA would implement standby regulations or continue (if then in force) both allocation and price controls on crude oil and petroleum products. The base year for gasoline rationing would be consistent with the base period definition contained in the standby product allocation regulations currently being developed so that suppliers and their customers would not have to change to a different base year once rationing became effective. However, if the standby allocation regulations were not imposed prior to rationing, the base year would be the 12 calendar months ending with the third month (or some other month designated by the ERA) prior to the month in which the President transmits to the Congress a request to impose gasoline rationing. The "base period" is defined as the period in the base year corresponding to the current calendar month, or current ration period, as appropriate. Thus, the base period would be updated from the current allocation regulations, which define the base period as the month in 1972 corresponding to the current month.

"Ration coupon" is defined as a coupon issued by the ERA entitling the bearer to purchase a specified volume of gasoline. "Ration check" is defined as a negotiable document other than a ration coupon evidencing the right to purchase specified volumes of gasoline. "Ration rights" means either ration coupons or ration checks. In most instances, ration rights would be distributed to a "registrant," which is defined as the party named in the most recent vehicle registration record maintained by a State Department of Motor Vehicle office (or, in the case of Federal vehicles, maintained with the appropriate Federal agency), which vehicle has been determined by the ERA as eligible for an allotment. A category of "eligible individual" has been established, so that the ERA may in special circumstances issue ration rights to persons who are not registrants. An example of such a group would be those Indians living on Federal reservations where the operation of vehicles is permitted without state vehicle registrations. Other recipients of ration rights are designated firms and priority class firms, which are described above. Thus, "ration recipients" are defined as registrants, eligible individuals, designated firms, and priority class firms. The ERA or its designees distribute ration rights in the form of Government ration checks to ration recipients.
The definition of "retail sales outlet" has been narrowed from the definition contained in §211.51 of the allocation regulations so as to make it clear that the entity to which that term applies is clearly understood to be the typical service station where sales of gasoline are made to owners of passenger cars and trucks. The term does not refer to a jobber or refiner making rack sales to commercial accounts. To qualify as a retail sales outlet, the major activity of a supplier would be to supply 130 gallons or less of gasoline into a vehicle’s fuel tanks. The volume of 130 gallons was chosen because it is the ERA’s understanding that in most instances 130 gallons is the maximum fuel tank size of any vehicle for which gasoline would be purchased at a service station.

The definition of “sanitation services” would by indelible to its current form in §211.51, with the exception that the reference to “during emergency conditions” would be deleted with respect to the maintenance, operation, and repair of liquid purification and waste facilities.

Several other definitions will be discussed below in the separate sections where these terms are applied. The remaining definitions are similar or identical to those definitions as currently set forth in §211.51 or §211.102 of the allocation regulations.

C. GENERAL PROVISIONS RELATING TO THE DETERMINATION, ISSUANCE, AND DISPOSITION OF ALLOTMENTS

The ERA would issue ration rights equal to the estimated total available supply for a given period. Ration rights would be issued as follows:

1. A percentage would be reserved for the National Ration Reserve.
2. A percentage would be reserved for the States.
3. The ERA would issue ration rights to designated firms and priority classes.
4. The ERA would issue ration rights to all registrants and eligible individuals.

It is our current intention that ration rights would be issued in the form of Government ration checks mailed to ration recipients on a quarterly basis, with the appropriate allotment amount printed on each check. Additionally, the ERA would have discretion to deposit ration rights directly into ration rights accounts.

In addition, we are currently evaluating a variation of the allotment distribution mechanism which would avoid the need for the mailing of Government ration checks by providing coupon issuance points with computer-prepared lists of eligible registrants. Coupons would be issued to registrants upon presentation of satisfactory identification at designated issuance points. Although this alternative mechanism is not specifically referred to in other parts of this plan, the definition of Government ration check in the proposed regulations would permit the adoption of a computerized direct transfer system for the issuance of ration rights in lieu of tangible checks.

Disposition of Government Ration Checks. In addition to exchanging Government ration checks for ration coupons at designated issuance points, a Government ration check could be transferred by endorsement to any individual or firm, or deposited in a ration rights account, or endorsed to a supplier in exchange for gasoline.

Under proposed §500.14, ration coupons would be redeemable for the face value of gasoline shown. It is anticipated that ration coupons will be issued in 5-gallon amounts, with the possibility that 1-gallon ration coupons or other denominations may be issued. Ration coupons which were printed in early 1974 with the designation “one unit” may also be utilized. If we determine to utilize these coupons, we would announce, by advance notice published in the Federal Register, the gallon amount for which each such coupon would be redeemable.

Ration checks would have a series designation and the ERA would publish an advance notice of the effective date for each coupon series designation. A coupon would not be valid until such date, but once a coupon had become valid, it would remain valid for the duration of gasoline rationing. However it may become necessary periodically to require old coupons to be redeemed for newer ones to avoid having too many series valid at one time.

D. CALCULATION OF RATION ALLOTMENTS

Based on reports submitted by refiners and importers, and upon other information available to the ERA, the ERA would estimate the total available supply of gasoline (TAS) for a predetermined computation period. It is presently anticipated that the ERA would issue ration rights and estimate the total available supply on the basis of a 90 day computation period. A net available supply (NAS) would be determined by subtracting the amount of ration rights to be allotted to the State Ration reserves (SRR) and the National Ration Reserve (NRR):

\[ \text{TAS} = \text{SRR} + \text{SRR} = \text{NAS} \]

From this figure, the total supplemental allotments (SA) to designated States and priority classes would be subtracted to yield a basic allotment supply (BAS):

\[ \text{NAS} - \text{SA} = \text{BAS} \]

ALLOCATIONS TO VEHICLES

Under the proposed rationing plan, the basic eligibility for ration allotments would be determined by vehicle registration records maintained in the Individual States’ departments of motor vehicles (DMV’s). Any individual or firm named on a registration record (the registrant) would be eligible for an allotment of ration rights if the corresponding registered vehicle is gasoline-powered, and was either already registered on a specified date prior to the effective date of the rationing program or is a new car purchased during the rationing program. The purpose of a registration cut-off date prior to the effective date of rationing would be to prevent the registration of fictitious, junked or inoperable vehicles for the sole purpose of obtaining ration rights. The actual cut-off date for vehicle registrations would be determined by the ERA when rationing is implemented. Vehicles for which there are multiple registrations would receive only a single allotment, based on the most recent registration date. In addition, we would intend to cross-check individual State registration lists to eliminate duplicate registrations among the States.

The proposed regulations would give ERA authority to establish different allotments for different types of vehicles. The Narrative describes our present intention as to how that would be done. Based on an analysis of fuel consumption and average annual miles traveled by vehicles in various categories, we would establish allotment indices to compute the size of the allotment for each type of vehicle. These indices would be based on the average annual fuel consumption of each vehicle category. The indices are keyed to the single passenger automobile allocation, which is assigned an index value of 1.0. The following example illustrates how the proposed allotment indices were computed. To begin with, passenger cars were found to travel an average of 10,100 miles per year with an average fuel efficiency of 13.5 miles per gallon, yielding an average annual gasoline consumption of 748 gallons. The amount was assigned a reference index of 1.0. All other vehicles classes are compared to this passenger automobile reference index. For example, trucks between 26,000 pounds and 33,000 pounds (gross vehicle weight) were found to travel an average of 16,600 miles per year with an average fuel efficiency of 5.3 miles per gallon, yielding an average annual gasoline consumption of 3,132 gallons. Dividing this figure by the passenger car gallons-per-year figure of 748, the allotment index for these trucks would be 4.2. Allotment indices for other vehicles were similarly determined, all keyed to the reference index of 1.0 for passenger cars.

It should be noted that all vehicles within a given category (e.g., all pas-
The sum of the CVP's for all vehicle classifications equals the total vehicle points (TVP).

\[ \text{CVP} + \text{CVP} + \ldots = \text{TVP} \]

A basic allotment (BA) would be computed, by dividing the basic allotment supply (BAS, as discussed at the beginning of this section) by the total vehicle points (TVP).

\[ \text{BA} = \frac{\text{BAS}}{\text{TVP}} \]

For example, assume the total vehicle points in the United States equals 150 million and the basic allotment supply for a 90 day computation period totals 18 billion gallons, then the basic allotment is determined as follows:

\[ \frac{18,000,000,000}{150,000,000} = 120 \text{ gallons (BA)} \]

Because ration rights will be distributed to registrants prior to the beginning of a ration period, and because the actual supply will not be known in advance, the total amount of ration rights to be distributed will be based on a projection of gasoline supplies for the ration period. Based on this computation, the ERA will also compute the value of ration rights to be distributed per vehicle point (DBA).

It is possible that the actual gasoline supply will either exceed or fall short of the projected supply by a wide margin. In such a case, to reconcile the actual supply of gasoline with the number of ration rights already distributed, it will be necessary to vary the length of the ration period. If the actual gasoline supply significantly exceeds the projected supply, it will be necessary to lengthen the ration period so that the given number of distributed coupons are “stretched” over a longer period and thereby reduce the actual supply. Conversely, if the actual supply of gasoline substantially exceeds the amount of distributed ration rights, the ration period would be shortened.

A change in the length of the ration period could be accomplished by delaying or moving up the validity date of the ration coupons issued for the following ration period.

To illustrate, assume that on the basis of the projected available supply, the ERA had distributed 110 gallons (DBA) to registrants of private automobiles for a given ration period as follows:

\[ 110 \text{ gallons (DBA)} \times 2.4 \times 90 = 264 \text{ gallons} \]

If the actual supply of gasoline had been 265 gallons, the ration period could be lengthened to 83 days. If the actual supply was 263 gallons, the ration period would be shortened to 77 days.

Because the ration allotments will be issued to the registrants of registered vehicles, vehicle rental or leasing companies would receive ration allotments for their registered vehicles. In order to avoid conferring a windfall on vehicle leasing companies, proposed §500.15 would permit the ERA to require that the lessee of a registered vehicle receiving ration allotments transfer such ration allotments to the lessee of such vehicle.

E. Designated Firms

1. “Off-highway Vehicles.” We propose to treat that class of firms that consumes a significant percentage of their total gasoline consumption in off-highway vehicles (those not registered with a State DMV, or registered with a State DMV for off-highway usage) as a category of “designated firm” in §500.31(a). The ERA...
would determine and publish in subse-
quent regulations the classes and
type of vehicles and equipment which
qualify as "off-highway." In most
States tractors and other vehicles used
conventionally for public passenger
transportation would be required to be registered with State DMV's. In States
where such vehicles are registered, we
would either exclude such vehicles from
the standard per vehicle allot-
ments (discussed in section D.1, above)
or would subtract the per vehicle allot-
ments for such vehicles from the sup-
plemental allotments that firms would
receive for off-highway vehicles. It is
our intention that this provision for
off-highway vehicles would provide for
the maintenance of agricultural oper-
ations, as required by section 4(b)(I)(C)
of the EPAA. This would be
accomplished by giving each designate
cd firm a certain percentage of its base
period usage, which percentage would
depend on the severity of the gasoline
shortage and the category and type of
the designated firm involved. With re-
spect to agricultural production, we
would consult with the Secretary of
Agriculture in establishing an appro-
riate level of supplemental allot-
ments to meet the gasoline require-
ments of farmers engaged in food pro-
duction.

The procedures by which designated
firms would identify themselves and
their base period volumes would be
specified by regulations issued prior to
or at the time rationing is implement-
ed. It is our expectation that the two
largest categories of designated firms
would be farming operations and con-
struction firms. Others might include
such firms as those engaged in logging
operations or the operation of gaso-
loline powered fishing boats. In the
early stages of this plan, we initially
considered a formula that in most
such instances, a

designed firm. It is presently an-
ticipated that supplemental allot-
ments would be based on a specified percentage of a designated firm's base
period gasoline consumption (minus
the per vehicle allotments already re-
ceived by the firm), as would be the case for operators of off-highway vehi-
cles. We initially considered a formula for shifting most firms from per vehi-
cle allotments to a percentage of base
period usage by the third quarter of
rationing. We rejected this alternative
in favor of the current proposal, which
is less complex but still permits the
flexibility to issue ration allotments to
firms on the basis of historical con-
sumption if such a course proves nec-
essary to prevent severe economic dis-
location to a particular firm or class of
firms.

We are interested in receiving specific
comments as to the proposed treat-
ment of emergency services under this plan. We are particularly interested in re-
ceiving comments as to (1) whether firms should receive allotments on the
basis of historical (base period) usage
rather than on the basis of vehicle owner-
ship; (2) whether specific criteria for eligibility as a designated firm
should be set forth in the regulations,
and (3) whether specific formulae
should be established in this regula-
tion, rather than when rationing is im-
plemented, for the determination of
supplemental allotments.

F. PRIORITY CLASS FIRMS

Section 500.32 provides that emer-
gency services, sanitation services and
car passenger transportation ser-
vrices would receive supplemental allot-
ments as "priority class" firms. Emer-
gency services are defined as law en-
forcement, fire fighting, snow removal,
and emergency medical services.

Public passenger transportation has
been broadly defined as facilities and
services for surface public transporta-
tion whether publicly or privately
owned, including water, rail, bus and
van transportation, but excluding taxi-
cabs; and bus and van transportation of
pupils to and from school. The ERA
believes that it would be inappropriate
to treat taxicab companies as priority
class firms, in that taxicabs cannot
achieve gasoline savings through
shared riding, reduced cruising, increased use of taxi stands, and greater
use of radio call equipment. In addi-
tion, the ERA believes that the desig-
nation of firms as priority class firms
should be strictly limited to essential
public services.

