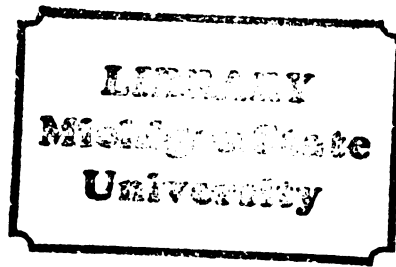


THESIS



3 1293 10420 6234

This is to certify that the

dissertation entitled

ENERGY AND LIFESTYLE:
THE DEVELOPMENT, TESTING AND REFINEMENT OF A
LIFESTYLE EXPECTATION INDEX

presented by

Bonnie J. Knutson

has been accepted towards fulfillment
of the requirements for

PH.D. degree in _____

Family and Child Ecology

A handwritten signature in cursive script, appearing to read "Bonnie J. Knutson".

Major professor

Date 5/14/82

ENERGY AND LIFESTYLE
THE DEVELOPMENT, TESTING AND REFINEMENT OF A
LIFESTYLE EXPECTATION INDEX

By

Bonnie J. Knutson

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Family and Child Ecology

1982

6-117702

© Copyright by
BONNIE J. KNUTSON
1982

ABSTRACT

ENERGY AND LIFESTYLE: THE DEVELOPMENT, TESTING AND REFINEMENT OF A LIFESTYLE EXPECTATION INDEX

By

Bonnie J. Knutson

This research was designed to develop, test and refine a Lifestyle Expectation Index (LEI) as a measure of the relative energy intensiveness of a household's expected living style, five years hence. A research model utilized an ecological perspective to conceptualize present lifestyle characteristics as precursors to the energy intensity of expected styles of living.

The primary data base to test the Lifestyle Expectation Index was collected during telephone interviews with 300 Michigan households. This sample was randomly selected from participants in Statewide Project Conserve, an energy information audit program. The program provided the secondary data base used in this study, including socio-demographic characteristics, energy attitudes, conservation behaviors, and total direct household energy consumption.

Expert review, bivariate correlations, factor analysis, step-wise multiple regressions, alpha tests and measures of central tendency were used to test and refine the index. Analyses suggested that a 30 item refinement of the original 44 question index was a valid and reliable

instrument ($\alpha = .7$) by which the relative energy levels of expected lifestyles could be gauged.

Step-wise multiple regression, discriminant analysis and joint frequency distributions were used to profile households with intensive (high), moderate (medium) and conservative (low) energy lifestyle expectations. Households within each LEI strata were found to significantly differ on eight present lifestyle characteristics: household income, household life cycle, adoption of voluntary simplicity measures, respondent's education, respondent's age, household employment pattern, percent change in total per degree day consumption of direct household energy, and energy conservation attitudes. These eight variables accounted for more than a third of the variance in index scores ($r^2 = .35$). Household income was revealed as both the major predictor ($r^2 = .18$; $p = 0.0$) and primary discriminator (change in Rao's $V = 51.36$; $p. = .0000$) of expected energy lifestyles reported by the sample.

Results from this study indicated that the 30 item index has an acceptable level of validity and reliability, as well as utility to profile households with varying energy lifestyle expectations. The results also suggest that there is a predictive relationship between present lifestyle and the relative energy requirements of a household's anticipated mode of living in the near future.

Bonnie J. Knutson

Based upon these findings, implications for future research, educational programs, and public policy development are presented.

For Bob, Lauri, and Aimee.
They knew I could, when I
thought I couldn't.

ACKNOWLEDGMENTS

How beautiful a day can be
when kindness touches it.
(George Elliston)

In the course of completing this graduate degree, many kindnesses were extended to me by untold numbers of caring people. To each of them, I say thank you for helping me realize an important goal in my life.

--Foremost, to Dr. Bonnie M. Morrison, my program advisor, guidance committee chairman, research director, and dissertation chairman, who continuously challenged me to stretch and grow, both professionally and personally. Her example as a scholar, and more importantly, as a human being, is exemplary.

--To the members of my guidance committee who were most supportive throughout this endeavor: Dr. Mary Andrews, Dr. Margaret Bubolz, Dr. Craig Harris and Dr. Joanne Keith. Each, in his or her own careful way, helped me focus on the specificity of the research effort while still envisioning it in the larger ecological context.

--To Dr. Susan Merkley, Dr. Mari Wilhelm, and Sue Haviland. As graduate students together, we shared the unique joys and anguishes that come only with working towards an advance degree.

--To the countless others who freely gave of their time and expertise throughout this research endeavor. Cynthia Fridgen, Dr. Peter Gladhart, Dr. Willett Kempton, Dr. Linda Nelson, Dr. Beatrice Paolucci, and Dr. Suzanne Sontag served as expert reviewers of the measuring instrument developed in this study. Dr. Nan Johnson graciously shared her analytical expertise. Judy Pfaff's accuracy in programming and knowledge of statistics and computer science made the task of statistical analysis much easier. Diane Osburn was invaluable in the preparation of this manuscript. Her penchant for accuracy and organizational format was paramount in its readability.

--To Ed Kluge, who brought extra laughter into my life at times when it was needed, and who gave me my porch, where I spent many sun drenched hours working.

--To my parents, Doris and Emil Brusatori, who warrant special plaudits. They instilled in me not only the love of learning, but also the importance of developing the potential that is mine.

--And above all, to my husband, Bob, and our daughters, Lauri and Aimee, who were an integral part of this degree. Their encouragement and support were constant, not only during the time of the dissertation writing, but throughout my entire graduate program.

--Finally, to Dr. Denton Morrison and Esther Zaffiro, who truly showed me the meaning of the word courage.

TABLE OF CONTENTS

	Page
LIST OF TABLES	x
LIST OF FIGURES	xii
Chapter	
I. INTRODUCTION	1
Lifestyle Expectations	2
Population	2
Personal Finances	3
Production	3
Promotion	4
Policies and Programs	4
Constraints on Expectations	6
Theoretical Framework	8
Expectation Theory	8
Ecosystems Theory	10
Conceptual Model	11
Research Question	17
Research Problem	18
Research Objective	19
Definitions Relevant to the Study	19
II. REVIEW OF LITERATURE	22
Lifestyle	23
The Importance of the Lifestyle	
Variable	23
Lifestyle Defined in the Literature	25
Determinants of Lifestyle:	
Operationalization of the Concept	28
Empirical Studies Related to Energy	
Conservation Behaviors	37
Summary of the Lifestyle Literature	44
Expectations	45

Chapter	Page
Belief in a Future Energy Problem . . .	45
Intentions to Alter Energy	
Consumption Behaviors	47
Expectations As Utilized In	
Behavioral Economics	49
Summary of the Expectation Literature .	54
Empirical Studies Related to a Linkage	
Between Energy Attitudes and Energy	
Consumption Behaviors	55
Synthesis of the Review	58
Development and Validation of an Index . .	59
Characteristics of an Index	60
Construction of an Index	61
Development of an Energy-Related Index:	
An Example	64
III. METHODOLOGY	66
Lifestyle Expectation Index--The	
Primary Data Base	67
Development of the Lifestyle Expectation	
Index	67
Expert Review: A Test of Content	
Validity	71
Pretesting the Lifestyle Expectation	
Index	73
Project Conserve--The Secondary Data	
Base	74
Selection of the Research Sample	76
Description of the Research Sample . . .	77
Collection of the Research Data	86
Analysis Procedures	86
To Establish Validity of the Lifestyle	
Expectation Index	87
To Establish Reliability of the Lifestyle	
Expectation Index	88
To Establish Utility of the Lifestyle	
Expectation Index	88
Assumptions Underlying the Study	98
Limitations of the Study	99
IV. FINDINGS AND DISCUSSION	101

Chapter	Page
Validation of the Lifestyle Expectation Index	101
Exploration of Instrument Reduction . .	101
Distribution of the Refined Index Scores	108
Bivariate Correlations of the Refined Index and Items Within the Index . . .	111
Analysis of Factors Inherent in the Refined Index	114
Multivariate Analysis of the Refined Index	118
Summary of Findings Relative to Index Validation and Refinement	122
Utilization of the Lifestyle Expectation Index As an Attitudinal Variable Linked to Present Lifestyle Characteristics . .	123
Multiple Regression Analysis	123
Stepwise Discriminant Analysis	128
Socio-Demographic Discriminating Characteristics: Age, Education and Income	133
Household Discriminating Characteristics: Life Cycle and Employment Pattern . .	135
Attitudinal Discriminating Characteristics: Ecoawareness	137
Energy Consumption Discriminating Characteristics: Voluntary Simplicity and Percent Change in Btu per Degree-Day Consumption	140
Housing Characteristics: Location and Technical Conservation Techniques Installed	142
Summary of Findings Relative to Utilization of the Lifestyle Expectation Index as an Attitudinal Variable Linked to Present Lifestyle Characteristics	145
V. CONCLUSIONS AND IMPLICATIONS	149
Conclusions	149
Analytical Conclusion	149
Speculative Conclusion	153
Implications of the Research	155

Chapter	Page
Implications for Future Research	155
Implications for Educational Programs .	160
Implications for Public Policy	161
LIST OF REFERENCES	166
APPENDICES	
Appendix	
A. LIFESTYLE EXPECTATION INDEX TELEPHONE INTERVIEW SCHEDULE: FALL 1981	180
B. SCORING OF RESPONSE CHOICES FOR THE 44 ITEMS IN THE LIFESTYLE EXPECTATION INDEX	189
C. INDEX ITEMS COMPRISING THE SIX REFINEMENTS OF THE 44 VARIABLE LIFESTYLE EXPECTATION INDEX	196
D. LIFESTYLE EXPECTATION INDEX: DISTRIBUTION OF ITEM RESPONSES FOR 300 MICHIGAN HOUSEHOLDS: ITEM MEANS AND STANDARD DEVIATIONS	198

LIST OF TABLES

Table	Page
2.1 Direct and Indirect Energy Use by Income: 1972-73	31
3.1 Income Distribution: Comparison of Research Sample, 1980, and Michigan Households, 1976 .	78
3.2 Educational Attainment: Comparison of Research Sample, 1980, and Michigan Population, 1976	80
3.3 Age Characteristics: Comparison of Age of Respondent in Research Sample, 1979 and Age of Household Heads in Michigan, 1976	81
3.4 Size of Household: Comparison of Research Sample, 1980 and Michigan Population, 1976 .	82
3.5 Form of Tenure: Comparison of Research Sample, 1980 and Michigan Households, 1976 .	83
3.6 Number of Rooms in Dwelling Unit: Comparison of Research Sample, 1980 and Michigan House- holds, 1970	84
4.1 Comparison of Measures of Central Tendency, Alpha Levels, Number of Item-Total Correlations Equal to or Greater Than .30, and Number of Index Factors for the Lifestyle Expectation Index (LEI) and the Six Refined Measures	106
4.2 Bivariate Correlations Between the Refined Lifestyle Expectation Index (30 Items) Score and the Index Items	113
4.3 Loadings in the Varimax Rotated Factor Matrix of Items in the Refined Lifestyle Expectation Index (30 Items).	117
4.4 Stepwise Multiple Regression of the Refined Lifestyle Expectation Index (30 Items) on Total Scores for Lifestyle Expectations . . .	119

Table		Page
4.5	Stepwise Multiple Regression Analysis of the Energy Intensive Lifestyle Expectation Index Scores on Selected Present Lifestyle Characteristics	124
4.6	Stepwise Discriminant Analysis of Low, Medium, and High Energy Intensive Lifestyle Expectation Scores on Selected Present Lifestyle Characteristics	130
4.7	First Order Present Lifestyle Socio-Demographic Discriminating Characteristics by Low, Moderate, and High Energy Lifestyle Expectation Index Scores: Respondent's Age, Respondent's Education, and Household Income	136
4.8	Present Lifestyle Household Discriminating Characteristics by Low, Moderate and High Energy Lifestyle Expectation Index Scores: Household Life Cycle and Household Employment Pattern	138
4.9	Present Lifestyle Attitudinal Discriminating Characteristics by Low, Moderate and High Energy Lifestyle Expectation Index Scores: Ecoawareness Level	139
4.10	Present Lifestyle Indirect and Direct Energy Consumption Discriminating Characteristics by Low, Moderate and High Energy Lifestyle Expectation Index Scores: Adoption of Voluntary Simplicity Measures and Percent Change in Btus per Degree-Day, from 1977-78 to 1979-80	143
4.11	Present Lifestyle Housing Characteristics of Households with Low, Moderate and High Energy Lifestyle Expectation Index Scores: Housing Location and Number of Technical Conservation Techniques Installed	146
4.12	Profiles of Present Lifestyle Characteristics of Households With Low, Moderate and High Energy Lifestyle Expectations	148

LIST OF FIGURES

Figure	Page
1.1 Schema of Selected Present Lifestyle Indicators Related to Household Energy Consumption	13
1.2 Schema of Variables Relating Present Lifestyle Indicators to Future Lifestyle Expectations	15
2.1 Expectations Components of the Index of Consumer Sentiment: February 1972 - August 1979	52
4.1 Distribution of Scores on the Refined 30 Item Lifestyle Expectation Index. (N = 300)	110
4.2 Elaboration of the Research Model: Discriminating Variables of Households With Low, Moderate and High Energy Lifestyle Expectations	132

CHAPTER I

INTRODUCTION

When anyone consumes anything,
he consumes energy (Bullard,
1975, p. 484).