It should be noted, however, that at the
time rationing is implemented, we could ex-
ine the authority under proposed

The proposed regulation provides
that the ERA may, by publishing
advance notice, designate other per-
sons or firms as priority classes. This
provision would permit us to include
other essential public services as priority
class firms if such additions prove
necessary.

Priority class firms would receive a
percentage of their base period gaso-
line consumption, such percentage to
be determined by the ERA at the time
rationing is implemented. It is our in-
tention that priority class firms would
receive a percentage of base period
usage generally greater than that re-
ceived by designated firms, but in most
cases would likely receive less than 100
percent of their base period usage.

Proposed section 500.33 would estab-
lush the right of precedence of delivery
for priority class firms, in accordance
with section 203(a)(1) of the EPCA,
which requires "the assignment of
rights, and evidence of such rights, to
certify the priority of such use..." en-
der such vehicles to obtain gasoline
in precedence to other classes of end-
users not similarly entitled.

G. PURCHASE OF GASOLINE: "WHITE
MARKET" SALES

The proposal provides that each con-
cumer must present valid ration rights
to the retailer according to the quanti-
ty of gasoline purchased. Thus, no
purchaser may obtain gasoline with-
out first giving its supplier (including
retail sales outlet) the appropriate
number of ration rights. Suppliers
(i.e., wholesale purchaser-resellers)
would be required at the time of deliv-
ery to give their suppliers a redemp-
tion check or redeemed ration rights
equal to the amount of gasoline trans-
ferred.

Proposed § 500.41(c) specifies that
rational coupons of a given series desig-
nation cannot be used for the pur-
chase of gasoline prior to their effec-
tive date.

Proposed § 500.41(d) provides that
unredeemed ration rights are freely
transferrable. This provision for a
ration rights exchange market ("white
market") should promote a more effi-
cient use of all available gasoline.

Section 500.41 (e) and (f) are in-
tended to protect the rights of pur-
cishers and sellers of gasoline. Section
500.41(e) would prohibit any supplier
from requiring any purchaser to pur-
chase ration rights from any firm in-
cluding itself as a condition of trans-
ferring gasoline. Section 500.41(f)
would prohibit any seller of gasoline
from refusing to accept valid ration
coupons at the time of sale. A supplier

§ 500.31(b) (discussed in section E.2, above)
to designate taxicabs as a class of "designat-
ed firms," and thus give them a specified
percentage of their base period gasoline
usage.
may accept a Government ration check for the purchase of gasoline, but would not be obligated to do so. Similarly, a supplier may also accept a ration check drawn on a ration rights account (see section J below on Ration Banking), but, as in ordinary commercial transactions, the supplier/payee would incur the risk that such a check was invalid, and his only recourse would be against the purchaser/payor.

The proposed regulation provides that suppliers (including retail sales outlets) which receive ration coupons in exchange for the sale of gasoline would be required to "redeem" (i.e., cancel) such coupons by indelibly marking them with the supplier's name, its redemption account number, in ink, and the legend "redeemed." Similarly, a supplier would be required to redeem all ration checks that it had received in order to be resupplied, a supplier would be required at the time of delivery to give its supplier a redemption check or redeemed ration rights equal to the amount of gasoline delivered. In this manner redeemed ration rights would "move up" the gasoline supply distribution chain in an amount equal to the volume of gasoline the chain. Under §500.44, refiners and importers, defined as principal suppliers, would be required to periodically submit a report to the ERA certifying the volume of gasoline sold during the reporting period and would be required to submit a redemption check or redeemed ration rights equal to the amount of gasoline delivered. In this manner, the distribution system would be "cleared," and the ERA would be able to ensure that gasoline was not sold without the transfer of ration rights.

H. INITIAL REDEMPTION ACCOUNT ADVANCE

At the beginning of rationing, suppliers that have largely depleted their inventories will not have the opportunity to accumulate sufficient redeemed ration rights from the sale of gasoline to obtain an adequate resupply of gasoline. Accordingly, it will be necessary, at the commencement of rationing, to provide an initial redemption account advance to suppliers which would permit them to obtain deliveries until they have accumulated sufficient redeemed ration rights. Proposed §500.45 provides that each supplier (including retail sales outlets) account for inventory drawn down at the end of the rationing program by submitting to the ERA a redemption check or redeemed ration rights equal on a gallon basis to the volume of gasoline sold during the reporting period. In this manner, the distribution system would be "cleared," and the ERA would be able to ensure that gasoline was not sold without the transfer of ration rights.

1. RELATIONSHIP OF ALLOCATION TO RATIONING

In developing the rationing plan and these proposed regulations, we have assumed that any supply interruption severe enough to occasion implementation of the rationing plan would cause us to continue or to reimpose allocation and/or price controls at the time of or during the period prior to the effective date of rationing. Once rationing is implemented the allocation program would be modified as set forth in these regulations so that the distribution of gasoline to wholesale purchasers-resellers (including retail sales outlets) would conform to the distribution of ration rights to consumers. The retention of supplier/purchaser relationships would assure wholesale purchasers of their historical share (on a pro-rata basis) of the available supplies if they possess sufficient redeemed ration rights. The proposed gasoline rationing regulations provide that supplier/purchaser relationships would be resumed or continued, as the case may be, that each supplier of gasoline would be required to supply all wholesale purchasers of their historically established relationships with and wholesale purchasers and bulk purchasers which purchased or obtained gasoline from that supplier during the base period shall be provided, and that the standby product allocation regulations currently being developed would probably be implemented during the period immediately preceding rationing and because the standby product allocation regulations may in some instances provide for different supplier/purchaser relationships than provided in these proposed regulations, proposed §500.52 establishes supplier/purchaser relationships on the basis of base period sales, unless otherwise directed by the ERA. This would permit us to retain the supplier/purchaser relationships that had been imposed under the standby product allocation regulations. Similarly, the proposed base year for gasoline rationing incorporates the term base period year as defined in the standby product regulations. Under these regulations, controls immediately preceding rationing, suppliers would not have to recompute their allocation fraction on the basis of base period sales, but would have supplier/purchaser relationships be altered as a result of the shift from the standby product regulations to the rationing regulations. If standby allocation controls were not imposed, the base year would be defined as the 12 calendar months ending with the third full month (September) designated by the President to the month in which the President transmits to the Congress a request to impose gasoline rationing.

Suppliers would calculate an allocation fraction in the same manner that they would under the standby product allocation regulations; that is, each month suppliers would provide each of their customers with its pro-rata share of the supplier's gasoline supplies. Suppliers would have an obligation to make supplies available only to those wholesale purchasers and bulk purchasers which they supplied in the base period. However, as a condition to receiving all or any portion of its allocation, a wholesale purchaser-reseller would be required to account for supplies it receives by giving its supplier redeemed ration rights equal to the amount of gasoline received, or by issuing a redemption check at the time of delivery drawn on its redemption account. The redemption check would be drawn to the order of the wholesale purchaser-reseller's supplier for redeemed ration rights equal to the amount of gasoline received from the supplier. Wholesale purchaser-con-
consumers and bulk purchasers would be required to transfer at the time of delivery ration rights equal on a gallon basis to the volume of gasoline purchased or obtained. In this regard it is important to note that ration rights (ration coupons or ration checks) are not identical to redemption checks; redemption checks are checks drawn against deposits of redeemed ration rights. Wholesale purchaser-consumers and bulk purchasers would not have redemption accounts because they consume rather than resell gasoline.

**DISTRIBUTION OF "SURPLUS" GASOLINE**

Under the allocation system described above, many retail sales outlets will be unable to purchase their full allocation entitlement due in part to sharply changed driving patterns that would in all likelihood occur as a result of a gasoline shortage (whether or not gasoline rationing was imposed). Similarly, the ration allotments received by consumer-coupons and bulk purchasers may not be sufficient to permit them to purchase their full allocation entitlement. If they have not purchased additional ration rights on the "white market," they would have to suffer a cut-back in their deliveries.

On the other hand, by drawing down inventories, many retail sales outlets would possess redeemed ration rights in excess of their allocation entitlement.

With respect to those base period customers with ration rights or redeemed ration rights greater than their allocation entitlement, the proposed allocation regulations would permit them to receive supplies initially only to the extent of their allocation entitlement. However, the allocation regulations would also require that a supplier treat the volumes of gasoline which are "under-lifted" by its consumer-coupons and bulk purchasers as a surplus. In other words, if a supplier has base period customers who have not purchased their full allocation entitlement or who have notified their supplier of their intent not to purchase their full allocation entitlement, such "under-lifted" volumes must be sold according to § 500.53(c)(c), which provides for the distribution of surplus gasoline. Suppliers with allocation fractions greater than 1 must allocate on a basis of an allocation fraction of 1, and treat any additional volumes as surplus gasoline.

Under proposed § 500.53(c), a supplier or must first offer any surplus gasoline on a pro-rata basis to its base period customers who have not yet received their full allocation entitlement from that supplier. The amount offered to each base period customer (on a pro-rata basis) would be the difference between the allocation entitlement of that base period customer and the amount actually sold to that customer for that month. However, as is the case for all purchases of gasoline, base period customers must pay their supplier at the time of delivery the appropriate amount of ration rights (if the base period purchaser is a bulk purchaser or a wholesale purchaser-consumer) or a redemption check or redeemed ration rights (if the base period purchaser is a wholesale purchaser-reseller) equal to the volume of gasoline so transferred. If a supplier still has surplus gasoline, it must next offer it to each of its base period customers on a pro-rata basis, provided they pay the supplier in ration rights or redeemed ration rights, as appropriate. If a supplier still has surplus gasoline after offering it to all its base period customers, it could sell surplus supplies to consumer-coupons or redeemed ration rights, as appropriate.

Principal suppliers and prime suppliers (as defined in § 211.51 of the current allocation regulations) will be required to submit reports on their disposition of surplus gasoline. The ERA will retain the authority contained in Part 211 to redirect surplus products.

**PROVISION FOR UNLEADED GASOLINE**

It is our tentative conclusion that these provisions for the disposition of surplus gasoline would provide sufficient flexibility so that jobbers or other distributors could redirect gasoline to follow the flow of ration coupons, while at the same time independent marketers would be protected from discrimination that might otherwise occur during a period of shortage. In particular, it is our opinion that during a period of gasoline rationing it is necessary to maintain the allocation program so that independent distributors, large marketers from increasing their market share through discriminatory practices. However, we are interested in specific comments as to whether the ERA should maintain the allocation regulations as modified herein, or whether we should eliminate the allocation program and allow wholesale purchasers and bulk purchasers to find any source of resupply, with volumes determined solely by the number of ration rights or redeemed ration rights held by each purchaser. It should be noted in this regard that proposed § 500.1 provides that the rationing regulations would become effective generally or in part, so that the Administrator would retain the discretion not to impose an allocation scheme. If we retain the allocation program, we are interested in specific comments as to whether the ERA should establish time periods by which base period customers must declare the volumes of gasoline they wish to fill for a given month, as well as time periods within which suppliers must offer and base period customers must respond to offers to purchase surplus gasoline, so that the distribution of surplus gasoline can be accomplished as quickly and as efficiently as possible.

**STATE SET-ASIDE**

Because the purposes of the State "set-aside" and the State Ration Reserve in the regulation proposed here would essentially be redundant, we have tentatively concluded that it would be unnecessary to maintain both systems within each State for the relief of hardship. Accordingly, proposed § 500.54 should promote the equitable distribution of the available unleaded gasoline supply. Such a requirement would serve to exchange ration coupons or redeemed ration rights. In other words, if a supplier has base period customers who have not purchased their full allocation entitlement, such "under-lifted" volumes must be sold according to § 500.53(c), which provides for the distribution of surplus gasoline. Suppliers with allocation fractions greater than 1 must allocate on a basis of an allocation fraction of 1, and treat any additional volumes as surplus gasoline.

Under proposed § 500.53(c), a supplier or must first offer any surplus gasoline on a pro-rata basis to its base period customers who have not yet received their full allocation entitlement from that supplier. The amount offered to each base period customer (on a pro-rata basis) would be the difference between the allocation entitlement of that base period customer and the amount actually sold to that customer for that month. However, as is the case for all purchases of gasoline, base period customers must pay their supplier at the time of delivery the appropriate amount of ration rights (if the base period purchaser is a bulk purchaser or a wholesale purchaser-consumer) or a redemption check or redeemed ration rights (if the base period purchaser is a wholesale purchaser-reseller) equal to the volume of gasoline so transferred. If a supplier still has surplus gasoline, it must next offer it to each of its base period customers on a pro-rata basis, provided they pay the supplier in ration rights or redeemed ration rights, as appropriate. If a supplier still has surplus gasoline after offering it to all its base period customers, it could sell surplus supplies to consumer-coupons or redeemed ration rights, as appropriate.

Principal suppliers and prime suppliers (as defined in § 211.51 of the current allocation regulations) will be required to submit reports on their disposition of surplus gasoline. The ERA will retain the authority contained in Part 211 to redirect surplus products.