There is increasing recognition of the role played by human factors in consumption activities. One important human factor is expectations. In 1977-78, for instance, the purchases of at least one-third of all one-family houses and new cars were motivated by the expectations of further inflation rather than by immediate needs and wants (Katona, 1980, p. 72). The theory that expectations can influence consumption behaviors is gaining support. It is a theory which emphasizes forecasts and moods rather than the technical factors and the fundamentals of decision-making (Bergmann, 1981).

Expectations are based on repetition of past experiences, the frequency and recency of which may determine their strength. This is true of both individual and collective expectations. Expectations may be in the nature of expecting: 1) a continuation of a prevailing trend, 2) its reversal, 3) stability following previous

change, or 4) change following stability. In other words, expectations may be regressive or extrapolative.

Lifestyle Expectations

During the last two centuries, we have evolved what amounts to an exponential growth culture, with institutions based on the premise of an indefinite continuation of exponential growth. One of the principal consequences of the cessation of exponential growth will be the inevitable revision of some of the tenets of that culture (Hubbert, 1973, p. 37).

During the decades following World War II, the cumulative interaction of several major factors provided a foundation for rising American lifestyle expectations. Fred Vinson, Director of War Mobilization and Reconversions, described it in this manner: "The American people are in the pleasant predicament of having to live fifty percent better than they ever have before" (Jones, 1980, p. 20).

Five of these interactive factors include:¹

Population

In the quarter century preceeding the bicentennial year, the American population grew by more than one-third, soaring from 152.3 to 216.8 million, and formed an additional 20 million households. Demand exploded for commodities such as housing, foodstuffs, clothing, furniture,

¹The data sources most used for the figures in these five factors were: a) Historical Statistics of the United States, Volumes I and II (1976), and b) Statistical Abstracts of the United States, 1940-1980.

automobiles, appliances, and schools, to name only a few examples. Time noted that, in 1947, the population had just increased by ". . . '2,800,000 more consumers' (not babies)" (Jones, 1980, p. 36).

Personal Finances

During this same time frame, personal income rose 580 percent. The median family income increased by a factor of five (\$3,319 in 1950 and \$16,009 in 1977), resulting in the tripling of disposable income at the national level.

Production

The industrial base, in place from the war effort, turned to peacetime production, providing goods and services for burgeoning consumer demand.

We need not stew too much about a post-armament depression. A civilian market growing by the size of Iowa every year ought to be able to absorb whatever production the military will eventually turn loose (Fortune in Jones, 1980, p. 36).

In 1950, the Gross National Product (GNP) was worth 286.2 billion dollars; by 1977, the value of goods and services produced jumped to 1889.6 billion dollars, an increase of 660 percent. Nowhere was this transformation more evident than in the housing and automobile industries. By 1977, Americans occupied 3.1 million more housing units and registered 94.6 million more vehicles than they had in 1950. Newman and Day (1975) point out that the rise in American affluence was symbolized in the automobile. Morrison (1981) calls the period between 1950

and 1970 the most affluent in American history, adding that the average growth rate in the United States economy (GNP) was 3.2 percent. Landsberg (1979) adds that the 3.2 percent growth rate was closely paralleled by a national growth in energy demand of 3.4 percent per year.

Promotion

Consumption was also advanced by new technologies and increasingly sophisticated advertising techniques--especially in the visual media--directed towards a more educated consumer audience. Planned obsolescence was the axiom of production. Consumer credit--touting buy today, pay tomorrow--jumped from 21.5 billion in 1950 (10.4 percent of disposable income) to 260.8 billion in 1977 (19.1 percent of disposable income). Jones (1980) states that the number of Americans who thought installment financing was a good thing increased from 50 to 60 percent in ten years.

Policies and Programs

At the federal level, programs were implemented which fostered consumer consumption (examples are the FHA and VA home loan programs, federal tax credits for loan interests and local property tax liabilities, and interstate highway development). At the same time, policies were enacted which artificially capped the true costs of energy production and consumption (examples are

the inverse utility rates, controlled prices for natural gas, and market demand prorationing¹). Consumers in all sectors of the economy were not required to pay the full energy costs, resulting in a philosophy of "the more purchased, the less per unit costs."

This unprecedented period of economic growth resulted in increasing affluence and a continual rising level of lifestyle expectations. People were better off materially than their parents had been. Almost all Americans were upwardly mobile; the possession of certain basic labor savers became commonplace (Newman and Day, 1975). Americans grew accustomed to "more of," "bigger than," and "new and improved." Expectations for more and better goods were limitless (D. Morrison, 1974).

This rise in affluence and therefore expectations, then, was largely the interactive result of many factors including abundant industrial raw materials, an available pool of labor, and inexpensive energy forms. With an average growth in direct household energy consumption of

¹Market demand prorationing was a policy designed to give each state control over the total supply of crude oil produced within the state. This policy helped keep prices for United States crude artificially above the competitive foreign oil (until the late 1960s) resulting in an increased reliance on foreign oil and a depressed developmental effort towards alternative energy forms.

2.9 percent per year and an average income increase of 2.3 percent per year, with year by year parallels notable (Morrison, 1980), Americans were ". . . in the midst of a revolution of rising expectations, involving a universal commitment to the concept of economic growth as an irreversible and irrepressible need" (Jaguaribe, 1966).

Constraints on Expectations

During the 1970s, it became increasingly apparent that some resources were becoming short in supply. Because of the finiteness of some natural resources, it is impractical, under present technology, to expect a future growth rate comparable to that of the past four decades. Among diverse, numerous contemporary societal problems which may, in their eventual resolution, push society towards a change in living style are: 1) the prospect of depleting critical industrial raw materials, and 2) the prospect of chronic energy shortages and, therefore, a difficult transition to a much more energy-efficient economy (Hubbert, 1973).

If the OPEC embargo was the crisis event, it is believed by many to have signalled a longer term, perhaps even permanent shift from abundance to scarcity of energy resources. The energy problem seems to fit a more basic pattern. It is but the latest in a series of problems recently emerged or recognized that touch on human conditions in quite fundamental ways. Everything we once took for granted--clean air and water,

nourishing and pure food, plentiful natural resources--have somehow become difficult and problematic. Energy is only the most recent manifestation of this general tendency. Like the others, we may suppose that the energy problem is at bottom a societal problem--a problem of the way we lead our daily lives and conduct our public affairs (Wolf in Unseld, et al., 1979, p. 380).

If this assessment is correct, it implies changing values and lifestyles relative to energy use. The energy problem, it appears, results from societal adjustments to a passing situation of energy abundance. The low cost, high quality energy supplies, that encouraged consumption by industrial, commercial and residential sectors, no longer prevail. Basic changes are mandated in the many facets of life: by individuals, by households, and by societies (Brooks and Gington, 1980; Landsberg, 1979; Schurr, 1979; Stobaugh and Yergin, 1979; Paolucci, 1978).

Actually, the world's present problems are by no means unmanageable in terms of present biological and technological knowledge. The real crisis confronting us is, therefore, not an energy crisis, but a cultural crisis (Hubbert, 1973, p. 37).

Toffler (1980) supports Hubbert's contention and adds that the lifestyle changes presently being experienced are not chaotic or random; but that, in fact, they form a sharp, clearly discernible pattern. These changes are cumulative; they add up to a transformation in the way Americans live, work, play and think--i.e., lifestyle.

Theoretical Framework

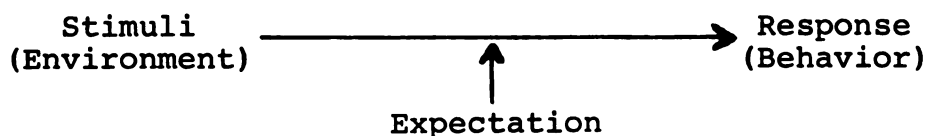
Theories are built from a body of relationships among variables. Kerlinger (in Compton and Hall, 1972) defines a theory as a set of interrelated constructs, definitions and propositions that present a systematic view of phenomena by specifying relations among variables with the purpose of explaining and predicting the phenomena.

In the development of this research study, two theories were relevant: Expectation Theory and Ecosystem Theory. Each is discussed in turn.

Expectation Theory

But there is a price to pay for the experience of substantial progress and the expectation of further progress. When expected progress is not achieved, we feel disappointed or even frustration. What we have today, even if it is much more than that which we had and which gave us full satisfaction yesterday, is no longer enough tomorrow (Katona, 1964, p. 120).

Expectations are personal intervening variables. In its most elementary form, the theory of expectations may be graphically represented as follows.



Personal intervening variables mediate between changes in the environment (stimuli) and people's responses to these changes (overt behavior or action).

They influence both the perception of the stimuli and the responses to them. Katona (1972) points out that expectations are of particular importance when people have substantial discretion of action and when a problem arises about how to respond to the stimuli.

Expectations are considered to be a class of attitudes that point to the future and reflect the degree of probability of an occurrence.¹ Attitudes constitute important intervening variables; they are generalized perspectives with affective connotations, indicating what is good or bad. Attitudinal variables are learned, that is, acquired and modified by past experiences with the environment. People's time perspective extends both backward and forward. Expectations, then, constitute a forward-looking class of attitudes of particular importance for consumption behaviors (Newcomb, 1972; Katona, 1972).

Expectations also tend to be stable as well as directionally consistent; that is, they tend to remain favorable or unfavorable over time. Based upon an understanding of the learning process, Katona (1972) argues that expectations do not generally change without reasons (people must be aware of these reasons and must consider them valid), but concludes that the formation of new

¹To measure expectations in their study on housing and neighborhood satisfaction, Campbell, et al. (1972), asked respondents about the housing and neighborhoods in which they (the respondents) thought they would be living five years hence.

expectations is not always based on a careful consideration of all facets of a situation.

Ecosystems Theory

There is a growing interest in viewing households, in particular, and social phenomena, in general, from a holistic or ecosystems perspective.^{1,2} It is being increasingly applied to analyses of households as a response to a growing concern for maintaining quality of life within a limited environment (Melson, 1980; Burr, et al., 1979a, 1979b; Kantor and Lehr, 1975; Morrison, 1974, 1975; Broderick, 1971; Hook and Paolucci, 1970). Odum (1974, p. 227) states that "as questions about the interaction of energy and environment are raised . . . many are beginning to see a unity of a single system of energy, ecology and economics."

The human ecosystem approach emphasizes, on the micro level, the interdependent relationships between an individual household and its near environments, and on the macro level, the interdependent relationships between

¹A system is simply some part of a whole singled out for attention and whose parts interact. Hence, a system is an organized whole. When the term system is used to refer to a set of components in interaction, the environment is simply all other factors (outside the system) that impinge upon it.

²In 1935, biologist A. G. Tensley coined the word "ecosystem" and defined it as the "whole system including not only the organism complex, but also the whole complex of physical factors forming what we call the environment" (Morrison, 1975, p. 53).

households and larger environments. The latter are conceived to be a set of hierarchical nested environments, based upon solar energy and fossil fuels that support agricultural and industrial environments, which are in turn regulated by social institutions, i.e., educational, legal, political and ethical environments (Melson, 1980; Bubolz, et al., 1978; B. Morrison, 1974).

The energy problem, then, is embedded in a knot of technological, economic and social issues which involves complex interactions among the natural, built and behavioral environments. Given these interdependencies, the environments must be considered together (Commoner in Kranzberg, et al., 1980; B. Morrison, 1974, 1975).

In ecosystem theory, human systems are conceptualized as open, dynamic, and self-reflexive; that is, they extract energy, material and information from their environment and transform it into products and behaviors, the results of which are then transmitted back into the environment. Human systems monitor the effects of their actions on the environment (a form of feedback) and adjust their functioning to maintain goal-direction. "The goal is a fit between system demands and environmental supplies, (and) between system supplies and environmental demands" (Melson, 1980, p. 31).

Conceptual Model

Development of the conceptual model for this study was based upon the review of literature, data availability

and an integration of ecosystem and expectation theories. Discussion of the model is presented here to give the reader a clearer overview of the research problem.

Present lifestyle indicators, that have come under consideration in previously reported energy studies, are shown in Figure 1.1. The directional relationships among these variables are also indicated.

In the literature reviewed, three socio-demographic variables have been related to energy consumption behaviors: age (-), education (+), income (+). In their review, Olsen and Goodnight (1977) summarize the pattern as follows: the younger, better educated, the more affluent a person, the more likely s/he is to support the need for energy conservation and to make some effort to reduce energy consumption. In a reciprocal light, Perlman and Warren (1977), Newman and Day (1975), and others (Farhar, et al., 1979; Olsen and Goodnight, 1977), found that higher income households consume more and thus can afford to conserve more than lower income households. These three variables have also been related to expectations in the same way; namely, the younger, more educated and more affluent hold higher expectations for their style of living (Katona, 1972; Campbell, et al., 1976).

It can be theorized that the three first order socio-demographic variables are in turn related to a set of second order variables, those that more directly influence household energy consumption; for example: size and

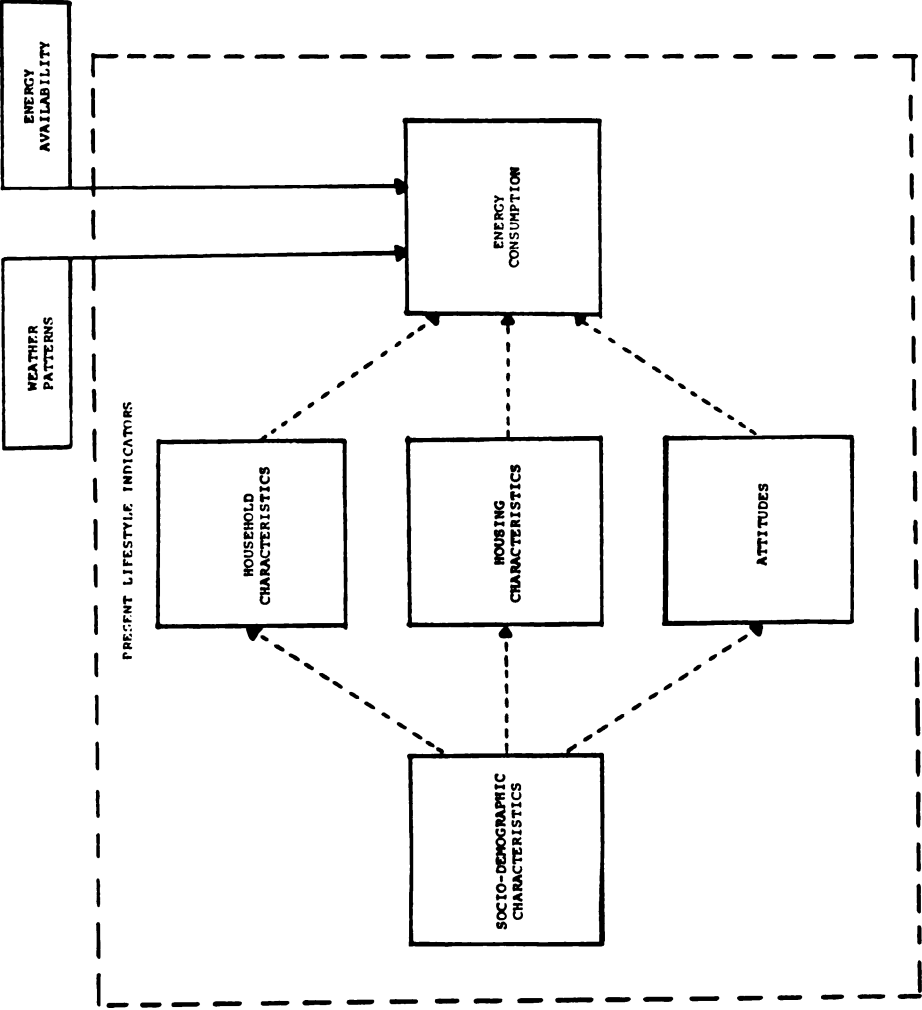


Figure 1.1. Schema of Selected Present Lifestyle Indicators Related to Household Energy Consumption.

location of dwelling unit, size and stage in life cycle of household, and attitudes. Taken together these variables are considered indicators of present lifestyle and conceptualized as related to household consumption levels, including those of direct and indirect energy.

The model presented in Figure 1.1, with variations, has been used in previous energy research, primarily directed at reported conservation behaviors (Farhar, et al., 1979; Olsen and Goodnight, 1977). In light of probable future changes in American lifestyle (resulting, in part, from resource shortages) and in light of the intervening role played by expectations in consumption behaviors, the challenge is to take this basic consumption model a step further and relate present lifestyle measures to perceptions of future lifestyle; i.e., lifestyle expectations.

Figure 1.2, then, depicts this next step. It presents not only the directional relationship between present lifestyle and lifestyle expectations, but also the reflexive nature of those expectations.

Although expectations are directionally stable over time, they are still dynamic; that is, they can be altered by environmental conditions. When viewing households from an ecological perspective, expectations, as an attitudinal variable, become part of a household's decision-making process whereby environmental resources (i.e., materials, energy and information) are inputs taken into the household system, transformed in accordance with its goals and values,

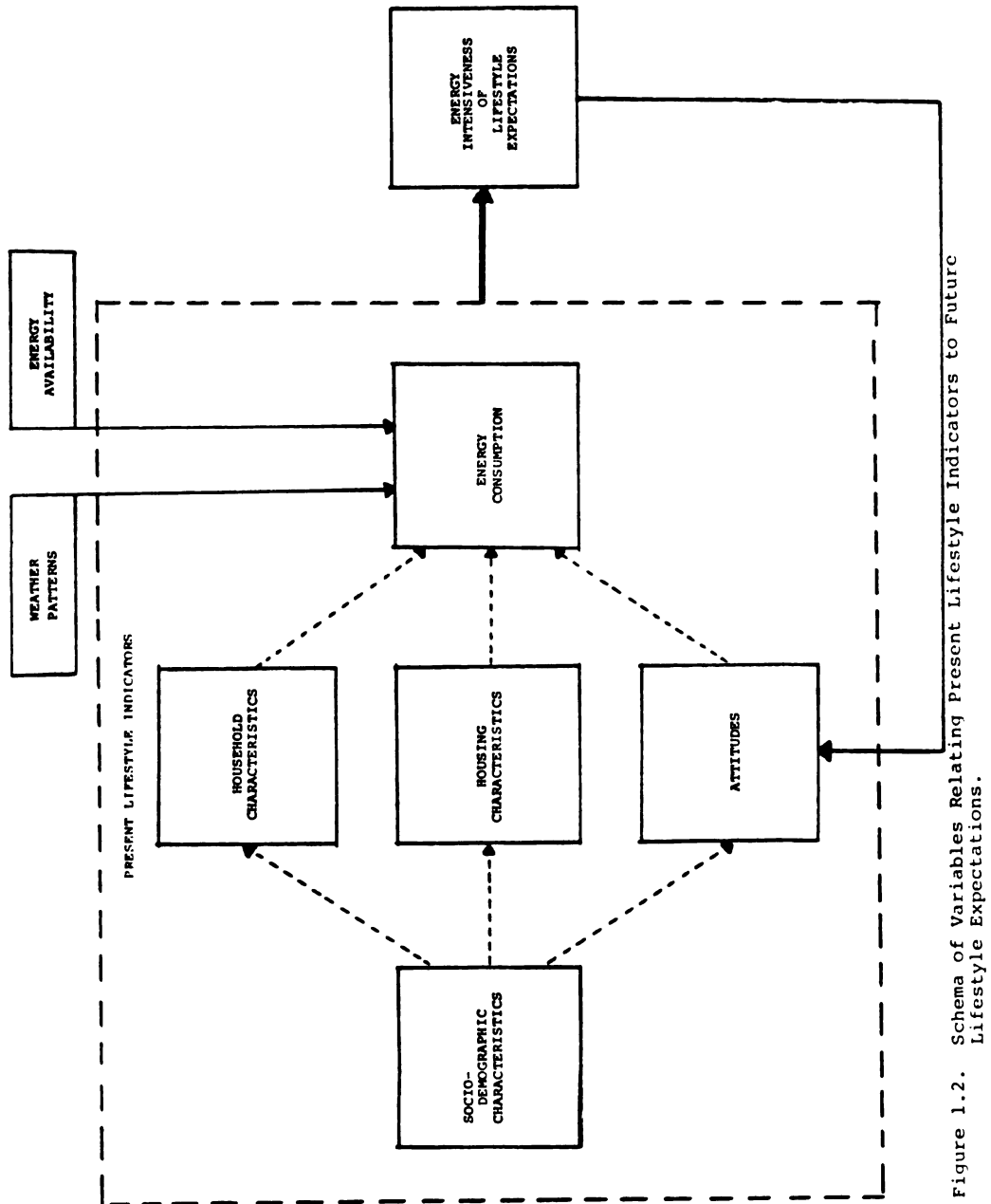


Figure 1.2. Schema of Variables Relating Present Lifestyle Indicators to Future Lifestyle Expectations.

then transmitted back into the environment as materials, services, wastes, and adaptive behaviors. Here, these outputs influence the environmental setting as a whole, and through feedback, again influence the household system in an interactive process.

An example of a hypothetical household will serve to illustrate these relationships. Expecting the cost of its heating fuel (natural gas) to rise significantly in the near term, and valuing warmth as related to health and comfort, a household decides to install a wood stove as its primary heating source. If such a decision were to be repeated on the aggregate or macro level, it could, over time, lead to a change in market demand--i.e., a decrease in the price of natural gas and an increase in the price of wood.