**SPECIFIC COMMENTS REQUESTED ON PROPOSED RELATIONSHIP BETWEEN RATIONING AND ALLOCATION PROGRAMS**

It is our tentative conclusion that these provisions for the disposition of surplus gasoline would provide sufficient flexibility so that jobbers or other distributors could redirect gasoline to follow the flow of ration coupons, while at the same time independent marketers would be protected from discrimination that might otherwise occur during a period of shortage. In particular, it is our opinion that during a period of gasoline rationing it is necessary to maintain the allocation program so that independent distributors, large marketers from increasing their market share through discriminatory practices. However, we are interested in specific comments as to whether the ERA should maintain the allocation regulations as modified herein, or whether we should eliminate the allocation program and allow wholesale purchasers and bulk purchasers to find any source of resupply, with volumes determined solely by the number of ration rights or redeemed ration rights held by each purchaser. It should be noted in this regard that proposed § 500.1 provides that the rationing regulations would become effective generally or in part, so that the Administrator would retain the discretion not to impose an allocation scheme. If we retain the allocation program, we are interested in specific comments as to whether the ERA should establish time periods by which base period customers must declare the volumes of gasoline they wish to fill for a given month, as well as time periods within which suppliers must offer and base period customers must respond to offers to purchase surplus gasoline, so that the distribution of surplus gasoline can be accomplished as quickly and as efficiently as possible.

**PROvision FOR UNLEADED GASOLINE**

In order to ensure that retailers have access to available supplies of both leaded and unleaded gasoline, proposed § 500.54 requires each supplier to make available to each of its base period purchasers a volume of unleaded gasoline that bears the same ratio to that purchaser's allocation entitlement as the ratio of that supplier's supply of unleaded gasoline to its total supply of gasoline (leaded and unleaded). Proposed § 500.54 should be a simplified version of the current provision for the allocation of unleaded gasoline, contained in § 211.108 of the allocation regulations. Proposed § 500.54 should promote the equitable distribution of the available unleaded gasoline supply for each purchaser and will automatically adjust itself to the expected increase in the supply of unleaded gasoline compared to leaded gasoline.

**STATE SET-ASIDE**

Because the purposes of the State "set-aside" and the State Ration Reserve in the regulation proposed here would essentially be redundant, we have tentatively concluded that it would be unnecessary to maintain both systems within each State for the relief of hardship. Accordingly, proposed § 500.54 provides that the State set-aside system would not be in effect for the duration of the rationing program.

**J. RATION BANKING**

1. Participating Banks and Coupon Issuance Points. It is our intention that the ERA would contract with a variety of financial institutions and firms to act as coupon issuance points (CIP's) or participating banks. CIP's would serve to exchange ration coupons for Government ration checks. Participating banks (which may or may not also be CIP's) would accept applications for and establish ration rights accounts and redemption accounts. Holders of Government ration checks could exchange such checks for ration coupons at CIP's. Presently, we anticipate that ration recipients would receive quarterly Government ration checks through the mail. The ration coupons received for each Government ration check would bear a separate series designation that would become effective until the first day of the ration period or periods applicable
to that Government ration check. Subject to terms and conditions to be established by the ERA, CIP's would be required to accept Government ration checks presented by the payee in exchange for ration coupons.

Since it would be our intention to establish CIP's and participating banks at locations throughout the country convenient to all ration rights recipients and suppliers, we are interested in receiving specific comments on how ERA might go about ensuring that sufficient numbers of banks and other institutions participate in the rationing program. In particular, we request comments on whether the proposed regulation should provide ERA with express authority to require appropriate firms to act as CIP's or participating banks, subject to certain specified terms and conditions to protect them from incurring undue burden.

2. Ration rights accounts. The proposed rationing regulations provide that any firm or individual may open a ration rights account at a participating bank. However, the ERA may establish a minimum initial deposit requirement, as well as other terms and conditions (including fees to defray the costs of administering the accounts) governing the operation and maintenance of ration rights accounts as are deemed to be necessary. It is our current intention that the minimum initial deposit required for the opening of ration rights accounts would be set sufficiently high to limit their use to those entities which would otherwise be required to handle large numbers of ration coupons. The ERA would also issue forms and instructions for the opening of such accounts.

Ration rights accounts are intended to operate in much the same manner as monetary checking accounts. Holders of ration accounts may deposit ration coupons and ration checks in their account and write ration checks drawn against their accounts. Provision would be made to an individual or firm shall issue a ration check drawn upon a ration rights account in which there are insufficient ration rights to cover that ration check and other outstanding ration checks drawn on that account. It is intended that normal commercial practices would govern in determining which party bears the burden of loss with respect to overdrawn ration checks. However, we are particularly interested in receiving comments as to alternative methods of preventing overdrafts of ration rights accounts.

3. Redemption accounts. Any supplier, including a retail sales outlet, may open a redemption account at a participating bank. Redemption accounts would be used by suppliers for the deposit of ration rights they have received and redeposited for gasoline sales and for the deposit of redemption checks they have received for gasoline sales, if any, to other suppliers. Suppliers would also deposit initial redemption account advances (as discussed in section II. above) in their redemption accounts.

Participating banks would service redemption accounts in the same manner as ration rights accounts. The ERA would establish forms and instructions for the opening of such accounts. Redemption account holders would be prohibited under § 500.63(c) from writing a redemption check upon which there are insufficient deposits to cover that redemption check and other outstanding redemption checks drawn on that account. Because redemption checks represent deposits of redemption accounts, the proposed § 500.63(d) provides that redemption checks shall not be valid for deposit in a ration rights account. Since redemption accounts and redemption checks are intended for use solely by suppliers of gasoline as a further safeguard against loss, redemption checks shall not be valid for the purchase of gasoline by wholesale purchaser-consumers, bulk purchasers and other ultimate consumers.

H. THE NATIONAL RATION RESERVE

The National Ration Reserve would be established as a special allotment which may be used by the ERA to meet national disaster relief needs, or for any other purpose which the ERA may deem necessary. It is currently anticipated that the National Ration Reserve would also be used to provide the Defense Department with whatever allotments are required for activities directly related to the maintenance of national security. For those activities deemed nonessential to the maintenance of national security, the Department of Defense would receive ration rights on the same basis as provided to registrants of other vehicles.

The National Ration Reserve would be computed as a percentage of the total available supply, such percentage to be determined by the ERA for each ration period.

L. STATE RATION RESERVES

For each ration period, we would determine a percentage of the total available supply to be administered by the States as a State Ration Reserve, in proportion to each State's gasoline sales during the base period and according to other relevant criteria. Upon approval of an application by a State to establish a State Ration Reserve, the Reserve would be administered by the State Rationing Office. This office could, at the State's option, be the same as the State Energy Office. The State Rationing Offices may redelegace the authority given to them.

We currently anticipate that the size of the State Ration Reserves would be approximately 3 percent of the total gasoline supply. However, we are interested in receiving specific comments as to the appropriate size of the State Ration Reserves, and whether the regulations should specify the percentage of the total available supply allotted to the State Ration Reserves. We are also interested in receiving comments as to whether the State Ration Reserves should be set at a substantially higher level than 3 percent, so that the States would thus acquire a substantial additional administrative responsibility in the rationing program.

The States would be required to use the State Ration Reserves for meeting the needs of all ration users, and for the deposit of redemption accounts and redemption checks represent deposits of redemption accounts, the proposed § 500.63(d) provides that redemption checks shall not be valid for deposit in a ration rights account. Since redemption accounts and redemption checks are intended for use solely by suppliers of gasoline as a further safeguard against loss, redemption checks shall not be valid for the purchase of gasoline by wholesale purchaser-consumers, bulk purchasers and other ultimate consumers.

The public will have an opportunity to comment on such proposals prior to final adoption and implementation.
posed rule after it is issued, we nevertheless recognize that this time-specific suggestion, as to the criteria the ERA should establish for delegating to the States the administration of the State Rationing Programs. In this regard, the Federal Energy Administration has provided an opportunity to the States to submit their comments to us in formulating a future proposal for public comment following any Congressional approval of the rationing contingency plan.

IV. SPECIFIC COMMENTS REQUESTED

We encourage comments from interested parties on all aspects of the rationing plan as to whether this feature should be considered in the foregoing discussion, we are interested in receiving comments on the following specific issues.

A. ALTERNATIVE PROPOSAL TO PROVIDE FOR A STATE ADJUSTMENT FACTOR

We have considered and have done substantial analysis on the possibility of adjusting ration allotments to registrants to reflect differences among the States in gasoline consumption per vehicle. We take no position at this time as to whether this feature should be adopted. However, this is an important issue on which we encourage a maximum of public discussion and debate.

Under the proposed calculations for determining and issuing ration allotments (discussed in Part III above), registrants would receive ration allotments based on a State Adjustment Factor which would vary for each State according to its historical gasoline consumption per vehicle. The resulting variations in gasoline consumption per vehicle point, as noted above, would probably be distributed among other factors by geographical areas that reflect average per capita gasoline consumption. The resulting variation within a State in the base year divided by the total vehicle points for vehicles registered in that State. This resulting quotient for each State (subject to other adjustments of similar character) would provide the basis for calculating a State Adjustment Factor. If such a proposal were adopted, it would probably be based on the assumption that the gasoline consumption per vehicle in each State is necessarily computed by dividing the amount of gasoline sold within a State by the number of registered vehicles in that State. In some jurisdictions, however, substantial variations in gasoline consumption per registered vehicle are necessary because of the amount of gasoline sold by the State. If such a proposal were to be adopted, it would probably be based on the assumption that the data would be required in order to make such adjustments.

Another factor in favor of adopting a State Adjustment Factor is that distribution of ration rights on a uniform national basis rather than base period gasoline consumption patterns would require adjustments in the gasoline distribution system. If the distribution of ration rights is based on historical consumption patterns, the resulting distribution system could be strained.

State-by-state variations would not be without substantial disadvantages, however. One disadvantage is that it would create a new set of inequities, by widening the differential between a light user of gasoline in a State that is above the average and the heavy user in a State that is below average. To illustrate, assume two motorists in different States had identical base period usages, and were allocated to their States a 20 percent cutback in the amount of gasoline they are permitted to purchase. It is important to note, however, that since these figures are solely for purposes of illustration. If adopted, the actual State Adjustment Factor would be based on data selected by the ERA for the appropriate base year at the time rationing is implemented. In developing its rationing plan, the ERA has provided an opportunity to State energy officials to express their views on several rationing issues, including whether the ERA should adopt a State Adjustment Factor. In adopting a State Adjustment Factor it would be important to account for differences in gasoline consumption. Of the 22 responses received, 15 States favored varying basic allotments according to per capita gasoline consumption patterns. These responses were received prior to the time the data in Table I were available, and, based upon such data, several States responding in favor of State-by-State variations turned out to be below the
PROPOSED RULES

We invite these States, as well as any other interested party, to again provide comments and any available supporting information on this important issue.

### Table I

<table>
<thead>
<tr>
<th>1976 Monthly Gasoline Per Vehicle</th>
<th>Ration Allotment With 25% Cutback and No State Adjustment</th>
<th>Ration Allotment With 25% Cutback and With State Adjustment</th>
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<tr>
<td>Gallons Per Vehicle</td>
<td>Percent of 1976 Use</td>
<td>Before Rounding</td>
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<tr>
<td>(1)</td>
<td>(3)</td>
<td>(5)</td>
</tr>
<tr>
<td>-----------------------------------</td>
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<td>-----------------------------------------------------------</td>
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<td>Arkansas</td>
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With no State adjustment, allotments would be rounded to 45 gallons and the ration period reduced to 28 days.
B. ALLOTMENTS BASED ON DRIVERS' LICENSES OR ON REGISTERED VEHICLES

The two practical alternatives for distributing ration rights to individuals are on the basis of licensed drivers or registered vehicles, lists of which are maintained in both cases by States' Departments of Motor Vehicles (DMV's). Within the driving age population of approximately 160 million in the United States, about 80 percent, or 134 million, now hold drivers' licenses. DMV vehicle registration files contain approximately 130 million motor vehicle records, of which 150 million are estimated to be automobiles. To our knowledge, the use of other lists, or combination of lists, (such as social security number) under the usual administrative procedures made solely for the purposes of rationing would be too expensive, too subject to fraudulent misuse, or too slow to implement for the purposes of an emergency rationing plan. After careful consideration of the advantages and disadvantages of the two plans, we have tentatively concluded that there are major differences between the supply characteristics of gasoline and diesel fuel which require that the two fuels be rationed by separate and independent mechanisms. We are currently developing a separate plan for diesel fuel rationing and are interested in receiving public comments as to some of the serious problems associated with developing such a plan.

Our analysis to date suggests that the principal problem associated with developing a diesel fuel rationing plan is the interchangeability of highway and non-highway diesel fuels. This matter is particularly for off-highway diesel fuel and home heating oil. It also appears that diesel fuel rationing may not be as desirable as gasoline rationing during a crude oil supply shortfall situation. Further, the similarity of EPCA and of the EPCA to the adoption of such a plan. -

V. DIESLE FUEL RATIONING

Sections 201 and 203 of the EPCA require the submission to Congress of a rationing plan not just for gasoline but also for "diesel fuel used in motor vehicles." The ERA has tentatively concluded that these two fuels be rationed by separate and independent mechanisms. We are currently developing a separate plan for diesel fuel rationing and are interested in receiving public comments as to some of the serious problems associated with developing such a plan.

A. WRITTEN COMMENTS

Comments on the environmental assessment to the address indicated in the "Addresses" section of this preamble.