On the micro level, the decision to adopt wood as a primary fuel source could also lead to changes in household behaviors (such as role allocations), resources (such as time and skills) and certain aspects of its living style--perhaps from ease of someone in the household adjusting the thermostat to an entire household activity of wood cutting, stacking, hauling, stoking and removing ashes. These realities could also then influence the household's lifestyle expectations.

The conceptual model developed for this study recognizes lifestyle expectations as intervening variables within an ecological framework. Viewing the household as an ecosystem, the model requires consideration of the

household in both active and reactive roles. In its active role, the household tries to achieve a valued level of goal satisfaction in order to satisfy a hierarchy of energy needs from survival, through safety, and stimulation to support. In its reactive role, the household must constantly adjust to environmental change and adapt to environmental constraints. In other words, the model recognizes lifestyle expectations as an effect of the household's past experiences with the environment and as a cause of the household's decisions and behaviors, which in turn affect its environment.

Research Question

. . . the manner in which individuals lead their daily lives . . . promise(s) to change in the future as we grapple with solutions to the energy problem (Unsel, et al., 1979, p. 3).

Katona proposes the hypothesis that a sudden change in collective expectations will occur only when major new developments are unfavorable, not when they are favorable. "Slow and gradual social learning may be the rule unless shocking news creates fear" (Katona, 1972, p. 570).¹

If the fossil fuel energy problem is considered unfavorable "shocking news" and if, as the literature

¹Dissonance theory would suggest that people are much more likely to accept new levels of lifestyle realities without dissonance if these new levels are not sharply discrepant with their expectancy levels; that is, if the transition is gradual versus if the transition is sudden (Abt, 1977; Appley, 1971).

suggests, future lifestyles promise to change in light of the energy situation, particularly the increasing costs of present energy forms, an overriding question must become: What are the expectations people have for their future lifestyles?

Before this broad question can be addressed, however, a more immediate research question must be answered: Are these expected lifestyles indicative of intensive energy use or conservative energy use? It is within the framework of this more immediate question that this research lies.

Research Problem

The need to develop a program of research exploring the relationships of energy consumption and lifestyle expectations can be found in the literature (Sills, in Unseld, et al., 1979; Wolf, in Unseld, et al., 1979; Katona, 1972). Before these relationships can be explored, however, it is necessary to have an instrument to measure the relative energy intensiveness of expected lifestyles.

The general objective of this study was, therefore, to take the first step in that direction. Specifically, the research problem addressed in this study was to 1) develop, test and refine a Lifestyle Expectation Index (hereafter, LEI) as a measure of the relative energy intensiveness of a household's expected living style, five years hence, and 2) to indicate the LEI's potential usefulness.

Research Objective

Given the nature of the research problem, the following four research objectives were established:

- 1) To develop and refine an index that measures the relative energy intensiveness of lifestyle expectations that include the dimensions of future housing, transportation, nutrition and behaviors.
- 2) To empirically establish a level of validity for the index.
- 3) To empirically establish a level of reliability for the index.
- 4) To determine a potential utility of the index by empirically establishing its power to profile households with intensive to conservative energy lifestyle expectations.

Because the primary focus of this study was the development and testing of a measuring instrument, no hypotheses were formulated.

Definitions Relevant to the Study

For purposes of this study, the following definitions were considered relevant:

Lifestyle--the specific or characteristic manner of expressing beliefs and attitudes through the acquisition and allocation of resources.

Expectations--a class of attitudes which reflects an anticipated prospect of a certain event occurring at a future point in time.

Lifestyle Expectations--the style of living (lifestyle) looked forward to as a due, proper or necessary; it involves a temporal comparison between present lifestyle (t_n) with past lifestyle (t_{n-1}) or with some temporally weighted average of lifestyle changes over all time up to t_n , which allows anticipation of future lifestyle (t_{n+1}). Each lifestyle component is assumed to have an energy intensivity.

Index--a composite measure designed to classify respondents by the combination of their responses to items included in the measure.

Lifestyle Expectation Index--a measure reflecting the relative energy intensiveness of an anticipated style of living. It is a continuum which suggests an expected lifestyle between intensive and parsimonious energy use and taps housing, transportation, nutrition and behavioral dimensions.

British Thermal Unit (Btu)--the amount of energy needed to raise the temperature of one pound of water by one Fahrenheit degree.

Average Total Household Energy Consumption¹--is the average number of total Btus consumed in the dwelling unit after the amount of electricity and/or natural gas, and fuel oil used is converted to the common measurement of Btus for each household, where:

1 CF Natural Gas = 1,000 Btus

1 KW Electricity = 3,413 Btus

1 Gal. Fuel Oil = 140,000 Btus

(#2 Fuel Oil)

1 Gal. Propane = 91,600 Btus

Heating Degree-Days--the number of degrees that the daily average temperature falls below 65° F.

¹Source: "Farm Energy Use" Michigan State University Cooperative Extension Services.

CHAPTER II

REVIEW OF LITERATURE

Embodied within the framework of this study are two diverse, yet interrelated, concepts associated with energy use: Lifestyle and Expectations. The review of literature is, therefore, organized to reflect these dual dimensions. For clarity, studies pertaining to these two concepts have been categorized and are presented in the following sequence:

Lifestyle

- The importance of the lifestyle variable.
- Lifestyle defined in the literature.
- Operationalization of lifestyle in the literature.
- Energy conservation behaviors.

Expectations

- Future belief in an energy problem.
- Future intentions to conserve.
- Expectations as utilized in behavioral economics.

Linkage between energy attitudes (expectations)
and energy consumption behaviors (lifestyle).

As previously stated, the purpose of this study was to develop, test, and refine an index that is indicative of energy intensive to energy conservative lifestyle expectations. Literature pertaining to index creation and validation is, therefore, also reviewed in this chapter.

Lifestyle

The Importance of the Lifestyle Variable

The household is considered an important sector in society relative to energy consumption. It has been estimated that American households account for over 30 percent of the national consumption of direct fossil fuel energy and an additional 40 percent of indirect or embodied energy (National Research Council, 1977; Hannon, 1975). While structural and technical variables undoubtedly influence a household's energy consumption, studies conclude that lifestyle decisions account for a substantial amount (50 percent) of variation in consumption (Keith, 1977; Morrison, 1975; Socolow, 1975; Grot and Socolow, 1974). For example, although Socolow (1975) anticipated that nearly all "lifestyle" effects would vanish through controlled technology, he discovered that for identical households located in similar housing tracts, energy usage was nearly double for some households in contrast to other households of the same size and age composition. He thus concludes that:

People are far from alike, even in their use of gas and electricity. We have

found a wide range of variation in consumption of both gas and electricity, both winter and summer, in nearly identical townhouses. The more a technology allows expression of individuality the more the expected variation, so that indeed there is more variation in summer electrical consumption. . . than in winter electrical consumption and more variation in the latter than in gas consumption for winter. But even the variation in gas consumption for winter heating is substantial (p. 320).

Similarly, in houses where there had been a change in occupancy, Sonderegger (Shippee, 1980) discovered that the consumption level of the new occupants could not be predicted from the level of usage exhibited by the prior residents. Although it was hypothesized that retrofitting (i.e., adding insulation, protective weatherstripping, etc.) identically designed houses in similar climates should yield equivalent reductions in energy use, Woteki (1977) found that there were high variances in energy consumption rates between the retrofitted houses. These examples suggest that energy consumption and perhaps conservation are highly dependent upon both technology and lifestyle.

The importance of lifestyle decisions in conservation efforts is also noted by Keith (1977); Morrison and Gladhart (1976), and Morrison (1975). In a study of 216 Lansing, Michigan households, Morrison found that although physical housing factors were more highly correlated with energy consumption than socioeconomic lifestyle factors ($\beta = .573$ compared to $\beta = .310$ respectively), the lifestyle factors did contribute a respectable amount to

the total variance explained ($r^2 = .485$). She thus concludes that lifestyle factors must be considered important.

Utilizing a subsample from this same Michigan study, Keith found that the role of the behavior of household members (the accumulation of many lifestyle micro decisions) was equally significant to that of energy efficient technology in effecting an overall reduction of 6.3 percent in direct household energy consumption (from 1973-74 to 1975-76).¹

Lifestyle Defined in the Literature

Lifestyle is an ambiguous term which tends to carry different meanings to different persons. Schwartz (1977) calls it a "widely (and loosely) used term that probably brings different images to mind for each individual" (p. 2).

Schwartz views lifestyle quantitatively and relates it to socioeconomic status. It is likewise defined as a "distinct or characteristic mode of living . . . (which) is the result of such forces as cultures, values, resources, symbols, license, and sanction" (Lazer, 1963, p. 3). Lifestyle is also defined as the configuration of roles which individuals choose to emphasize from a larger number of possibilities open to those of similar "basic" characteristics and includes the personal allocation of

¹The decrease occurred in fuel oil and natural gas, the major sources for space heating.

resources such as time, finances, materials and energy (Michelson and Reed, 1970, pp. 18-24). Congruent with this definition is the one formulated by Gladhart and Roosa: ". . . that set of values, behaviors, practices and possessions that are characteristic of a family" (1978, p. 2).

The idea of resource allocation being related to lifestyle is a centralizing theme in lifestyle definitions. As Schwartz articulates, "different lifestyles are identified by some combination of attitudes, mannerisms and more importantly, activity and consumption patterns" (1977, p. 2). Michelson and Reed (1970) concur, pointing out that lifestyle isn't likely to be coincident with one or more objective factors; rather, that it is assembled from pieces of demonstrative behavior.

This interrelationship between resource allocation and lifestyle is well summarized by Gladhart (1977) when he states:

Based upon perceptions of the nature and availability of its resources and constraints, and the nature and salience of its needs, the family engages in sets of activities that are perceived as being instrumental in meeting some need or achieving some objectives. Taken as a whole, this constitutes both an allocation of resources and a division of labour within the family. This outcome is also conveniently referred to as 'lifestyle' (p. 266).

By adding "the heating and gasoline bills are the consequence of the family's lifestyle," Morrison and Gladhart suggest a relationship between lifestyle and

energy consumption (1976, p. 16). Morrison (1980), strengthens this hypothesized relationship by defining lifestyle as "a complexity of social class norms, family structure and functioning, the acquisition and allocation of resources, the outcome of which is some level of energy consumption" (p. 17).

Melson (1980) believes lifestyle's energy needs to be similar in nature to Maslow's hierarchy of needs. She postulates that a hierarchy of needs--survival, safety, stimulation, and support--means that a household requires more and different sources of energy as it attempts to satisfy its hierarchical needs. It appears, then, that as a household satisfies its lower level survival needs and begins to climb the hierarchy of need satisfaction (i.e., changes its lifestyle), its energy requirements increase and become more complex. Thus, satisfaction of hierarchical needs has implications for fossil fuel energy requirements as well as for all other natural resources.

When man has satisfied his physical needs, the psychologically grounded desires take over, which are of 'a lower order of urgency' in the sense, for example, that a car would be given up before food would be given up. It is essential to remember that psychological wants can be as insistent as physical needs, and more importantly, that there is no such thing as reaching a point of satiation with 'higher-order wants' (Galbraith, 1958, p. 143).

Determinants of Lifestyle: Operationalization of the Concept

. . . life style can be seen as well to contribute to a greater proportion of variance being accounted for when cast in the role of intervening variable . . . In the case of consumer behavior the usual major variables of age, education, income, etc., act as constraining factors on behavior, while smaller but significant effects are contributed by value differences and variations in calculations of marginal utility among individuals; these differences, deriving from diverse social and psychological factors, may be aggregated in the concept and operationalization of lifestyle (Michelson and Reed, 1970, pp. 17-18).

Because there are many diverse definitions and/or connotations of lifestyle, operationalization of such a synoptic concept is problematic. Several behavioral research efforts have, however, attempted to define a set of determinants, which may, in the aggregate, reflect lifestyle. In reading the following section, it is important to note not only the differences in variables utilized to measure lifestyle, but also the commonality that runs through the studies.

In their attempt to conceptualize and operationalize lifestyle, Michelson and Reed (1970) looked at how individuals allocated their temporal, financial, and material resources. They believe the:

allocation of resources to be the best medium within which to develop an operationalization of life style because allocation of resources is one of the

best single indicators of that hierarchy of values and hence of life style (p. 24).¹

While acknowledging the importance of socioeconomic status and stage in family life cycle as important determinants of lifestyle, Michelson and Reed define location and type of housing as the two variables most likely to correspond with major lifestyle differences. For example, they postulate that those living in suburban single-family dwelling units are more likely to emphasize a family-home-centered lifestyle whereas central urban dwellers are more likely to place stronger emphasis on extra-residential activities.

Support for the discriminating power of the location and housing type variables comes from Michelson's (1977) study of the mobility patterns of 900 Toronto families. Stratifying the sample in order to control for other lifestyle characteristics, the study points to these two variables as being extremely relevant to lifestyle. Clarifying further, he found that objective factors such as family income, size of family, stage in family life cycle and wife's employment pattern, along with subjective factors, such as behavior patterns relative to "commercial activity" (i.e., consumption) and behavior patterns relative to socialability and recreation were, in turn,

¹They also note that, for greater completeness, emotional and energy resources might also be added. They further caution that energy can only be inferred from the resources of time, finances and materials.

correlated with the location and dwelling unit variables. Thus, they too may be considered appropriate variables by which to operationalize lifestyle.

The first empirical work attempting to relate energy and lifestyle was by Newman and Day (1975). While they acknowledged this as their goal, they concluded that, due to time and methodological constraints, they were unable to develop a theoretical framework for relating an essentially qualitative phenomenon (lifestyle) to one that while partially qualitative, could still be quantified (energy use). However, two of their key findings provide insight into the relevancy of selected variables to this hypothesized relationship.

First, household income is the basic determinant in level of direct and indirect energy use. As shown in Table 2.1, the well-off use substantially more direct household energy than the poor. The Energy Policy Project of the Ford Foundation further estimates that indirect energy consumption of the well-off is about three times that of the poor. The Project cautions, however, that their consumption estimates are "very rough" and leave a substantial part of embodied energy use to be identified and quantified.

Table 2.1. Direct and Indirect Energy Use by Income:
1972-1973.

<u>Energy Use</u>	<u>Poor^a</u>	<u>Lower Middle</u>	<u>Upper Middle</u>	<u>Well-Off</u>
(Average Btu per household - millions)				
Direct	207	295	403	478
Indirect	353	549	831	1095
(Btu Index; Poor = 100)				
Direct	100	140	190	230
Indirect	100	160	240	310

^aNewman and Day based their income categories partly on U.S. government definitions for 1972. Thus, the average income of poor households was \$2,500. The lower middle group includes all the nonpoor whose income was under \$12,000 (average income: \$8,000). The upper middle group had incomes between \$12,000 and \$16,999 (average income: \$14,000) and the well-off had incomes of \$16,000 or more (average income \$24,500).

Source: Adapted from Newman and Day (1975), Figure 5-1, page 88 and Table 5-1, page 90.

Newman and Day thus conclude that when "all the spheres of discretionary consumption . . . are taken into account, the energy gap (level of direct and indirect use) will (more closely) approximate the income gap."

The other key finding of Newman and Day's study relates to Michelson's work. Once a household chooses its dwelling unit (and consequently its type and location), much of its lifestyle and energy use are predetermined. For example, the setting, the architectural design, and the heating system influence direct energy use in the house; its location dictates the proximity to and

transportation choices for employment, commercial and recreational activities. They conclude that since lower income households have less choice in either the location or type of dwelling unit in which they live, they have less flexibility in either their use of energy or their lifestyle options.

In The Contrasumers, Fritsch (1974) presents an attempt to quantify both the direct and embodied energy requirements of lifestyle--thereby overcoming the shortcoming of which Newman and Day wrote. To this end, he developed a Lifestyle Index--i.e., an inventory--of six parts: 1) Household Energy Expenditures, 2) Household Materials and Personal Items, 3) Foods and Beverages, 4) Leisure Activities, 5) Transportation, and 6) Social and Collective Services.¹

While such a comprehensive endeavor is commendable, certain limitations must be considered relevant to Fritsch's inventory. First (and one which he readily admits), many approximations and estimates of how many "energy units" are utilized in each good or service had to be made. Such quantification entails a personal judgment as to what goods and services to include and how to apportion their energy unit value.

¹By "filling in the blanks and adding up the total," Fritsch suggests that the reader can evaluate the energy requirements of his or her own lifestyle in comparison with that of the average individual in the United States and in other countries.

Secondly, the inventory does not take into account factors such as attitudes, values, or the household decision-making process.¹ Finally, presented as the "first practical guide for changing lifestyles," the Lifestyle Index has not been empirically tested as a valid measuring instrument. Its primary value seems to be in alerting the layperson to the energy consequences (especially embodied energy) of lifestyle choices and to heighten the "sense of social responsibility in the efficient use of energy" (Fritsch, 1974, p. 159).

In their review of energy conservation literature, Farhar, et al. (1979, pp. 207-217), arbitrarily established four "lifestyle characteristics:" marital status, housing characteristics, homeownership, and transportation characteristics. For the categories employed to organize the energy data related to these four characteristics, their pattern of findings are as follows:

- Perception of the Energy Crisis--few items relating to perception of the energy situation were analyzed by these four lifestyle variables; no patterns of difference were found.
- Energy and the Environment--Insufficient data were available to discover patterns by lifestyle characteristics regarding the energy-environment tradeoff.

¹For a more comprehensive discussion of a household's decision-making process relative to energy use and lifestyle, see Gladhart and Roosa (1978), Perlman and Warren (1977), Gladhart (1977), and Keith (1977).

--Knowledgeability and Information Sources About Energy--No strong patterns of difference were discovered regarding knowledgeability about energy or credibility of information sources.

--Attitudes About Solar Energy-- No patterns of difference were discovered by the lifestyle variables.

--Attitudes About Conservation--Data suggests that unmarried people are somewhat more likely to find infringement on personal mobility a hardship than are married people. No patterns in difference in energy conserving behavior by marital status were discovered, however. No patterns of difference by housing characteristics and living situations were discovered regarding conservation. There is some evidence that homeowners are more concerned than renters with reducing energy consumption.

What is more noteworthy than these findings is Farhar's, et al. (1979), choice of the four lifestyle indicators. Housing and transportation characteristics closely parallel the notion expressed by Michelson and Reed (1970) and supported by Newman and Day (1975); namely, the location and type of dwelling unit are primary determinants of both lifestyle and energy use. While homeownership and marital status are not as obvious, by deduction, it is evident that both are related to location and dwelling unit type and thus to style of living and consumption of direct and indirect energy.

In repeating "some earlier efforts to model variations" in electricity and natural gas consumption in single family, detached dwellings, Latta, et al. (1981), utilized two different combinations of variables to define lifestyle. First, in developing a model for the

consumption of electricity for air-conditioning, an interaction of household income, cooling degree days and number of rooms air-conditioned by different types of equipment was used. Secondly, for natural gas consumption, the lifestyle of the household was represented by the interaction of the respondent's age, the number of heating degree days, and the use of natural gas as the main heating source. No rationale was presented for the different representations. The authors also indicate that "in both models, the number of bathrooms is probably an indication of . . . the lifestyle of the occupants" (p. iv).

A longitudinal study entitled the "Family Energy Project" was "from the beginning (January, 1974) designed to measure several important aspects of family lifestyle and energy" (Morrison, 1981, p. 15). Pointing to the interdependency of lifestyle and energy use, the study conceptualizes lifestyle as the complex interaction of societal norms, family characteristics and resource distribution, resulting in some level of energy consumption (Morrison, 1981, p. 17).

From a multidimensional model, a set of variables was selected to reflect what the researchers deem to be "essential variables defining lifestyle and energy use." They include:

Objective Measures: defined as measures of a factual nature.

1. Family Characteristics--income, age distribution, educational attainment, occupation, number in household.
2. Housing Characteristics--location, tenure, number of rooms, orientation, age.
3. Appliance Characteristics--kind and number of major and minor appliances.
4. Automobile Characteristics--kinds, numbers, size, cost.
5. Energy Consumption--household consumption of natural gas, fuel oil, electricity, liquid petroleum gas (LPG), (Btus and quantities).
6. Conservation Characteristics--measured difference (quantities and Btus) between 1974 and 1976, controlled for degree-days.

Subjective Measures: defined as beliefs, attitudes, values, and reported behaviors.

1. Belief in an Energy Problem--now, short run and long run.
2. Attitudes about Energy--Who is to blame; the relative importance of energy to other social problems.
3. Values--Human Responsibility (personal resolution to solve); Ecoconsciousness interrelatedness of economic and energy based systems); Lifestyle Flexibility (willingness to change) and Ease of Cutting Back (perceived ease of change).
4. Reported Behaviors--Related to consumption and conservation behaviors in housing and automobiles.

Although complete findings have not yet been published, this study takes the conceptualization and operationalization of lifestyle further than the studies

discussed previously.¹ By quantifying the subjective elements of lifestyle, and integrating them with the objective measures, a more complete profile of living style (relative to energy) is formulated. It should also be noted that this study did not attempt to specifically include the measurement of embodied energy in its model as Fritsch tried to do. Rather, its recognition of the interdependency of lifestyle and indirect energy use can be assumed by its use of housing, appliance, and automobile measures.

Empirical Studies Related to Energy Conservation Behaviors

Since lifestyle can be identified, in part, by activity and behavior patterns, findings exploring households' energy use behaviors, both self-reported and actual, are presented.

The importance of energy conservation is well documented (Brooks and Gington, 1980; Landsberg, 1979; Schurr, 1979; Stobaugh and Yergin, 1979).

Indeed, in the near term, conservation could do more than any other of the conventional sources to help the United States deal with the energy problem . . . conservation is the key energy source . . . (it) is no less an energy alternative than oil, gas, coal or nuclear (Stobaugh and Yergin, 1979, pp. 136-137).

¹For partial findings, the reader should consult Hungerford (1978), Keith (1977), Hogan (1976), Eichenberger (1975), and Morrison (1975).

Schipper (1976) has identified three important conservation strategies: 1) Input Juggling, 2) Belt Tightening, 3) Output Juggling.¹ Each is discussed in turn.

Input Juggling involves changing the mix of physical inputs into a given kind of output. Substitutions can be made among energy forms, materials, or economic variables such as labor, capital, design, or machines. Recycling is a form of input juggling. The use of returnable beverage containers substitutes capital and labor for the extra energy and materials lost through throwaways. In a similar vein, the use of "free" solar energy requires a substitution of investment and technological design for direct energy expenditures.

Input juggling requires the least amount of lifestyle change and can be thought of as a "technical fix." Its advocacy is promulgated in policy and program statements such as " . . . it is to be fervently hoped that some sort of technological solution will be found . . . and . . . save us all from potentially painful transitions in our living habits . . ." (Foresight, 1978, p. 1).

Many consumers think that technology will overcome the energy problem, a belief which allows them to continue

¹Stobaugh and Yergin (1979) identified three categories of conservation as curtailment, overhaul and adjustment (pp. 138-139). These categories are comparable with those of Schipper.

consuming energy extravagantly (Schnorr, 1979). In a study of two California energy-saving communities, Hamrin (1979) found that people in houses with the greatest technological potential for savings actually made fewer conservation efforts on their own than did people in conventional houses of a comparable nature. She attributes this to the attitude of those people who bought solar houses, thinking the houses were a "technical fix" and they didn't have to think about energy savings measures--i.e., let the structure do it for them.