VII. ENVIRONMENTAL ASSESSMENT

Pursuant to the national environmental Policy Act of 1969 (NEPA), 42 U.S.C. 4321 et seq., DOE has prepared an environmental assessment on the proposed Contingency Gasoline Rationing Plan. Following a review of this assessment, DOE has determined that the proposed action constitutes "major Federal action significantly affecting the quality of the human environment" as defined in section 102(2)(C) of NEPA. Accordingly, preparation of an environmental impact statement is not required, and a negative determination to that effect is hereby issued. Copies of the environmental assessment are available for public review in the DOE Freedom of Information Reading Room, Room 2107, 12th and Pennsylvania Avenue NW., Washington, D.C. 20461. Inquiries should be addressed to the address indicated in the "Addresses" section of the preamble.

VI. Economic Analysis and Regulatory Analysis

Section 201(f) of EPCA requires that any rationing contingency plan submitted to Congress be based upon a consideration of the potential economic impacts of such plan, including an analysis of:

1. Any effects of such plan on (A) vital industrial sectors of the economy; (B) employment (on a national and regional basis); (C) the economic vitality and competitive position of States and regional areas; (D) the availability and price of consumer goods and services; and (E) the gross national product;

2. Any potential anticompetitive effects.

In addition, Executive Order 12044 (52 FR 12661, March 24, 1978) requires that a "regulatory analysis" be prepared on all significant regulations expected to have "major economic consequences for individual industries, geographical regions, or levels of government." The Administrator of ERA has determined that such a regulatory analysis is required for the contingency gasoline rationing regulations.

Given the similarity of EPCA and of Executive Order 12044 regarding the requirement of an analysis of economic impact, we have decided to combine them into one document. Accordingly, ERA has prepared a preliminary "Economic and Regulatory Analysis of the Proposed Standby Gasoline Rationing Plan" which when finalized is intended to meet the requirements of both sections 201(f) of EPCA and Executive Order 12044.

Copies of this preliminary document are available for public review in the DOE Freedom of Information Reading Room, Room 2107, 12th and Pennsylvania Avenue NW., Washington, D.C. 20461. Inquiries should be addressed to the address indicated in the "Addresses" section of the preamble.

VII. COMMENT PROCEDURES

A. WRITTEN COMMENTS

You are invited to participate in this rulemaking by submitting data, views or arguments with respect to the proposals set forth in this notice. Written
comments should be submitted by 4:30 p.m., e.d.t., August 31, 1978 to the address indicated in the "Addresses" section of this preamble and should be identified on the outside envelope and on the document with the designation: "Contingency Gasoline Rationing Plan." Fifteen copies should be submitted.

Any information submitted which you consider to be confidential must be so identified and submitted in writing, one copy only. We reserve the right to determine the confidential status of the information and to treat it according to our determination.

II. PUBLIC HEARINGS

1. Procedure for Request to Make Oral Presentation. The time and place for the hearing are indicated in the "Dates" and "Addresses" sections of this preamble.

If you have an interest in the proposed amendments issued today, or represent a group or class of persons that has an interest, you may make a written request for an opportunity to make oral presentation by 4:30 p.m., July 24, 1978. You should be prepared to describe the interest concerned and, if appropriate, to state why you are a proper representative of a group or class of persons that has such an interest, and to give a concise summary of the proposed oral presentation. You should also provide a phone number where you may be contacted through the day before the hearing.

If you are selected to be heard, you will be so notified before 4:30 p.m., July 24, 1978. If you wish to ask a question at the hearing, you may submit the question, in writing, to the presiding officer. The ERA or, if the question is submitted at the hearing, the presiding officer will determine whether the question is relevant, and whether the time limitations permit it to be presented for answer.

Any further procedural rules needed for the proper conduct of the hearing will be announced by the presiding officer.

A transcript of the hearing will be made and the entire record of the hearing, including the transcript, will be retained by the ERA and made available for inspection at the DOE Freedom of Information Office, Room 2107, Federal Building, 12th and Pennsylvania Avenue N.W., Washington, D.C., between the hours of 8 a.m. and 5:30 p.m., Monday through Friday. You may purchase a copy of the transcript from the reporter.

As required by section 7(a)(1) of the Federal Energy Administration Act of 1974, Pub. L. 93-275, a copy of this notice has been submitted to the Administrator of the Environmental Protection Agency for his comments concerning the impact of this proposal on the quality of the environment. By letter dated April 28, 1978, the Administrator provided the following comments:

In response to your letter of April 27, 1978, the Environmental Protection Agency has reviewed the Department of Energy's draft notice of proposed rulemaking establishing 10 CFR Part 500 "Contingency Gasoline Rationing Plan." At present, we do not foresee this action having an unacceptable impact on the quality of the environment as related to the duties and responsibilities of EPA. We are currently reviewing the environmental assessment on the rationing plan as prepared by DOE. Should we identify significant environmental concerns, we will notify DOE during the public review period provided for this action.

Pursuant to the requirements of section 404(a) of the Department of Energy Organization Act (Pub. L. 95-91), this proposed rule has been referred, concurrently with the issuance hereof, to the Federal Energy Regulatory Commission for a determination whether the proposed rule would significantly affect any matter within the Commission's jurisdiction.


In consideration of the foregoing, Chapter II, Title 10 of the Code of Federal Regulations, is proposed to be amended as set forth below.


David J. Bardin,
Administrator, Economic Regulatory Administration.

10 CFR Chapter II is amended by adding Part 500, to read as follows:

PART 500—CONTINGENCY GASOLINE RATIONING REGULATIONS

Subpart A—General Provisions

Sec. 500.01 Scope.
500.02 General definitions.
500.03 Penalties.
500.04 Reporting requirements.
500.05 User fees.
500.06 Authority to contract or delegate.

Subpart B—Rationing of Gasoline

500.11 Determination of allotments.
500.12 Distribution of ration rights.
500.13 Disposition of Government ration checks.
500.14 Ration coupons.
500.15 Mandatory transfers of ration allotments.

Subpart C—Compensation of Reserves and Allotments

500.21 Definitions.
500.22 Calculations.

Subpart D—Supplemental Allotments to Designated Firms and Priority Classes

500.31 Designated firms.
500.32 Supplemental allotments to priority classes.
500.33 Precedence of delivery.

Subpart E—Purchase of Gasoline

500.41 General.
500.42 Supplier disposition of ration coupons and ration checks.
500.43 Supplier's obligation to its supplier.
500.44 Principal supplier's obligations to the ERA.
500.45 Redemption account advances.
500.46 Inventory changes.

Subpart F—Allocation of Gasoline

500.51 Relationship to Paris 210 and 211.
500.52 Supplier/purchaser relationships.
500.53 Allocation by suppliers to wholesale purchasers and bulk purchasers.
500.54 Allocation of unleaded gasoline.
500.55 Normal business practices.
500.56 State set aside.

Subpart G—Ration Banking

500.61 Coupon issuance points and participating banks.
500.62 Ration rights accounts.
500.63 Redemption accounts.
500.64 Restrictions on endorsements.

Subpart H—National Ration Reserve

500.71 National Ration Reserve.

Subpart I—State Ration Reserve

500.81 Establishment of State Ration Reserve.
"Designated firm" means (1) a firm that in the business of selling consumer gasoline in vehicles or equipment determined by the ERA to qualify as off-highway vehicles and equipment, and that meets the additional eligibility requirements to be established by the ERA pursuant to an application approved by the ERA pursuant to Subpart D of this part, or (2) a firm designated by the ERA as a designated firm pursuant to § 500.31(b).

"Eligible individual" means a natural person designated by the ERA as eligible to receive ration rights on the same basis as a registrant of a specified vehicle classification.

"Emergency services" means law enforcement, fire fighting, snow removal, and emergency medical services.

"ERA" means the Economic Regulatory Administration or its delegate.

"Firm" means any association, company, corporation, estate, individual, joint-venture, partnership, or sole proprietorship, or any other entity however organized including charitable, educational, or other eleemosynary institutions, and the Federal Government including corporations, departments, Federal agencies, and other instrumentalities, and State and local governments. The ERA may, in regulations and forms issued in this part, treat as a firm:

(a) A parent and its consolidated and unconsolidated entities (if any) which directly or indirectly controls, (b) A parent and its consolidated entities, (c) An unconsolidated entity, or (d) Any part of a firm.

"Gasoline" means motor gasoline as defined in § 211.51 of Part 211 of this chapter excluding, however, aviation fuels as defined in § 211.142 of Part 211 of this chapter.

"Government ration check" means a ration check issued by the ERA or its delegate to a registrant, or the intangible representation of ration rights evidenced by lists or other means to be distributed by the ERA to coupon issuers.

"National Ration Reserve" means the State Ration Reserves of each State to carry out the authorities delegated to that State by the ERA pursuant to Subpart I of this part.

"State Ration Reserve" means the part of the ERA which exercises control of that firm, or (e) receives delivery of that product for use in cargo, freight and mail hauling by truck.

"Principal supplier" means a supplier which manufactures gasoline in or imports gasoline into the United States.

"Public passenger transportation" means (a) facilities and services for public passenger transportation whether public or private, including water, rail, bus and van transportation, but excluding taxicabs; and (b) bus and van transportation of pupils to and from school.

"Ration check" means a negotiable document other than a ration coupon evidencing the right to purchase specified volumes of gasoline.

"Ration coupon" means a coupon issued by the ERA entitling the bearer to purchase a specified volume of gasoline.

"Ration recipient" means a registrant, an eligible individual, a designated firm, or a priority class firm.

"Ration rights" means ration coupons and ration check which shall be evidence of a ration recipient's right to purchase specified volumes of gasoline.

"Ration rights account" means an account opened pursuant to the provisions of § 500.62 for the deposit and withdrawal of ration rights.

"Redeemed ration rights" means ration coupons or ration checks accepted by a supplier in exchange for the sale of gasoline, and cancelled or endorsed by that supplier pursuant to § 500.42.

"Redemption account" means an account opened by any purchaser pursuant to the provisions of § 500.63 for the deposit of ration rights received and redeemed in exchange for the sale of gasoline, and for the deposit of redemption checks received from other suppliers in exchange for the sale of gasoline.

"Redemption check" means a check drawn on a redemption account by a supplier who is the holder of that account.

"Registrant" means the party named in the most recent vehicle registration record maintained at a State Department or Motor Vehicle office (or in the case of Federal vehicles, maintained with the appropriate Federal agency), which vehicle has been determined by the ERA as eligible for an allotment.

"Retail sales outlet" means a site on which a supplier maintains an ongoing business of selling gasoline to any ultimate consumer.

"Sanitation services" means the collection and disposal for the general public, of solid wastes, whether by public or private entities, and the maintenance, operation and repair of liquid purification and waste facilities. Sanitation services also includes the provision of water supply services by public utilities, whether privately or publicly owned or operated.

"State" means any one of the fifty States, the District of Columbia, Puerto Rico or any territory or possession of the United States.

"State Rationing Office" means the office established or designated by the Chief Executive of each State to carry out the authorities delegated to that State by the ERA pursuant to Subpart I of this part.
Supplemental allotment means the allotment distributed to a designated firm or priority class firm pursuant to Subpart D of this part.

"Supplier" means any firm or any part or subsidiary of any firm other than the Department of Defense which currently, during the base period, or during any period between the base period and the present supply, sells, transfers or otherwise furnishes (as by consignment) gasoline to wholesale purchasers or end-users, including, but not limited to refiners, importers, resellers, jobbers, and retailers.

Total available supply means the total unreserved amount of gasoline, excluding, but not limited to refiners. Storage tank substantially under the control of that firm means any firm that is an ultimate consumer which, as part of its normal business practices, purchases or obtains gasoline from a supplier and receives delivery of that product into a storage tank substantially under the control of that firm at a fixed location and which either (a) purchased or obtained more than 30,000 gallons of gasoline for its own use in agricultural production in the base year, or (b) purchased or obtained more than 84,000 gallons of gasoline in the base year.

"Wholesale purchaser" means a wholesale purchaser-reseller or wholesale purchaser-consumer, or both.

"Wholesale purchaser-consumer" means any firm which, as part of its normal business practices, purchases or obtains gasoline from a supplier and receives delivery of that product into a storage tank substantially under the control of that firm at a fixed location and which either (a) purchased or obtained more than 30,000 gallons of gasoline for its own use in agricultural production in the base year, or (b) purchased or obtained more than 84,000 gallons of gasoline in the base year.

"Wholesaler purchaser-reseller" means any firm which purchases, receives through transfer, or otherwise obtains (as by consignment) gasoline and resells or otherwise transfers it to other purchasers without substantially changing its form.

Penalties.

(1) Any person who violates any provision of these regulations or any order issued pursuant thereto shall be subject to the penalties as set forth in section 5 of the Emergency Petroleum Allocation Act of 1973, and shall be subject to the penalties as set forth in Subpart P of Part 205 of this chapter.

(2) Any firm having custody, care or control of ration coupons or Government ration checks shall at all times, in receiving, storing, transmitting, or otherwise handling ration coupons, take all precautions necessary to avoid acceptance, transfer, negotiation, or use of spurious, altered, or counterfeit ration coupons and Government ration checks, and to avoid any unauthorized transfer, negotiation, or use of ration coupons and Government ration checks. Such firms shall also safeguard ration coupons and Government ration checks from theft, embez-

lement, loss, damage, or unauthorized destruction.

§ 500.4 Reporting requirements.

The ERA shall require such reports as it deems necessary to administer the Contingency Gasoline Rationing Program.

§ 500.5 User fees.

The ERA may impose a uniform fee on each gallon of gasoline sold during the period for which these regulations are in effect. Provided, That the total fees collected shall not exceed the cost of administering the Contingency Gasoline Rationing Program and the cost of initial distribution of end-user rights.