Indeed, a centralizing theme in the energy lifestyle discussion has been that conservation, i.e., changes in energy consumption, should not alter existing lifestyles (Morrison, 1980; Farhar, et al., 1979; Rudd, 1978; Olsen and Goodnight, 1977). Rudd (1978) concludes that people may be harboring the hope that by reacting negatively to an unwanted change, they can prevent it from happening.

Belt Tightening involves turning off lights, changing thermostat settings, driving more slowly or car pooling. These small, but important changes in energy use cause only minor inconveniences or changes in lifestyle and habits, and are behaviors that must be consciously pursued. The energy conservation activities of most Americans involve this strategy. "Even the most ardent believers in impending energy shortages have made only minor changes in their energy consumption" (Schwartz, 1977).

People like to think that they are contributing to energy conservation, so they take the energy saving steps that involve little inconveniences (Milstein, 1976).

Or:

The less disrupting a measure would be to current lifestyles, the more likely it is to be accepted by the public (Bartell, 1974; Bultena, 1976).

And:

The majority of people are willing to endorse those energy conservation policies and programs which will cause them the least in the way of personal inconvenience or expense (Gottlieb and Matre, 1976).

Hayes (1976) suggests that Americans will continue to travel as many miles, keep their homes as warm, operate as many appliances and eat what they now eat because "they assume that lifestyle will change only cosmetically" (p. 7). Indeed, more than half (53 percent) of a national sample (n = 2023) said that the energy situation has had little or no effect on their lifestyle, while another 30 percent reported that their lifestyle was less comfortable and convenient, but not seriously so (Solar Age, April 1981, p. 22).

Some changes in energy use have been reported, however. Farhar, et al. (1979), states that "85 to 95 percent of survey respondents indicate that they have tried to conserve at least 'a fair amount'." A national survey

conducted in 1976 discovered, for example, that 55 percent of those interviewed were making an effort to turn out lights when leaving a room, and that 48 percent were reducing their thermostats to 68° or lower during the day (Milstein, 1977). In the studies reviewed by Olsen and Goodnight (1977), figures range between 62 and 93 percent for those who reported reducing their levels of home lighting and heating (p. 9).

A hierarchy of conservation practices is reported by Morrison, et al. (1979). High levels of adoption include turning off unused lights (96 percent), maintenance of heating equipment (68 percent), setting the daytime temperature no higher than 68° in winter (65 percent). Moderate levels of adoption include reducing the use of hot water (51 percent) and establishing a nighttime temperature of 60° or less in winter (47 percent). A low adoption level was reported in the use of a clothesline rather than a dryer (32 percent).

In a statewide Michigan study (n = 2016), Harris and Keith (1980) report finding a similar hierarchy of behavior adoption. To the extent that self-report is accurate, high frequencies (more than 70 percent) were reported for adding five or less inches of attic insulation, adding storm doors and/or windows, wall insulation, using less hot water, wearing warmer clothing in winter, opening windows to cool on pleasant days, and lowering

the thermostat when going to bed. Moderate frequencies (40 to 70 percent) were reported for weatherstripping doors and windows, servicing heating systems, using the clothesline, setting the daytime temperature at or below 68° in winter and reducing the number of rooms heated. Low frequencies (less than 40 percent) were reported for other behavior decisions such as adding more than five inches of attic insulation, insulating the hot water heater, heat ducts or basement walls, solar or wood heat as an alternative energy source, lowering the thermostat setting when absent from the house and adding a clock thermostat.

Keith (1977) found that when a scale measuring increased intensity of conservation behaviors was entered into a forward regression equation, it was a significant predictor of direct household energy consumption level ($p = .003$).

Harris, et al. (1980), also utilized a regression procedure to assess the effects of conservation behaviors on a reduction of 5.1 percent in measured direct household energy consumption between 1976-77 and 1978-79. For this Michigan sample, adding wall insulation was the only significant predictor ($p = .02$). Altogether, however, the ten behavioral variables used in the regression equation were able to explain seven percent of the variance.

Although increases in conservation practices and decreases in energy consumption have been reported, many believe it will be harder to conserve more in the future (Morrison, et al., 1979; Curtin, 1976). Asked how difficult they thought it would be for their family to further reduce their use of heating, electricity and gasoline, a majority said it would be "difficult" to conserve energy with a sizeable proportion saying it would be "very difficult." One-third of the 1400 respondents, nationally, indicated it would be "very difficult" to further conserve gasoline, one-fourth said reducing home heating would be "very difficult" and one-fifth said cutting down on their use of electricity in the future would be "very difficult"¹ (Curtin, 1976, pp. 41-42).

A more complete picture of people's views on energy conservation would show, then, that a majority of adult Americans believed that demands for energy must be curbed by consuming less . . . and conservation was widespread. Nonetheless, the prospect of future conservation was viewed as problematic and a difficult course of adjustment (Curtin, 1976, p. 42).

In the future, higher energy costs may force additional energy conservation and shift lifestyles (Committee on Science and Technology, 1977). The majority of conservation efforts, Landsberg (1979) points out, are a result of higher costs. As prices of direct and indirect energy

¹In contrast, only one in ten respondents, on the average, said it would not be difficult to reduce future energy consumption.

increase, as there are shortages, curtailments and prohibitions, people respond by using less. Sociologist Edward Devereau (in Titus, 1978, p. 18) states that there is evidence that people can change their lifestyle in very dramatic ways when convinced it's necessary. When you see people frowning on others who drive big cars, he says, you'll know we are moving in that direction.

Output Juggling results from changes in lifestyle, consumer preferences, investment practices or major shifts from manufacturing to services in the economy that lead to directly lowered energy demands. Smaller cars, changing housing patterns, increased lifetime of durable consumer goods, or altering recreational patterns or tourism are examples.

Certain subpopulations have already embraced major changes in what might be termed the "American Lifestyle." Most notably are those engaged in communal living (Feldman in Titus, 1978; Corr and MacLeod, 1972, 1975), "voluntary simplicity" (Leonard-Barton and Rogers, 1980; Elgin and Mitchell, 1977), and "elegant frugality" (Hannon, 1975).

Summary of the Lifestyle Literature

The importance of understanding the interdependency of lifestyle and level of energy use is clearly demonstrated in the literature. The definition and operationalization of lifestyle are not as clearly documented, however. Numerous variables have been selected to define

lifestyle. Primarily, they are objective in nature, although, one study (Morrison, 1981) incorporates subjective measures into a multidimensional energy lifestyle model.

In the studies reported, energy consumption and/or conservation measures have been conceptualized as dependent variables, resulting from the selected lifestyle-defining measures (as independent variables). Thus, both zero-order and higher order analyses have been used in an attempt to explain the predictive impact of lifestyle measures upon energy use.

The literature also demonstrated that, while Americans are altering their energy consumption behaviors in small, but important ways, the vast majority of lifestyles have not been significantly changed. There was also a perception that future changes in energy use (i.e., lifestyle) efforts will be problematic.

Expectations

Expectations are, in theory, considered attitudinal in nature. Therefore, findings pertaining to persons' attitudes about future energy issues are included.

Belief in a Future Energy Problem

Olsen and Goodnight (1977) conclude, from their evaluation of social and behavioral literature on energy conservation (both theoretical and empirical), that a majority of Americans do have a general understanding of

the fundamental energy situation. At least half believed the energy problem is real, now or in the future. Findings vary, depending on the wording of the questions and the timing of the survey, but in general, surveys indicated that between 38 and 64 percent believed that the country faces a long term energy problem (p. 7).

These findings are corroborated by Farhar, et al. (1979), who looked at questions directed towards respondents' estimates about the duration and/or intensity of the energy problem. Based upon an analysis of 115 surveys, they conclude that an increasing majority (up to 79 percent) felt that the United States faces energy shortages and rising energy costs in the foreseeable future.¹ The proportion indicating expected shortages of electricity ranged from 24 to 82 percent, while about 50 percent expected shortages of oil and between 45 and 60 percent of the public expected the United States to experience shortages of natural gas in the foreseeable future (pp. 89-100).^{2,3}

¹The 115 surveys came from major pollsters (Roper, Harris, Gallup), from federal, state and local agencies, and from universities and private sources.

²The discrepancies were partially attributed to differences in item wording and in geographical areas sampled. National surveys tended to produce the highest percentages expecting future electrical shortages.

³Farhar, et al. (1979), further states that the public perception of future energy supplies is more hopeful for coal, nuclear power and solar energy.

Surveys also indicate that, based upon perceived United States technology, respondents felt optimistic about the energy future (Market Facts of Canada, 1979; Angell, 1975; Barnaby and Reizenstein, 1975). A survey conducted in Grand Rapids, Michigan found that while 66 percent agreed "there will be an energy related problem in the future in the United States," 62 percent felt that "the problem will be solved in the future" (Thompson and MacTavish, 1976). In a 1980 national survey, 57 percent of the 2023 homeowners queried, expected the national energy situation to improve "about five years from now," while only 27 percent believed it would worsen (Solar Age, April 1981, p. 22). Sommers's, et al. (1981), survey of 209 Detroit, Michigan, households likewise detected an optimistic, though more long range, outlook for the United States' energy future. Most people did not expect the energy crisis to end by 1985, but about half did expect it to end by 1995 (p. 31).

Intentions to Alter Energy Consumption Behaviors

Studies, concerned with future intentions to conserve, also provide some interesting findings related to this research effort. Hummel, et al. (1978), discovered that demographic variables showed only a weak ability to predict behavioral intentions to support energy conservation policies. A survey by Honnold and Nelson (1976) postulates that traditional demographic variables may have to be supplemented by "demographic profiles" in

order to be effective predictors of future intentions to conserve. These authors constructed such profiles by combining demographic variables with attitudes towards energy issues.

A second finding obtained by Hummel, et al. (1978), corroborates the results of a large scale Los Angeles survey (n = 1069) conducted by Sears, Tyler, Citrin and Kinder (Ferber, 1977). Both suggest that the perceived personal impact of an energy availability crisis was a fairly powerful predictor of respondents' behavioral intentions. In the Sears, et al., study, perceived impact was also the most powerful predictor of self-reported conservation efforts. Thus, when persons perceived the crisis as severely affecting them personally, conservation intentions increased.

Two laboratory experiments support this conclusion. Hass, et al. (1975), and Wasco, et al. (1976), examined the effect of the perceived magnitude of noxiousness of a potential energy crisis on respondents' intentions to reduce energy consumption.¹ They found that increases in the perceived severity of an energy shortage elicited stronger intentions to conserve.

Several surveys (Hummel, et al., 1978; Nietzel and Winett, 1977; Rapoport, 1975) indicate that the

¹The Wasco, et al. (1976), study was a replication of Hass, et al. (1975).

perception as to the source of the blame for the energy shortage is the most powerful predictor of a behavioral intention to conserve. When persons perceive that their personal energy consumption patterns are wasteful, that is, when they accept personal responsibility for energy mismanagement, they are more likely to express intentions to conserve energy. It is interesting to note, also, that in each of these studies, respondents were more favorable toward government policies that would lead to increases in production of energy resources rather than decreases in energy consumption. They likewise preferred voluntary rather than mandatory techniques to reduce national consumption levels. Zuiches' (1976) analysis of policy acceptance by 217 Michigan families agreed.

Expectations As Utilized In Behavioral Economics

It is clear to me from talking with people all over the country that they are not convinced they need to reduce their energy use. Everything in our culture has led them to act in a different way for the last fifty or sixty years (Titus, 1978, p. 17).