§ 500.6 Authority to contract or delegate.

The ERA may delegate or contract for the carrying out of all or any part of its functions under this part.

Subpart B—Rationing of Gasoline

§ 500.11 Determination of allotments.

The ERA shall issue ration rights for each ration period equal to the estimated total available supply of gasoline as follows:

(a) A percentage shall be reserved for distribution pursuant to Subpart H of this part for a National Ration Reserve.

(b) A percentage shall be reserved for distribution to the States as a State Ration Reserve pursuant to Subpart I of this part.

(c) The ERA shall issue ration rights to designated firms and priority classes pursuant to Subpart D of this part.

(d) The ERA shall issue ration rights to all registrants and eligible individuals pursuant to Subpart C of this part.

§ 500.12 Distribution of ration rights.

Ration rights will be issued under the form of Government ration checks distributed to ration recipients. In addition, ration rights may at the discretion of the ERA be directly deposited into ration rights accounts.

§ 500.13 Disposition of Government ration checks.

Government ration checks may be disposed of as follows:

(a) Government ration checks may be exchanged for ration coupons at coupon issuance points pursuant to Subpart G of this part.

(b) Government ration checks may be deposited in a ration rights account, and may be subsequently withdrawn as ration rights pursuant to § 500.22.

(c) Government ration checks may be surrendered to a supplier for gasoline.

(d) Government ration checks may be transferred or sold to any individual or firm.

§ 500.14 Ration coupons.

(a) Value of ration coupons. A ration coupon shall be redeemable for the number of gallons indicated on the face of the coupon, or for such other amount as shall be determined and announced by the ERA.

(b) Validity of ration coupons. Unless declared invalid by the ERA or redeemed pursuant to § 500.42, ration coupons of a given series designation shall be valid from a date specified in an order published by the ERA through the end of the Contingency Gasoline Rationing Program.

§ 500.15 Mandatory transfers of ration allotments.

The ERA may require the lessor of a registered vehicle receiving ration allotments to transfer such ration allotments to the lessee of such vehicle whenever the terms of the lease extend beyond a minimum period to be established by the ERA, or according to other terms and conditions to be established by the ERA.

Subpart C—Computation of Reserves and Allotments

§ 500.21 Definitions.

For purposes of this Subpart C, the following symbols have the following meanings:

Symbol Units Meaning

CP—Days The computation period, the length of which will be determined by the ERA and will be used to compute the length of the ration period.

REF—Gallons Projected reserve out of gasoline during the computation period.

IMP—do.. Projected imports of gasoline during the computation period.

EXP—do.. Projected exports of gasoline during the computation period.

LOS—do.. Projected losses of gasoline from spillage, evaporation, and causally losses during the computation period.

INV—do.. Amount of desired gasoline inventory drawdown or buildup during the computation period from industry.

ADJ—do.. An adjusting term representing errors, rounding, and unclaimed allotments in previous ration periods.

TAS—do.. The net available supply of gasoline to be rationed during a ration period.

NRR—do.. Ration Rights be reserved for use in the National Ration Reserve for the ration period.

SRR—do.. Ration Rights distributed to the States for the State Ration Reserve for the ration period.

NAS—do.. The net available supply of gasoline during a computation period, equal to the TAS minus amount necessary for the National Ration Reserve and the State Ration Reserves.
PROPOSED RULES

(2) The sum of the CVP's for all vehicle classifications equals the total vehicle points (TVP).

CVP=$\sum_{i}CVP_{i}$

(3) The basic allotment (BA) for any given vehicle is equal to the value of ration rights in gallons, multiplied by the allotment index (AI) for that vehicle.

$BA = VA \cdot AI$

(3) Length of the Ration Period. The length of the ration period is determined as follows:

1. The ERA will determine a distributed basic allotment (DBA) which is the value of ration rights in gallons allotted for private automobiles.

2. The length of the ration period equals the distributed basic allotment (DBA) divided by the basic allotment (BA), the quotient multiplied by the computation period (CP), and rounded to a full day.

$RP = \frac{DBA}{BA} \cdot CP$

§500.22 Calculations.

(a) Total available supply (TAS). The total available supply (TAS) of gasoline for a computation period is determined from data available on the refining and importing of gasoline, adjusted for exports, losses, inventory changes, and other adjustments.

$TAS = REF + IMP - LOS + INV + ADJ$

(b) Net available supply (NAS). The net available supply is computed by subtracting from the TAS the National Ration Reserve and the State Ration Reserves.

$NAS = TAS - NRR - SRR$

(c) Basic allotment supply (BAS). The basic allotment supply (BAS) is computed by deducting the total supplemental allotments (SAT) to designated firms and the priority class allotments, from the NAS.

$BAS = NAS - SAT - BAS$

(d) Basic allotment (BA). The basic allotment (BA) is computed as follows:

1. The sum of all vehicles in a given vehicle classification is multiplied by the allotment index (AI) for that classification to yield a vehicle classification point (CVP).

$BA = VA \cdot AI$

§500.31 Designated firms.

(a) A firm may apply to the ERA for a supplemental allotment as a designated firm, if in the base year such firm consumed gasoline in vehicles or equipment determined by the ERA to qualify as off-highway vehicles and equipment and such firms meets such additional eligibility requirements to be established by the ERA.

(b) The ERA may designate other classes of firms or any individual firm as a designated firm to receive supplemental allotments on a basis to be established by the ERA.

(c) A designated firm applying for a supplemental allotment shall submit an application to the ERA according to forms and procedures to be established by the ERA.

§500.32 Supplemental allotments to priority classes.

(a) A firm in any of the following classifications may apply to the ERA for a supplemental allotment as follows:

1. Emergency services.
2. Sanitation services.
3. Public passenger transportation.

(b) The ERA may designate other classifications or firms as priority classes eligible to apply for a supplemental allotment pursuant to paragraph (a) of this section.

(c) Any firm applying for a supplemental allotment as a priority class shall submit an application to the ERA according to forms and procedures to be established by the ERA.

§500.33 Precedence of delivery.

Prior to arranging delivery schedules for any other purchasers, suppliers shall first establish mutually satisfactory delivery schedules with all their base period purchasers which qualify as priority class firms pursuant to §500.32.

Subpart E—Purchase of Gasoline

§500.41 General.

(a) Except as otherwise provided in paragraph (b) of this section, no supplier may sell or otherwise transfer gasoline to a wholesale purchaser without securing from the purchaser at the time of sale or transfer of ration rights equal on a gallon basis to the volume of gasoline transferred.

(b) Notwithstanding the provisions of paragraph (a) of this section, no supplier may sell or otherwise transfer gasoline to a wholesale purchaser without securing from the consumer at the time of sale or transfer a redemption check or redeemed ration rights equal on a gallon basis to the amount of gasoline transferred.

(c) No purchaser may tender, and no supplier may accept ration coupons transferred for or without consideration.

(d) Subject to the provisions of §500.64 of Subpart G of this part, unredeemed ration rights may be freely transferred for or without consideration.

(e) No supplier (including a retail sales outlet) shall require any purchaser to purchase ration rights from a supplier (including itself) as a condition of transferring gasoline.

(f) No supplier (including a retail sales outlet) may refuse to accept valid ration coupons offered as evidence of entitlement to purchase gasoline if such coupons are tendered by a customer at the time of sale. A supplier may accept ration checks other than Government ration checks from a customer as evidence of entitlement to

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purchase gasoline, but if there are insufficient ration rights in the ration rights account on which the ration check is drawn, the payee shall be liable for the deficiency.

§500.13 Supplier disposition of ration rights and ration checks.  
(a) A supplier (including a retail sales outlet) which accepts ration coupons in exchange for gasoline shall redeem all such checks by indelibly marking them with the supplier's name, its redemption account number, if any, and the legend "redeemed." No supplier shall sell or otherwise transfer gasoline for consumption to a purchaser in exchange for ration coupons that have previously been redeemed.  
(b) A supplier (including a retail sales outlet) which accepts ration checks in exchange for gasoline shall redeem all such checks by indelibly marking them with the supplier's name, its redemption account number, if any, and the legend "redeemed."  

§500.43 Supplier's obligation to its supplier.  
(a) A supplier shall issue to its supplier at the time of delivery a redemption check or redeemed ration rights equal on a gallon basis to the volume of gasoline received.  
(b) A supplier that has a redemption account shall promptly deposit all redemption checks and redeemed ration rights received in its redemption account.  

§500.44 Principal supplier's obligations to the ERA.  
Each principal supplier shall file with the ERA in such form and for such period as shall be designated by the ERA, a report certifying the volume of gasoline sold during the reporting period, and shall submit with such report a redemption check or redeemed ration rights equal on a gallon basis to the volume of gasoline sold during the reporting period.  

§500.45 Redemption account advances.  
(a) Every supplier other than a principal supplier shall be entitled to receive an initial redemption account advance for deposit in its redemption account according to a formula to be established and published by the ERA. Such formula shall take into account the needs, if any, of suppliers located in remote areas subject to infrequent deliveries, and measured at intervals to be specified by the ERA.  
(b) The ERA may provide for such additional redemption account advances as it deems necessary.  
(c) The ERA shall require suppliers receiving redemption account advances to repay such advances to the ERA according to terms and conditions established and published by the ERA.  

§500.46 Inventory changes.  
(a) Each supplier (including a retail sales outlet), shall report according to forms and instructions to be issued by the ERA, its inventory of gasoline, measured on its first day of rationing before any sales of gasoline are made, measured at the end of the rationing program, and measured at intervals to be specified by the ERA.  
(b) Any supplier (including a retail sales outlet), whose inventory at the close of the rationing program is less than its inventory measured on the first day of rationing shall be required to submit a redemption check or redeemed ration rights to the ERA or its designate equal on a gallon basis to the amount of inventory drawdown, less an amount to be specified by the ERA for losses due to spillage and evaporation.  

Subpart F—Allocation of Gasoline  
§500.51 Relationship to Parts 210 and 211.  
(a) Except where inconsistent with the provisions of this part, the provisions of Parts 210 and 211 of this chapter shall apply.  
(b) The allocation levels as provided in Part 211 shall not apply to this part.  

§500.52 Supplier/purchaser relationship.  
Unless otherwise directed by the ERA, each supplier of gasoline shall supply all wholesale purchaser-re-sellers, resale purchasers and consumer or bulk purchasers which purchased or obtained gasoline from that supplier during the base period.  

§500.53 Allocation by suppliers to wholesale purchasers and bulk purchasers.  
(a) Supply obligation. A supplier's supply obligation of gasoline for a month which ends within the base period is the sum of (1) the amounts of its wholesale purchaser-resellers' base period volumes which were supplied by the supplier during the base period: Provided, that the wholesale purchaser-reseller is still in business; (2) the amounts of its wholesale purchaser-consumers' base period volumes which were supplied by the supplier during the base period: Provided, that the wholesale purchaser-consumer is still in business; (3) the amounts of its bulk purchasers' base period volumes which were supplied by the supplier during the base period: Provided, that the wholesale purchaser-consumer is still in business; and (4) the amounts of base period uses of new wholesale purchasers and bulk purchasers assigned by the ERA.  
(b) Allocation by suppliers to wholesale purchasers and bulk purchasers. Each supplier shall allocate to each wholesale purchaser and bulk purchaser a volume of gasoline equal to the product of that supplier's allocation fraction (as defined in Part 211 of this chapter) multiplied by the amount equal to that wholesale purchaser's or bulk purchaser's base period allocation. Provided, That, (1) a wholesale purchaser-reseller transfers to its supplier at the time of delivery a redemption check or redeemed ration rights equal on a gallon basis to the volume of gasoline purchased or obtained; and (2) a wholesale purchaser-consumer or bulk purchaser transfers to its supplier at the time of delivery ration rights equal on a gallon basis to the volume of gasoline purchased or obtained.  

(c) Allocation fractions equal to or less than one. (1) When a supplier's allocation fraction is less than one, (i) a supplier shall reduce, on a pro-rata basis, the amounts of gasoline to be supplied its wholesale purchasers and bulk purchasers.  
(2) Any supplier whose allocation fraction is equal to or less than one (i) will reduce the amount allocated to its wholesale purchasers or bulk purchasers entitled to receive an allocation from that supplier either have not purchased or have not notified the supplier that they wish to change their allocation entitlement by the end of the allocation period must dispose of such additional volumes as surplus gasoline in accordance with the provisions of paragraph (e)(1) of this section.  

(d) Allocation fractions greater than one. Any supplier whose allocation fraction is greater than one shall adjust its allocation on the basis of the provisions of paragraph (e)(2) or (d) of this section. Each supplier shall divide its additional allocation fractions as follows: (1) The supplier shall offer to sell on a pro-rata basis to wholesale purchasers and bulk purchasers which are entitled to receive an allocation from that supplier an amount equal to the difference between the allocation entitlement of that wholesale purchaser or bulk purchaser minus the amount actually sold to that purchaser for the month: Provided, That a wholesale purchaser-consumer or bulk purchaser transfers to its supplier at the time of delivery ration rights equal on a gallon basis to the volume of gasoline purchased or obtained, and that a wholesale purchaser-reseller transfers to its supplier at the time of delivery a redemption check or redeemed ration rights equal on a gallon basis to the volume of gasoline purchased or obtained; (ii) the supplied shall next offer to sell such additional volumes remaining to its wholesale purchasers and bulk purchasers on a

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pro-rata basis. Provided, That a wholesale purchaser-consumer or bulk purchaser transfers to its supplier at the time of delivery ration rights equal on a gallon basis to the volume of gasoline purchased or obtained, and that a wholesale purchaser-reseller transfers to its supplier at the time of delivery a redemption check or redeemed ration rights equal on a gallon basis to the volume of gasoline purchased or obtained; (iii) a supplier may dispose of any additional volumes of gasoline not sold or otherwise transferred pursuant to paragraphs (e)(1) and (ii) of this section to any holder of ration rights or redeemed ration rights: Provided, That a purchaser transfers to the supplier at the time of sale or delivery of gasoline, a redemption check or redeemed ration rights equal on a gallon basis to the amount of gasoline sold or otherwise transferred.

§ 500.51 Allocation of unleaded gasoline.

Notwithstanding the provisions of paragraph (e)(1) of this section, the ERA may authorize additional firms and institutions to act as participating banks. Participating banks shall establish ration rights accounts and redemption accounts and may also act as coupon issuance points.

§ 500.52 Ration rights accounts.

(a) Any firm or individual may establish a ration rights account in accordance with forms and procedures to be established by the ERA. The ERA may by Order and Notice establish a minimum initial deposit and other terms and conditions governing the operation and maintenance of ration rights accounts.

(b) No individual or firm shall issue a ration check drawn upon a ration rights account in which there are insufficient deposits to cover that ration check and other outstanding ration checks drawn on that account.

§ 500.63 Redemption accounts.

(a) Any supplier including a retail sales outlet may open a redemption account in which there are sufficient deposits to cover that redemption account and the receipt of deposits therefor shall be made at participating banks according to forms and procedures to be established by the ERA.

(b) The opening of a redemption account and the receipt of deposits therefor shall be made at participating banks according to forms and procedures to be established by the ERA.

(c) No individual or firm shall issue a redemption check drawn upon a redemption account in which there are insufficient deposits to cover that redemption check and other outstanding redemption checks drawn on that account.

(d) Redemption checks shall not be valid for deposit in a ration rights account, nor shall redemption checks be valid for the purchase of gasoline by a wholesale purchaser-consumer, bulk purchaser or other ultimate consumer.

§ 500.64 Restrictions on endorsements.

The ERA may establish limitations on the endorsements of ration checks and redemption checks.

Subpart H—National Ration Reserve

§ 500.71 National Ration Reserve.

(a) The National Ration Reserve shall be used by the ERA to meet national disaster relief needs or for any other purpose as determined by the Administrator of the ERA.

(b) For each ration period, the ERA shall determine a percentage of the total available supply for which ration rights shall be reserved by the ERA for the National Ration Reserve.

Subpart I—State Ration Reserves

§ 500.81 Establishment of State Ration Reserves.

(a) For each ration period, the ERA shall determine a percentage of the total available supply for which ration rights shall be reserved by the ERA for distribution to the States to meet the needs of approved hardship applicants.

(b) Any State may apply to the ERA to create a State Rationing Office to administer the State Ration Reserve according to criteria for the delegation of such authority to be prescribed by the ERA by rule. Such application may provide for the distribution of ration rights from the State Ration Reserve through local boards, provided such boards are of balanced composition reflecting the community as a whole. After ERA review of a State's application and upon certification by the ERA, such State Rationing office will be delegated appropriate authority to administer the State Ration Reserve allotted by the ERA to that State.

(c) The State Ration Reserves will be distributed by the ERA to the State Rationing Offices by transmitting a Government ration check to each State. The size of the State Ration Reserve for each State shall be determined according to that State's gasoline sales during the base period and according to other relevant criteria determined and published by the ERA.

(d) Each month the State Rationing Office shall report to the ERA with respect to the preceding month (1) the number of hardship petitions received by the State's Ration Reserve, and (2) such other information as the ERA shall require.

(e) The State Rationing Office may redelegate the authority given to it by the ERA to local rationing boards, provided they meet the balanced composition criteria set forth in paragraph (b) of this section.

(f) No State shall issue a ration check drawn upon a ration rights account if there are insufficient ration rights to cover that ration check and other outstanding ration checks drawn on that ration rights account.

§ 500.82 Hardship applications and guidelines.

(a) Hardship applications will be received by the State Rationing Office for its delegate for review and determination. In its administration of the State Ration Reserve, a State Rationing Office or its delegate shall consid-
er the mobility needs to handicapped persons. In addition, the State Rationing Office or its delegate may consider the hardship needs of other individuals and firms, such as low-income, long-distance commuters, migrant workers, persons engaged in household moves, and other recurring or one-time hardship needs.

(b) For purposes of this section, the term "handicapped person" means any individual who, by reason of disease, injury, age, congenital malfunction, or other incapacity or disability, is unable without special facilities, planning or design to utilize mass transportation vehicles, facilities, and services and who has a substantial impediment to mobility.
FINDING ANSWERS TO IOWA'S TRANSPORTATION FUEL PROBLEMS: 1979

The following questions focus on the gasoline crisis which is facing the United States today. Please indicate your attitude on a continuum from very favorable to very unfavorable toward the following:

1. Gasoline rationing
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

2. Adding a thirty cents per gallon gasoline tax
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

3. Voluntary restrictions on personal driving
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

4. Banning weekend driving
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

5. Closing recreational areas on Sundays
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

6. Reducing the amount of allowable air travel
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable
7. Mandatory alternate gasoline buying days
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

8. Taxing cars getting less than twenty miles per gallon
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

9. Special privileges for car pools
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

10. Government subsidies to encourage bus riding
    a. Very favorable
    b. Somewhat favorable
    c. Somewhat unfavorable
    d. Very unfavorable

11. A $3.00 per gallon gasoline price
    a. Very favorable
    b. Somewhat favorable
    c. Somewhat unfavorable
    d. Very unfavorable

12. Higher taxes to finance the development of new energy sources
    a. Very favorable
    b. Somewhat favorable
    c. Somewhat unfavorable
    d. Very unfavorable

13. More government controls on oil companies
    a. Very favorable
    b. Somewhat favorable
    c. Somewhat unfavorable
    d. Very unfavorable
14. Importing more oil from other countries
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

15. Should a person strictly follow all laws that are set up to conserve gasoline even if those laws result in personal hardship? (Circle the letter.)
   a. Definitely
   b. Probably
   c. Not sure
   d. Probably not
   e. Definitely not

16. Do you think that most people are willing to give up some of their own gasoline needs so that others will be sure to have enough gas to meet basic needs? (Circle the letter.)
   a. Definitely
   b. Probably
   c. Not sure
   d. Probably not
   e. Definitely not

17. Overall, would you say that during the last year or so the effect of the gasoline shortage on your household has been very severe, severe, not too severe, or not severe at all? (Circle the letter.)
   a. Very severe
   b. Severe
   c. Not too severe
   d. Not severe at all
   e. Don't know

18. Do you think that the shortage of gasoline will get worse, stay the same, or get better during the next ten years? (Circle the letter.)
   a. Get worse
   b. Stay the same
   c. Get better
   d. Don't know
19. Do you think that you would get your "fair share" if a gas rationing system were set up? (Circle the letter.)
   a. Definitely
   b. Probably
   c. Not sure
   d. Probably not
   e. Definitely not

20. In general, which of the following statements best expresses your feelings about the "national gas shortage" of the past year or so? (Circle the letter.)
   a. There is not and never was a real shortage.
   b. There probably was a shortage for a while but it is over now.
   c. There is still a shortage, but I am sure the problem will be solved.
   d. There is a severe shortage but it can be solved in the future.

21. Where do you feel the most responsibility for solving any gasoline shortage must lie? (Circle the letter.)
   a. Government
   b. Business and industry
   c. Individual consumers
   d. Government, business and industry, and individual consumers
   e. Government and business and industry
   f. Government and individual consumers
   g. Business and industry and individual consumers
   h. No response
FINDING ANSWERS TO IOWA'S TRANSPORTATION FUEL PROBLEMS (1980)

The following questions focus on the gasoline crisis which is facing the United States today. Please indicate your attitude on a continuum from very favorable to very unfavorable toward the following:

1. Civic awards for carpooling
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

2. Voluntary restrictions on personal driving
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

3. Driving smaller cars to save gasoline
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

4. Combining shopping trips to save gasoline
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

5. Taking shorter and fewer vacations
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

6. Setting up a "still" in your home to make your own gasoline
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable
7. Riding a bicycle or walking to work
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

8. Reducing the amount of allowable air travel
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

9. Research and development projects to build more fuel efficient automobiles
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

10. Making bus and train terminals cleaner and more attractive to attract customers
    a. Very favorable
    b. Somewhat favorable
    c. Somewhat unfavorable
    d. Very unfavorable

11. Voluntary nationalization of oil companies
    a. Very favorable
    b. Somewhat favorable
    c. Somewhat unfavorable
    d. Very unfavorable

12. Gasoline rationing
    a. Very favorable
    b. Somewhat favorable
    c. Somewhat unfavorable
    d. Very unfavorable

13. Adding a fifty cents a gallon gasoline tax
    a. Very favorable
    b. Somewhat favorable
    c. Somewhat unfavorable
    d. Very unfavorable
14. Taxing cars getting less than twenty miles per gallon
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

15. Government subsidies to encourage bus riding
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

16. Importing more oil from other countries
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

17. Should a person strictly follow all laws that are set up to conserve gasoline even if those laws result in personal hardship?
   a. Definitely
   b. Probably
   c. Not sure
   d. Probably not
   e. Definitely not

18. Do you think that most people are willing to give up some of their own gasoline needs so that others will be sure to have enough gas to meet basic needs?
   a. Definitely
   b. Probably
   c. Not sure
   d. Probably not
   e. Definitely not

19. Do you think that a 55 mile per hour speed limit is a reasonable limit for the purpose of saving gas?
   a. Definitely
   b. Probably
   c. Not sure
   d. Probably not
   e. Definitely not
20. Overall, would you say that during the last year or so the effect of the gasoline shortage on your household has been very severe, severe, not too severe, or not severe at all?
   a. Very severe
   b. Severe
   c. Not too severe
   d. Not severe at all
   e. Don't know

21. Do you think that the shortage of gasoline will get worse, stay the same, or get better during the next ten years?
   a. Get worse
   b. Stay the same
   c. Get better
   d. Don't know

22. Do you think that you would get your "fair share" if a gas rationing system were set up?
   a. Definitely
   b. Probably
   c. Not sure
   d. Probably not
   e. Definitely not

23. In general, which of the following statements best expresses your feelings about the "national gasoline shortages" of the past year or so?
   a. There is not and never was a "real" shortage
   b. There probably was a shortage for a while, but it is over now
   c. There is still a shortage, but I am sure the problem will be solved
   d. There is a severe shortage, but it can be solved in the future
   e. The shortage is so severe that nothing can be done about it

24. Where do you feel the most responsibility for solving any gasoline shortages must lie?
   a. Government
   b. Business and industry
   c. Individual consumers
   d. Government, business and industry, and individual consumers
The following questions focus on the gasoline crisis which is facing the United States today. Please indicate your attitude on a continuum from very favorable to very unfavorable toward the following:

1. Gasoline rationing
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

2. Voluntary restrictions on personal driving
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

3. Reducing the amount of allowable air travel
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

4. Government subsidies to encourage bus riding
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

5. Mandatory alternate gasoline buying days
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable

6. Importing more oil from other countries
   a. Very favorable
   b. Somewhat favorable
   c. Somewhat unfavorable
   d. Very unfavorable
7. Should a person strictly follow all laws that are set up to conserve gasoline even if those laws result in personal hardship?
   a. Definitely
   b. Probably
   c. Not sure
   d. Probably not
   e. Definitely not

8. Do you think that most people are willing to give up some of their own gasoline needs so that others will be sure to have enough gasoline to meet basic needs?
   a. Definitely
   b. Probably
   c. Not sure
   d. Probably not
   e. Definitely not

9. Overall, would you say that during the last year or so the effect of the gasoline shortages on your household has been very severe, not too severe, or not severe at all?
   a. Very severe
   b. Severe
   c. Not too severe
   d. Not severe at all
   e. Don't know

10. Do you think that the shortages of gasoline will get worse, stay the same, or get better during the next ten years?
    a. Get worse
    b. Stay the same
    c. Get better
    d. Don't know

11. Do you think that you would get your "fair share" if a gasoline rationing system were set up?
    a. Definitely
    b. Probably
    c. Not sure
    d. Probably not
    e. Definitely not
12. In general, which of the following statements best expresses your feelings about the "national gasoline shortages" of the past year or so?

   a. There is not and never was a "real" shortage.
   b. There probably was a shortage for a while, but it is over now.
   c. There is still a shortage, but I am sure the problem will be solved.
   d. There is a severe shortage, but it can be solved in the future.
   e. The shortage is so severe that nothing can be done about it.