This study was concerned with lifestyle expectations. To better understand the concept of expectations and its relationship to energy demand, the author turned to the discipline of behavioral economics because 1) in behavioral economics, the focus is on the process of decision making on consumption rather than on the results; that is, the study of the human factor is an important consideration in measuring and analyzing the psychological

antecedents of consumption activities including attitudes, motives, and expectations, and 2) in an affluent society, characterized by "more for many" rather than "much for few," motives, attitudes and expectations play a much greater role than in a poor society in which consumption is a direct function of income (Morgan, 1980; Katona, 1964, 1980; Katona and Mueller, 1956).

The theory that expectations are related to consumption behaviors has become increasingly important (Bergmann, 1981). Support for this theory can be drawn from data collected in the longitudinal nationwide surveys conducted by the Institute for Social Research at the University of Michigan.

Katona (1980) reports that efforts to forecast economic trends from survey data on changes in consumer attitudes and expectations have been very successful on the aggregate or macro level.¹ When the Index of Consumer Sentiment² was correlated with macro measures reflecting the changes in the national economic activities (such as the Gross National Product or automobile sales), it was

¹Similar success has not been reported in predicting individual consumption behaviors from individual attitudes and expectations. Katona attributes this to the fact that individual attitudes may change quickly and are affected by a great variety of factors.

²The Index of Consumer Sentiment represents a macro measure reflecting the attitudes and expectations of all Americans.

found that the Index declined substantially prior to the onset of every recession and advanced prior to the beginning of every economic recovery since 1950 (Katona, 1980, p. 51).

As indicated in Figure 2.1, the expectation components of the Index of Consumer Sentiment reached its peak level of over 90 in the fall of 1972; by the fall of 1973, prior to the Arab Oil Embargo, it fell to 72.¹ In reporting this finding, Katona quotes a "friendly critic" of the predictive value of consumer expectations:

You are lucky; your 1973 prediction of a forthcoming recession proved correct because shortly after you made your prediction something happened that you did not foresee, namely, the oil embargo (Katona, 1980, p. 67).

Katona argues however, that based upon past experiences regarding the influence of people's expectations on consumption behaviors and in turn on cyclical trends, the notion that the recession of 1974-75 was caused by the Oil Embargo alone is contradicted.

Consumer expectation revived in 1975-76, signaling a forthcoming economic recovery period with purchases of automobiles and single family dwellings leading the way. Survey data revealed that these purchases were motivated

¹Katona attributes this decline to the lack of consumer confidence in the American economy which stemmed from rapid increases in food prices, in overall inflation, and in dwindling trust in the government.

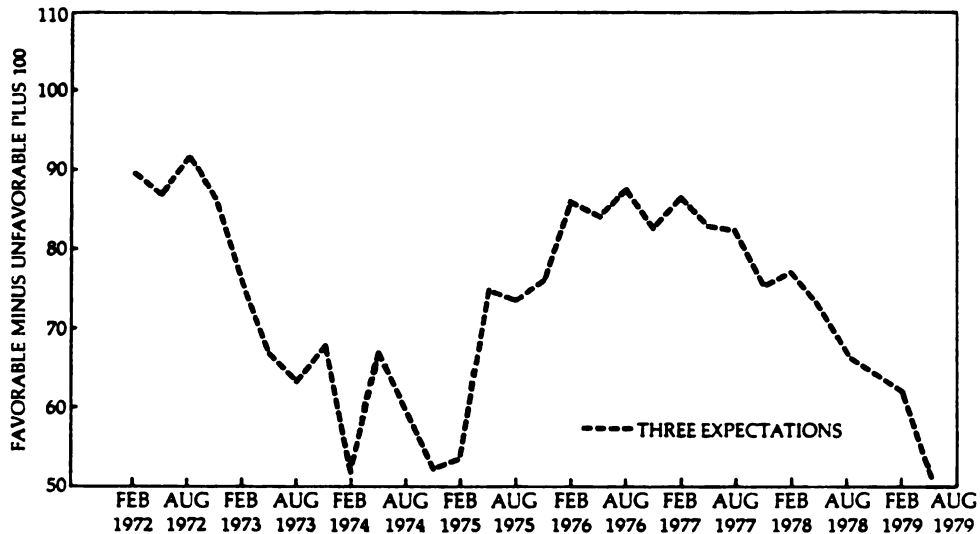


Figure 2.1. Expectations Components of the Index of Consumer Sentiment: February 1972 - August 1979.¹

¹The following three questions asked by the Institute for Social Research's Center in its quarterly surveys reflect the expectation component of the Index of Consumer Sentiment.

- 1) Looking ahead--do you think that a year from now you (and your family living there) will be better off financially, or worse off, or just about the same as now?
- 2) Now turning to business conditions in the country as a whole--do you think that during the next 12 months we'll have good times financially or bad times, or what?
- 3) Looking ahead, which would you say is more likely--that in the country as a whole we'll have continuous good times during the next 5 years or so, or that we will have periods of widespread unemployment or depression, or what?

Source: Adapted from Katona, 1980, pp. 68-69.

by more than the optimism that follows the inauguration of a new administration (Carter's); beginning in 1977, they were motivated by an expectation of coming higher prices.

While the Law of Demand says that demand will decrease as prices increase, the law was contradicted in 1977-79 when consumers responded to large increases in the prices of single family houses and automobiles by increasing their rate of purchases because they expected further substantial price increases in the future. In 1978, more than one-third (40 percent) of those who purchased automobiles and single family dwellings did so before they really needed them because they expected that later they would be unable to afford them.

Katona postulates that what contributed strongly to the general inflation in 1978-79 was the buying behavior of the people. Consumers resorted to advance buying in fear of further price increases; business had no fear that higher prices would lower sales and therefore promptly passed all cost increases to their customers. Even anticipatory pricing--that is, setting prices so as to compensate not only for past increases in costs but for expected future increases as well--became a common business practice.

Attitudes and expectations functioned as variables intervening between a stimulus (change in prices) and response (extent of demand). Expectations were, at that time, the major factor shaping the demand for the two largest, most energy consuming purchases people make--a

house for their own occupancy and an automobile (Morgan, 1980; Katona, 1980).

In the fall of 1977, the Index, especially its expectational component, again began to decline, and by late 1978 it indicated an economic recession forthcoming. Then, in 1979, came a sharp increase in crude oil prices and gasoline shortages, both of which were major factors in the economic downturn. Again, Katona states that the earlier sharp deterioration in the consumer sentiment (especially measures of expectations) clearly indicated the economic slowdown of 1979. Thus, he argues, psychological factors such as expectations, do have a predictive relationship to consumption behaviors. Morgan (1980, p. 222) supports this conclusion when he states:

In an uncertain world, where the choices are actions that are expected to lead to satisfaction, a third dimension enters: the subjective probability that a particular action will actually lead to that desired result. Psychologists use the term "expectancy" for this notion of subjective probability. The final attractiveness of some alternative [lifestyle] is then stated to be the product of the strength of the basic motive (value), the incentive value (marginal utility), and the expectancy (the probability that the desired outcome will occur).

Summary of the Expectation Literature

The importance of the relationship between expectations and consumption behaviors has proliferated in economics since the late 1970s when inflationary pressures rendered traditional economic models obsolete (Bergmann,

1981).¹ This awareness has not been reflected in the energy-related behavioral studies reported to date. Expectations have only indirectly been considered relative to energy use through measures directed at belief in a future energy problem and personal intentions to conserve energy.

Those studies reporting belief measures tended to rely on frequency distributions and zero-order analysis. Consequently, what is known about future belief relative to energy consumption patterns is restricted to an overview of a given sample or analysis by selected individual variables.

In the case of intentions to conserve measures, however, higher order analysis has been utilized to suggest that a demographic profile (constructed from socio-demographic, attitudinal, and perception variables) may be an effective predictor of a person's future intentions to conserve energy. Because, in terms of social-behavioral issues, the energy question is a recent phenomenon, time has not permitted research to sufficiently investigate the correlations between intentions to conserve and resulting conservation practices and/or changes in living style.

Empirical Studies Related to a Linkage Between Energy Attitudes and Energy Consumption Behaviors

The energy studies reviewed to this point have focused on either attitudes (beliefs and intentions) or on

¹Considerably earlier, the economist John M. Keynes emphasized the extent to which expectations influence current activities.

energy consumption/conservation behaviors (lifestyle).

A third category of studies has been concerned with both of these dimensions, which theoretically, should form an attitude-behavior linkage relative to energy use.

Some evidence has been offered that indicates people often express attitudes favorable to energy conservation yet behave in a conflicting manner (Milstein, 1977; Curtin, 1976; Wasco, et al., 1976; Murray, et al., 1974). Other evidence is offered that, indeed, energy attitudes do play a role in energy consumption behavior (Seligman, et al., 1979).

Curtin (1976) and Murray, et al. (1974), had little success in predicting self-reported consumption levels or conservation estimates. Seligman, et al. (1979), suggests however, that this result may be because persons are poor self-monitors of their consumption behaviors rather than because there is no attitude-behavior relationship. Supportive of this contention, Seligman, et al. (1979), utilized actual energy consumption levels (electricity use) to which respondents' attitudes and beliefs about energy issues were correlated. A factor analysis on 28 attitudinal questions yielded four general attitudinal factors related

to the use of air-conditioning.^{1,2} The results of a multiple regression analysis revealed that the Comfort and Health Factor was an extremely potent predictor of air-conditioning usage levels, accounting for over 30 percent of the total variance in consumption.³ On the first of two administrations of their attitude questionnaire (but not on a later replication), two additional factors emerged as significant predictors. The High Effort-Low Payoff Factor and the Role of the Individual Factor together accounted

¹Seligman, et al. (1979), were specifically interested in air-conditioning because it accounted for nearly 70 percent of the respondents summer electricity use.

²The four factors identified were: 1) Personal Health and Comfort Factor, reflecting the belief of many respondents that personal comfort is related to air-conditioning, 2) High Effort-Low Payoff Factor, which suggests persons' levels of energy conservation may be determined by their perception of the degree of effort needed to conserve and the extent to which these efforts result in substantial monetary savings, 3) Role of the Individual Factor, which reflects the extent to which individuals feel their personal conservation efforts would impact national energy conservation levels, 4) Legitimacy of the Energy Crisis Factor, which represents the perception of the extent that the energy crisis was "manufactured" by producers.

³In a nationwide probability sample of 1203, ORC (1976) also found that people preferred saving energy around the home in ways that would not entail physical discomfort, i.e., weatherproofing rather than raising summer temperatures or lowering winter temperatures.

for 25 percent more of the variance in usage rates. In both surveys, the Legitimacy Factor was not a significant predictor of consumption. Bartell (1976) also used multiple regression analysis to detect a relationship between attitudes and energy behaviors of 1069 Los Angeles residents. In his study, an anticipated effect on one's future employment was the only significant predictor of personal energy conservation.

These studies suggest that measured energy consumption can be related to (i.e., can be predicted from) persons' energy attitudes. Their results also give rise to the speculation that a shortcoming of some other studies, that attempted to link energy attitudes and consumption behaviors, centered around reliance on self-reported estimates of consumption. When actual rates of consumption were utilized, a stronger relationship between attitudes and behavior was found.

Synthesis of the Review

The literature review revealed three broad weaknesses in research efforts to date exploring the relationship of lifestyle factors to energy use and of expectations to energy use.

1. Because of the ambiguity associated with the definition of lifestyle, definitive measurement has been problematic. While unifying threads do run across research endeavors, each reflects its own approach to lifestyle as

an energy related variable. This has resulted in a lack of consistency across studies, especially in how lifestyle has been conceptualized and defined; there likewise has been an inconsistency in operationalizing variables most accurately reflecting its attributes.