13. Where do you feel the most responsibility for solving any gasoline shortage must lie?

   a. Government
   b. Business and industry
   c. Individual consumers
   d. Government, business and industry, and individual consumers
   e. Government and business and industry
   f. Government and individual consumers
   g. Business and industry and individual consumers
   h. No response
   i. Don't know
Method Used in Merging the 1979 and 1980 Questionnaire Data

The questionnaire used in the 1979 data collection included fourteen attitude items which contained the response categories very favorable, somewhat favorable, somewhat unfavorable, and very unfavorable. These items were as follows:

1. Attitude toward gasoline rationing (GASRAT)
2. Attitude toward adding a thirty cents per gallon gasoline tax (FTAX)
3. Attitude toward voluntary restrictions on personal driving (VOLND)
4. Attitude toward banning weekend driving (NDRIVE)
5. Attitude toward closing recreational areas on Sundays (CLOSREC)
6. Attitude toward reducing the amount of allowable air travel (AIRRED)
7. Attitude toward mandatory alternate gasoline buying days (GALTD)
8. Attitude toward taxing cars getting less than twenty miles per gallon of gasoline (TAXCAR)
9. Attitude toward special privileges for car pools (CARPOOL)
10. Attitude toward government subsidies to encourage bus riding (GOVSUB)
11. Attitude toward a $3.00 per gallon gasoline price (HPRICE)
12. Attitude toward higher taxes to finance the development of new energy sources (FINSCORC)
13. Attitude toward more government controls on oil companies (GOVCONT)
14. Attitude toward importing more oil from other countries (IMPOIL)

The remaining questionnaire items on the 1979 questionnaire were identical to those used in the 1980 data collection (see pages 161 and 162 for a discussion of these items).

There were two basic reasons why the questionnaire was modified for the second round of data collection. First, as it was pointed out in the
Methods Chapter, some of the questionnaire items were shown to be irrelevant to the sample drawn for this investigation. Second, when the fourteen items listed above were assessed, it became apparent that a majority of them emphasized actions the government might take to resolve the gasoline shortages, while only four emphasized actions which might be taken by individual consumers or business and industry (see Table C.1 for the way in which the items were categorized).

Table C.1. Categorization of questionnaire items for the 1979 data set

<table>
<thead>
<tr>
<th>Categories</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individually controlled actions to resolve the gasoline shortages</td>
<td>Business and industry actions which might be taken to resolve the gasoline shortages</td>
</tr>
<tr>
<td>1. Voluntary restrictions on personal driving (VOLND)</td>
<td>1. Closing recreational areas on Sundays (CLOSREC)</td>
</tr>
<tr>
<td>2. Special privileges for car pools (CARPOOL)</td>
<td>2. Reducing the amount of allowable air travel (AIRRED)</td>
</tr>
<tr>
<td>Business and industry actions which might be taken to resolve the gasoline shortages</td>
<td></td>
</tr>
<tr>
<td>1. Closing recreational areas on Sundays (CLOSREC)</td>
<td></td>
</tr>
<tr>
<td>2. Reducing the amount of allowable air travel (AIRRED)</td>
<td></td>
</tr>
<tr>
<td>Government actions which might be taken to resolve the gasoline shortages</td>
<td>Government subsidies to encourage bus riding (GOVSUB)</td>
</tr>
<tr>
<td>1. Adding a thirty cents per gallon gasoline tax (FTAX)</td>
<td></td>
</tr>
<tr>
<td>2. Banning weekend driving (NDRIVE)</td>
<td></td>
</tr>
<tr>
<td>3. Mandatory alternative gasoline buying days (GALTD)</td>
<td></td>
</tr>
<tr>
<td>4. Taxing cars getting less than twenty miles per gallon (TAXCAR)</td>
<td></td>
</tr>
<tr>
<td>5. Government subsidies to encourage bus riding (GOVSUB)</td>
<td></td>
</tr>
<tr>
<td>6. A $3.00 per gallon gasoline price (HPRICE)</td>
<td></td>
</tr>
<tr>
<td>7. Higher taxes to finance the development of new energy sources (FINSCORC)</td>
<td></td>
</tr>
<tr>
<td>8. More government controls on oil companies (GOVCONT)</td>
<td></td>
</tr>
<tr>
<td>9. Importing more oil from other countries (IMPOIL)</td>
<td></td>
</tr>
</tbody>
</table>
The research group concluded that the questionnaire items should, somewhat more equally, reflect each of the three areas in which responsibility for resolving the gasoline shortages might rest. This was believed to have been an important stage in modifying the questionnaire because it permitted a more realistic focus on ways in which individual consumers could begin to accept at least part of the responsibility. It is suggested that bringing these attitudes toward individual action to the surface, so to speak, would provide respondents with added knowledge of the multidimensional nature of the gasoline shortages. That is, that no one group, by itself, would be able to resolve the shortages. Many American consumers believed that the gasoline shortages had emerged overnight in response to the 1973 oil embargo and the quadrupling of OPEC's prices. However, as Wirth (1975:101) concluded, the energy crisis had been emerging for a long time. The problem came about, in part because:

It has taken Americans years to wake up to the energy crisis, and it will take even more years for them to consent to the consequences of solving the crisis. Ultimately there are only two forms that a solution can take. Either the United States will develop or otherwise acquire a nondepletable energy source, or it will have to reduce drastically its consumption of depletable nonrenewable resources. (Wirth, 1975:101)

Since Wirth published his conclusions in 1975, others have noted as well (Ball, 1977; Henderson, 1978a; Orr, 1981) that the United States has not and probably will not, in the near future, find an alternative nondepletable energy source to replace oil, and neither is the "technological fix" close at hand. Consequently, it may become necessary to redefine the "material" standard of living to which Americans have been accustomed. In the interim, consumers will need to become aware of the degree to
which their individual and collective actions may contribute, in part, to a relatively stable United States energy budget. Indeed, such actions may not only be a more desirable resolution to the gasoline shortages, they may also be more effective, because the political arena appears fraught with conflicting values and political interests which will be neither easily nor quickly resolved (Wirth, 1975; Landsberg, 1980).

Table C.2 shows the categorization of questionnaire items for the 1980 data set. While the items included in this table appear to be small contributions to a very large problem, each required an individual sacrifice in terms of time, privacy, and/or personal comfort. It is also suggested that respondent attitude toward individually controlled actions might not be related to the actual decisions made during participation in shortage. That is, indication of an attitude toward any of these items may have been stated in good faith, but gasoline rationing was an unknown element for each of the respondents drawn for this sample. As such, some, if not all, of the questionnaire items might not be expected to be related to actual behavior given conditions of gasoline rationing.

Table C.3 shows the attitude items which were identical on both the 1979 and the 1980 questionnaires. As is shown, a number of the items were lost as a result of the questionnaire modification. However, it was concluded that those items which remained could still provide a valid means by which the data could be analyzed.

The major difficulty encountered in attempting to merge the data sets came about because of the discrete response categories for attitudes
Table C.2. Categorization of questionnaire items for the 1980 data set

<table>
<thead>
<tr>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individually controlled actions to resolve the gasoline shortages:</td>
</tr>
<tr>
<td>1. Civic awards for carpooling (CIVAWD)</td>
</tr>
<tr>
<td>2. Voluntary restrictions on personal driving (VOLND)</td>
</tr>
<tr>
<td>3. Driving smaller cars to save gasoline (SMCAR)</td>
</tr>
<tr>
<td>4. Combining shopping trips to save gasoline (SHOP)</td>
</tr>
<tr>
<td>5. Taking shorter and fewer vacations (SFVAC)</td>
</tr>
<tr>
<td>6. Setting up a &quot;still&quot; in your home to make your own gasoline (STILL)</td>
</tr>
<tr>
<td>7. Riding a bicycle or walking to work (BIWK)</td>
</tr>
<tr>
<td>Business and industry actions to resolve the gasoline shortages:</td>
</tr>
<tr>
<td>1. Voluntarily reducing the amount of allowable air travel (AIRRED)</td>
</tr>
<tr>
<td>2. Research and development projects to build more fuel-efficient automobiles (RESCAR)</td>
</tr>
<tr>
<td>3. Making bus and train terminals cleaner and more attractive to attract customers (APPSE)</td>
</tr>
<tr>
<td>4. Voluntary nationalization of oil companies (NATOIL)</td>
</tr>
<tr>
<td>Government actions to resolve the gasoline shortages</td>
</tr>
<tr>
<td>1. Gasoline rationing (GASRAT)</td>
</tr>
<tr>
<td>2. Adding a fifty cents a gallon gasoline tax (FTAX)</td>
</tr>
<tr>
<td>3. Taxing cars getting less than twenty miles per gallon (TAXCAR)</td>
</tr>
<tr>
<td>4. Government subsidies to encourage bus riding (GOVSUB)</td>
</tr>
<tr>
<td>5. Importing more on oil from other countries (IMPOIL)</td>
</tr>
</tbody>
</table>

toward SHWORS, SHREAL, and SHRESP. Because these response categories were discrete, it was not possible to perform a difference of means test for them. Instead it was decided to examine the frequency distributions and percentages for these presimulation and postsimulation items for each year, 1979 and 1980, respectively. It was believed such an approach
Table C.3. Attitude items used in merging the data sets

<table>
<thead>
<tr>
<th>Attitude toward</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline rationing (GASRAT)</td>
</tr>
<tr>
<td>Taxing cars getting less than twenty miles per gallon (TAXCAR)</td>
</tr>
<tr>
<td>Government subsidies to encourage bus riding (GOVSUB)</td>
</tr>
<tr>
<td>Voluntary restrictions on personal driving (VOLND)</td>
</tr>
<tr>
<td>Reducing the amount of allowable air travel (AIRRED)</td>
</tr>
<tr>
<td>Mandatory alternate gasoline buying days (GALTD)</td>
</tr>
<tr>
<td>Importing more oil from other countries (IMPOIL)</td>
</tr>
<tr>
<td>Strictly following all laws set up to conserve gasoline (CONSG)</td>
</tr>
<tr>
<td>Giving up individual gasoline needs so that others will be able to meet basic needs (GIVUP)</td>
</tr>
<tr>
<td>Degree of severity of the gasoline shortages on individual's household during the past year (SHSEV)</td>
</tr>
<tr>
<td>Degree to which the shortages will worsen, stay the same, or get better over the next decade (SHWORS)</td>
</tr>
<tr>
<td>Getting a fair share of gasoline if rationing should be set up (FSHAR)</td>
</tr>
<tr>
<td>Belief in the &quot;reality&quot; of the gasoline shortages (SHREAL)</td>
</tr>
<tr>
<td>Who is most responsible for solving the gasoline shortages (SHRESP)</td>
</tr>
</tbody>
</table>

might provide some insights into the degree of differences between the two samples.

A qualitative examination of Table C.4 seems to indicate that the differences in responses were most noticeable in the response category indicating the gasoline shortages would worsen over the next ten years. In 1979, 65.1% of all respondents indicated the shortages would worsen, while in 1980, 74.2% maintained this attitude. This finding was puzzling in that those respondents who were a part of the 1979 sample had been more likely to have experienced difficulty purchasing gasoline than were those used in the 1980 sample. However, these findings were consistent with Richman's (1979:581) in which it was found that people who had experienced difficulty in purchasing gasoline were the least likely to
believe the shortages would worsen. The consensus in 1979 was that within five-to-ten years the gasoline shortages would no longer be a problem.

An examination of Table C.5, however, suggests the postsimulation differences between the two samples were negligible. It was decided, based on the evaluation of the frequency distributions and percentages, to include the attitude item SHWORS in the data analysis.

Table C.5. Frequency distributions and percentages for postsimulation attitude toward SHWORS: 1979 and 1980 questionnaires

<table>
<thead>
<tr>
<th>Attitude toward SHWORS</th>
<th>1979</th>
<th></th>
<th>1980</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Get worse</td>
<td>74.4%</td>
<td>(32)</td>
<td>74.2%</td>
<td>(23)</td>
</tr>
<tr>
<td>Stay the same</td>
<td>7.0%</td>
<td>(3)</td>
<td>16.1%</td>
<td>(5)</td>
</tr>
<tr>
<td>Get worse</td>
<td>9.3%</td>
<td>(4)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Don't know</td>
<td>9.3%</td>
<td>(4)</td>
<td>9.7%</td>
<td>(3)</td>
</tr>
<tr>
<td>Totals</td>
<td>100.0%</td>
<td>(43)</td>
<td>100.0%</td>
<td>(31)</td>
</tr>
</tbody>
</table>
Table C.6 demonstrates the frequency distributions and percentages for presimulation attitude toward SHREAL for the 1979 and 1980 samples. The differences between these responses were small for both presimulation and postsimulation responses, with a majority of respondents indicating there was a gasoline shortage, but that it would eventually be solved. As such, the decision was made to include the attitude toward SHREAL in the data analysis.

Table C.6. Frequency distributions and percentages for presimulation attitude toward SHREAL: 1979 and 1980

<table>
<thead>
<tr>
<th>Attitude toward SHREAL</th>
<th>1979</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is not and never was a &quot;real&quot; shortage</td>
<td>16.3</td>
<td>(7)</td>
</tr>
<tr>
<td></td>
<td>16.1</td>
<td>(5)</td>
</tr>
<tr>
<td>There probably was a shortage, but it is over now</td>
<td>23.2</td>
<td>(10)</td>
</tr>
<tr>
<td></td>
<td>12.9</td>
<td>(4)</td>
</tr>
<tr>
<td>There is still a shortage, but I am sure the problem will be solved</td>
<td>27.9</td>
<td>(12)</td>
</tr>
<tr>
<td></td>
<td>32.2</td>
<td>(10)</td>
</tr>
<tr>
<td>There is a severe shortage, but it can be solved in the future</td>
<td>32.6</td>
<td>(14)</td>
</tr>
<tr>
<td></td>
<td>35.5</td>
<td>(11)</td>
</tr>
<tr>
<td>The shortage is so severe that nothing can be done about it</td>
<td>0.0</td>
<td>(0)</td>
</tr>
<tr>
<td></td>
<td>3.2</td>
<td>(1)</td>
</tr>
<tr>
<td>Totals</td>
<td>100.0</td>
<td>(43)</td>
</tr>
<tr>
<td></td>
<td>100.0</td>
<td>(31)</td>
</tr>
</tbody>
</table>
Table C.7. Frequency distributions and percentages for postsimulation attitude toward SHREAL: 1979 and 1980

<table>
<thead>
<tr>
<th>Attitude toward SHREAL</th>
<th>1979</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>There is not and never was a &quot;real&quot; shortage</td>
<td>14.0 (6)</td>
<td>19.4 (6)</td>
</tr>
<tr>
<td>There probably was a shortage, but it is over now</td>
<td>7.0 (3)</td>
<td>9.7 (3)</td>
</tr>
<tr>
<td>There is still a shortage, but I am sure the problem will be solved</td>
<td>39.5 (17)</td>
<td>32.3 (10)</td>
</tr>
<tr>
<td>There is a severe shortage, but it can be solved in the future</td>
<td>37.2 (16)</td>
<td>35.5 (11)</td>
</tr>
<tr>
<td>The shortage is so severe that nothing can be done about it</td>
<td>2.3 (1)</td>
<td>3.2 (1)</td>
</tr>
<tr>
<td>Totals</td>
<td>100.0 (74)</td>
<td>100.0 (74)</td>
</tr>
</tbody>
</table>

Table C.8 shows the frequency distributions and percentages for the presimulation attitude toward SHRESP for the 1979 and 1980 questionnaires. There was some hesitancy as to whether or not attitude toward SHRESP should be included in the data analysis (for a discussion of the modification of this question, see pages 203-206). As it can be seen from Table C.8, prior to participation in SHORTAGE, 32.6% of all respondents in the 1979 sample indicated that government was primarily responsible for solving the gasoline shortages, while only 16.1% indicated this attitude in the 1980 sample. Further examination of this table, however, showed that, prior to participation in SHORTAGE, 41.7% of all respondents within the 1979 sample indicated that individual consumers were wholly or in part responsible for solving the gasoline shortages,
Table C.8. Frequency distributions and percentages for presimulation attitude toward SHRESP

<table>
<thead>
<tr>
<th>Attitude toward SHRESP</th>
<th>1979</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Government</td>
<td>32.6</td>
<td>(14)</td>
</tr>
<tr>
<td>Business and industry</td>
<td>14.0</td>
<td>(6)</td>
</tr>
<tr>
<td>Individual consumers</td>
<td>23.2</td>
<td>(10)</td>
</tr>
<tr>
<td>Government, business and industry, and individual consumers</td>
<td>4.6</td>
<td>(2)</td>
</tr>
<tr>
<td>Government and business and industry</td>
<td>1.7</td>
<td>(5)</td>
</tr>
<tr>
<td>Government and individual consumers</td>
<td>9.3</td>
<td>(4)</td>
</tr>
<tr>
<td>Business and industry and individual consumers</td>
<td>4.6</td>
<td>(2)</td>
</tr>
<tr>
<td>No response</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Don't know</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Totals</td>
<td>100.0</td>
<td>(43)</td>
</tr>
</tbody>
</table>

while for the 1980 group, 51.6% indicated this attitude.

Table C.9 shows the frequency distributions and percentages for the postsimulation attitude toward SHRESP. Within the 1979 sample, 60.5% of all respondents indicated the individual consumer was wholly or in part responsible for solving the gasoline shortages, while for the 1980 sample, 51.7% held this attitude. While these differences may be important, because of the exploratory nature of this study it was decided to include attitude toward SHRESP in the data analysis.

Table C.10 shows the results of the differences of means test
Table C.9. Frequency distributions and percentages for postsimulation attitude toward SHRESP

<table>
<thead>
<tr>
<th>Attitude toward SHRESP</th>
<th>1979</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Government</td>
<td>11.6</td>
<td>(5)</td>
</tr>
<tr>
<td>Business and industry</td>
<td>11.6</td>
<td>(5)</td>
</tr>
<tr>
<td>Individual consumers</td>
<td>27.9</td>
<td>(12)</td>
</tr>
<tr>
<td>Government, business and industry, and individual consumers</td>
<td>14.0</td>
<td>(6)</td>
</tr>
<tr>
<td>Government and business and industry</td>
<td>2.3</td>
<td>(1)</td>
</tr>
<tr>
<td>Government and individual consumers</td>
<td>4.6</td>
<td>(2)</td>
</tr>
<tr>
<td>No response</td>
<td>7.0</td>
<td>(3)</td>
</tr>
<tr>
<td>Don't know</td>
<td>7.0</td>
<td>(3)</td>
</tr>
<tr>
<td>Totals</td>
<td>100.0</td>
<td>(43)</td>
</tr>
</tbody>
</table>

performed for the 1979 sample and the 1980 sample. Included are attitudes toward GASRAT (GASRAT79, GASRAT80), TAXCAR (TAXCAR79, TAXCAR80), GOVSUB (GOVSUB79, GOVSUB80), AIRRED (AIRRED79, AIRRED80), IMPOIL (IMPOIL79, IMPOIL80), CONSG (CONSG79, CONSG80), GIVUP (GIVUP79, GIVUP80), SHSEV (SHSEV79, SHSEV80), FSHAR (FSHAR79, FSHAR80), and GALTD (GALTD79, GALTD80). Respondent attitude toward AIRRED, reducing the amount of allowable air travel was the only item which demonstrated a statistically significant difference in means between the 1979 and 1980 samples. As it was pointed out in the Methods Chapter, however, the review of literature did not yield evidence to indicate that this attitude item was
Table C.10. Results of difference means test for attitude items: 1979 and 1980

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean 1979</th>
<th>Difference</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>GASRAT79</td>
<td>2.3548</td>
<td>0.1290</td>
<td>N.S.</td>
</tr>
<tr>
<td>GASRAT80</td>
<td>2.2258</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAXCAR79</td>
<td>2.2900</td>
<td>0.0968</td>
<td>N.S.</td>
</tr>
<tr>
<td>TAXCAR80</td>
<td>2.0323</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GOVSUB79</td>
<td>1.6774</td>
<td>0.2903</td>
<td>N.S.</td>
</tr>
<tr>
<td>GOVSUB80</td>
<td>1.3871</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIRRED79</td>
<td>2.2903</td>
<td>0.3226</td>
<td>.01 **</td>
</tr>
<tr>
<td>AIRRED80</td>
<td>1.9677</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMP0IL79</td>
<td>3.2581</td>
<td>0.2258</td>
<td>N.S.</td>
</tr>
<tr>
<td>IMP0IL80</td>
<td>3.0323</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONSG79</td>
<td>2.2903</td>
<td>0.1935</td>
<td>N.S.</td>
</tr>
<tr>
<td>CONSG80</td>
<td>2.0968</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIVUP79</td>
<td>2.2903</td>
<td>-0.0645</td>
<td>N.S.</td>
</tr>
<tr>
<td>GIVUP80</td>
<td>3.3548</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SHSEV79</td>
<td>3.3226</td>
<td>0.0</td>
<td>N.S.</td>
</tr>
<tr>
<td>SHSEV80</td>
<td>3.3226</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSHAR79</td>
<td>2.7162</td>
<td>0.2842</td>
<td>N.S.</td>
</tr>
<tr>
<td>FSHAR80</td>
<td>2.4322</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GALTD79</td>
<td>2.5161</td>
<td>0.3548</td>
<td>N.S.</td>
</tr>
<tr>
<td>GALTD80</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**p. < .01.**
significant in determining consumer travel behavior patterns. Respondent attitudes toward alternate gasoline buying days and taxing cars getting less than twenty miles per gallon were also dropped from the data analysis in favor of including only those attitude items believed to be critical to understanding consumer travel behavior under conditions of energy constraint. That is, SHORTAGE was a gasoline rationing simulation. There was no indication in the literature that attitude toward TAXCAR or GALTD would have any bearing on respondent behavior given conditions of rationing.
APPENDIX D: IOWA DEPARTMENT OF TRANSPORTATION RESEARCH--UNITED STATES DEPARTMENT OF ENERGY RATION PLAN BEHAVIOR
1. purchase old low value cars
2. purchase fuel miser car
3. purchase moped or motorcycle
4. buy someone's coupons
5. loan-exchange-trade coupons
6. steal coupons
7. fly in a dirigible instead of airplane
8. ride an intercity bus
9. join or form a carpool or vanpool
10. relocate residence to minimize travel
11. stop attending church services
12. do all shopping once a week or less
13. stop children's extracurricular activities
14. stop attending service club meetings and related functions
15. limit visiting friends and relatives more than 50 miles away
16. drop participation in bowling, golf, tennis, bridge parties, etc., by adult family members
17. buy gasoline from someone who doesn't require coupons
18. buy a diesel vehicle if no rationing of diesel fuel
19. ride a bike to work
20. ride a bike to shop
21. make the children ride a bike to their activities
22. walk to work
23. walk to shopping areas
24. make the children walk to their activities
25. stop using personal vehicle on business errands
26. buy a 10-acre farm and apply for an agricultural fuel allocation
27. form a fake construction company and apply for an "off-highway" fuel allocation
28. move an elderly relative into your home and apply for a "hardship" fuel allocation in his or her name
29. stop mowing grass and weeds along the roadside
30. stop picking up trash along the highway
31. stop patching potholes in the roads
32. cancel trucking regulations which force trucks to run empty in one direction
33. stop plowing snow on gravel roads
34. stop grading the bumps and ruts on rural gravel roads
35. break consolidated schools up into one-room schools distributed around so children can walk to school
36. operate school system classes 4 days a week for 8 periods in place of 5 days for 6 periods per day
37. operate school system classes 3 days a week for 10 periods in place of 5 days for 6 periods per day
38. delete all junior and senior high activities requiring school travel
39. shop from a catalog with goods delivered to home
40. shop from a door-to-door peddler
41. order groceries by telephone based on newspaper ad shopping list prices with store delivering groceries
42. pay bills and do banking by telephone if such service is available
43. eliminate all postal delivery except packages and require telephone, TV type communication to replace letters
44. purchase an electric powered automobile
45. purchase an electric powered bike
46. ride a horse for some travel needs
47. set up a still in the basement to make alcohol to burn in your gasoline engine
48. construct housing and small factories around large existing shopping centers to create urban villages
49. buy a large truck and use the truck gasoline allocation in other vehicles
50. watch cable TV and cassette home movies (if available) instead of going out of the home for entertainment
51. use mobile library services to get books to read
52. stop going snowmobiling
53. stop going water skiing
54. stop recreationally flying
55. outlaw motorcycle racing events
56. outlaw auto racing events
57. outlaw motorboat racing events
58. stop downhill skiing
59. I might run out of ration coupons before I got home if I made a trip ___ miles
60. I would drive no faster than ___ miles per hour on the open highway to conserve my fuel on a trip
61. falsely report that ration coupons were not delivered in order to get a second set of coupons
62. form a private security service (like a night watchman service) and apply for the unlimited ration to "emergency services" groups
63. form or join a volunteer fire department and apply for the unlimited ration to "emergency services" groups
64. form a trash hauling service and apply for the unlimited ration to sanitation services

65. turn off all emission control equipment on my vehicle if instructions were available and it would increase my gas mileage

66. apply pressure on political friends to obtain some of the state controlled allocation ration

67. exaggerate the economic hardship of reduced fuel available on businesses in my area to obtain a larger fuel allocation in the area

68. layoff administrative city, county and state employees to reduce the driving of publicly owned vehicles

69. roll through stop signs to reduce fuel consumed by a full stop

70. drive through a red stop light if no one is coming on the cross street to avoid wasting fuel

71. illegally double park rather than drive around the block several times to find a parking space

72. coast down long hills to save fuel

73. take all my vacations at home

74. write letters instead of traveling to visit people, even those who live close by

75. ride a bus to travel around in town

76. violate weight limit laws in hauling goods and produce if a truck is more fuel efficient with a heavier load

77. have someone in the family or a neighbor cut my hair or style it rather than going to a barber shop or beauty parlor.

78. purchase oil or gasoline treatment additives to increase my mileage (such as STP and others)

79. purchase carborator fuel flow restriction inserts to increase gas mileage

80. if I had ration coupons which were to expire tomorrow and the fuel tanks on my vehicles were full I would use the coupons to fill cans to be stored in my garage

81. I would sell my unexpired ration coupons to anyone needing them if I did not plan to use them.
82. extra ration coupons that I did not expect to need to use would be given away to someone who could use them.

83. I would drive without air conditioning in the summer to conserve fuel.

84. I would disconnect the air conditioning in my home to conserve fuel.

85. we would cook all hot meals on our kitchen range only once per day to conserve fuel.

86. each person in our family would take a bath or shower no more than once every three days to conserve fuel (two, four, five days?)

87. our lawn mowing, shrub trimming, garden tilling, snow removal, etc., will all be done with hand tools to conserve fuel.

88. all hair dryers, hair blowers, hot combs, etc., will be abandoned to conserve fuel.

89. all food preparation for meals will (except actual cooking) be done with hand powered appliances to conserve fuel.

90. no more than one meal per month will be eaten out of the home to conserve fuel.

91. I would report to the authorities any service station selling fuel without requiring ration coupons.

92. I would report to the authorities anyone selling counterfeit ration coupons.

93. if I owned an oil company and knew rationing were going to start in 90 days, I would raise my prices today.

94. steal fuel.