2. Expectations related to energy, as an attitudinal variable, has not been definitively studied outside of future belief in an energy problem and intentions to conserve.

3. While it is recognized that both lifestyle and expectations can be major determinants of energy consumption behaviors, they have not been integrated conceptually or theoretically. Thus, their valid measurement, relative to energy use, has not occurred.

This research effort was designed to overcome these shortcomings by 1) utilizing an ecological perspective to conceptualize lifestyle expectations relative to energy use (i.e., present lifestyle indicators--including direct household energy use--to the relative energy intensiveness of expected lifestyle); and 2) developing and testing an instrument that measures the relative energy intensiveness of expected lifestyle.

Development and Validation of an Index

After an examination of the substantive literature based on social science data, Babbie (1979) concludes that although indexes are frequently used in behavioral

research, the methodological literature contains little if any discussion of index construction. He concedes that methods of index construction are not discussed because they seem obvious and straight forward.

To overcome this methodological shortcoming, Babbie presents a detailed process for the creation and validation of an index. A synthesis of that process is presented here.¹

Characteristics of an Index

Webster defines an index as "a thing that points out . . . a representation." In applying this definition to the social sciences, Babbie defines it as a method of classifying subjects, in terms of some variable or attribute, by the combination of their responses to items included in the index. As such, an index must have three characteristics.

1. Ordinal Measure--An index is constructed so as to rank order respondents in terms of a specific variable.

2. Composite Measure--An index measurement is based on more than one data item.²

¹For a more complete discussion of index construction and validation, the reader is directed to The Practice of Social Research, Earl R. Babbie; Wadsworth Publishing Company, Belmont, California, 1979, Chapter 15, pp. 395-421.

²Assuming that single indicators of complex concepts have insufficient validity, a composite measure solves this problem by including several indicators of a concept in one summary measurement.

3. Simple Accumulation--An index is constructed through the addition of scores assigned to individual items.

Construction of an Index

Babbie indicates that the creation of an index involves several methodological steps, including 1) selection of the index items, 2) scoring of the index items, and 3) validation of the index.

Selection of the Index Items. A composite index is created to measure some concept. The first criterion for selecting index items is, therefore, face validity; that is, each item must logically represent at least some element of the construct being measured by the index.

As a composite measure, an index should represent a central dimension. Babbie cautions, however, about subtle nuances that may exist within the scope of the concept of interest and states that, ultimately, the nature of the items included will determine how broadly that dimension is measured.

The variance provided by the items is also important in index construction. Assuming that variance does exist on the concept of interest in the real world, the sum of the index items should provide an indication of a respondent's position on the index variable within a possible range. In other words, items should be selected so that their summed score differentiates between respondents with varying levels of the attribute being measured.

Scoring of the Index Items. In assigning scores for individual responses to each question, the researcher must choose between the assignment of equal weights or different weights to each particular response. Believing this to be an open issue in index construction, and, arguing that there are no firm rules to be followed, Babbie suggests (and claims that practice supports his method) that items should be weighted equally unless there are compelling reasons for differential weighting; that is, the burden of proof should be on differential weighting; equal weighting should be the norm.

By recognizing that, in index construction, individual responses are scored and summed, Babbie suggests the use of a Likert-type measurement method as appropriate for index scoring. "The Likert method is based on the assumption that the overall score based on responses to the many items seeming to reflect the variable under consideration provides a reasonably good measure of the variable" (Babbie, 1979, p. 410).

He cautions that these overall scores are not the final product of index construction; rather, they are for purposes of item analysis, resulting in the selection of the best items for the index.

Validation of the Index. To this point, two steps in index construction have been discussed: 1) item selection, and 2) item scoring. Babbie states that if both of these steps are carefully carried out, the likelihood of

the index actually measuring the variable of interest is enhanced. To prove useful, however, he further states there must be validation of the index.

The first step in index validation is an item analysis which examines the extent to which the composite index score is related to the individual items included in the index itself. In a complex index containing many items, this step provides a more parsimonious test of the independent contribution of each item to the index. If a given item is poorly related to the index measure, it may be assumed that other items in the index are masking the effect of the item in question. Since that item contributes nothing to the power of the index, Babbie believes it can be excluded.

Finally, while item analysis is, according to Babbie, an important test of the index's validity, it is not a sufficient test. If the index does, in fact, measure a given concept, the ranking of groups of respondents on that index should predict (be correlated to) the ranking of those groups in answering other questions dealing with the same concept as the index measures.¹ For this validation process, data external to the index must be utilized.

In concluding his discussion on index creation, Babbie cautions that ". . . there is no cookbook solution

¹This test of validity assumes that an underlying process does exist in the real world.

. . . the wisdom of (the) decision(s) regarding the index will be determined by its utility in later analyses involving that index" (p. 409).

Development of an Energy-Related Index: An Example

In developing their multidimensional measure on voluntary simplicity, Leonard-Barton and Rogers (1980) report following methodological steps similar to those advocated by Babbie (1979). They selected items which were suggested in the literature on the topic and in which self-proclaimed advocates of a voluntary simplicity lifestyle commonly engaged.

An 18 item measure, evolving through three stages, was tested on 812 California homeowners in 1979. In an effort to shorten this index without diminishing its power to indicate a tendency towards voluntary simplicity, the researchers 1) used factor analysis, enabling the index to be reduced to six items by using the one item which loaded most heavily on each of the six evolving factors (each of the six items loaded on its respective factor greater than .42); 2) used stepwise multiple regression, determining that, for the California population being tested, four index items accounted for 71 percent of the variance in index scores while nine items represented 91 percent of the variance in index scores; 3) used the rate of adoption to identify the most commonly practiced voluntary simplicity behaviors.

Finally, using data external to the voluntary simplicity measure, the index score was utilized as an independent variable in a stepwise regression of ten attitudinal and behavioral variables and found to be the second strongest predictor of energy-conserving behaviors. When the index score was used as a dependent variable, the researchers found it to have a slight curvilinear relationship with income and a positive relationship to age, education, mechanical ability, and the respondents' personal conviction that they should save energy.

Guided, then, by the work of Babbie (1979) and Leonard-Barton and Rogers (1980), a research methodology was designed to develop, empirically test, and refine an index that measures the relative energy intensity of a household's future lifestyle expectations. A discussion of the methodology employed is found in Chapter III.

CHAPTER III

METHODOLOGY

In this study, both primary and secondary data were used. The methodological aspects of the research process, discussed in this chapter, are therefore presented in the following order:

1. Primary Data--The Lifestyle Expectation Index
 - a. Development of the index, including the future lifestyle dimensions represented, the assignment of response values, and the scoring of the index.
 - b. Expert review of the index.
 - c. Pretesting the index.
2. Secondary Data--Project Conserve
 - a. Selection of the research sample.
 - b. Description of the research sample.
3. Collection of the Research Data
4. Analysis Procedures Used to Test the Index
5. Identification of the Major Assumptions Underlying the Study
6. Identification of the Limitations Inherent in the Study

Lifestyle Expectation Index--The Primary Data Base

Development of the Lifestyle Expectation Index

The conceptualization of lifestyle expectations began during the spring of 1980. From a preliminary literature review, an embryonic index was developed for use in a senior seminar class at Michigan State University entitled, "Energy and the Designed Environment." That first index took the form of an inventory list of household and transportation goods. For each item, the respondent was to report whether s/he expected that good to be a "luxury," a "desirable," or a "necessity" for his or her expected lifestyle.

After a more thorough literature review, it was determined that an index designed to measure the relative energy intensiveness of lifestyle expectations should be broader in scope than an inventory list. It was also determined that a Likert-type index would provide a more accurate assessment of those expectations than the three-choice response. These determinations resulted in a second form of a lifestyle expectation index which has evolved through two further stages.

Lifestyle Dimensions Represented in the Index. In developing items for the Lifestyle Expectation Index, questions were included that relate to dimensions which the literature suggested are 1) indicators of lifestyle, and 2) empirically or theoretically related to energy consumption.

Using this criteria, four major components were represented in the Lifestyle Expectation Index: housing type and location, transportation patterns, nutritional practices, and market consumption behaviors.

Assignment of Response Values. The Lifestyle Expectation Index was composed of 44 closed-ended questions representing four central aspects of an anticipated style of living: housing, transportation, nutrition, and behaviors.

For each item, a five-choice measurement method was used, with a score of five being assigned to the response reflecting the most intensive use of energy and a score of one being assigned to the response reflecting the most conservative use of energy. For example, Question 1 asked, "In which type of residence do you expect your family to be living?" The response choices were: single family house; multiple family building with 2, 3 or 4 units; small apartment or multiple unit building with 5 to 10 units; large apartment building with 11 or more units; mobile or modular home.

A number of studies have investigated the energy requirements of varying housing types and housing densities (Erley, et al., 1979; Real Estate Research Corporation, 1974). They concluded that single family detached housing is the most energy (direct and embodied) intensive form of housing, while common wall, or multifamily units, require

less energy to construct, maintain, and to heat and/or cool.¹

The response choices to the housing question were therefore scored to reflect these findings; namely, single family house = 5; mobile or modular house = 4; 2, 3, or 4 unit multifamily dwelling = 3; 5 to 10 unit dwelling = 2; 11 or more unit dwelling = 1.

A second example relates to Questions 35 and 36 which asked about how often the household expected to purchase clothing or furnishings at a resale shop (Question 35) or at a garage sale (Question 36). In both cases, the response choices reflected a behavior continuum between never and very often.

Material simplicity is a value central to a voluntary simplistic way of living that "embraces frugality of consumption" (Elgin and Mitchell, 1977, p. 200). The purchase and use of recycled goods is considered a manifestation of this value and has been used in an index measuring voluntary simplicity (Wilhelm, 1982; Leonard-Barton and Rogers, 1980).

¹Erley (1979) suggests that low rise, multiunit housing types (with densities of seven to 40 dwelling units per acre) are the most energy efficient in terms of construction and climate control. He further suggests, that beyond a certain density level, energy benefits begin to decline and be reversed. This threshold is generally attributed to added structural support requirements, and added energy requirements of providing elevator service and general services to high-rise buildings.

Response scoring for the expected purchases in the resale shop and garage sale questions thus reflected the nonconsumption (direct and indirect energy) oriented patterns of use evidenced in recycling; namely, never = 5; rarely = 4; sometimes = 3; fairly often = 2; very often = 1.

Scoring of the other 41 index items reflected a similar range of assumed energy requirements. (See Appendix B.)

Scoring of the Lifestyle Expectation Index. To determine the relative energy intensiveness of a household's lifestyle expectations--that is, its position on the Lifestyle Expectation Index--the household's scores for each individual item were summed and averaged. The arithmetic equation to represent this data processing operation is:

$$LEI = \frac{\sum \text{item scores}}{\text{responses}}$$

where;

LEI = the household's score on the Lifestyle Expectation Index, with a range of 1 (energy conservative lifestyle expectations) to 5 (energy intensive lifestyle expectations).

$\sum$ item scores = the summed total of the scores of all responses by the household respondent.

responses = the total number of index questions answered by the household respondent.

Since the Index score was computed as a mean of the responses given, it was assumed that a missing item score would not significantly alter the Index score for that

individual case. Missing values were thus not assigned to individual missing items.

Expert Review: A Test of Content Validity

As part of the empirical process for establishing the validity of the expectation measure, a first stage Likert-type scored index was reviewed by six Michigan State University faculty members whose research concerns include the impact of finite resources on lifestyle.^{1, 2, 3}

To confirm or reject the proposed weighting of response choices for each item in the Index, three reviewers were asked to select the response which best reflected the most intense level of energy use (including direct and indirect energy), while the other three reviewers were asked to select the response which best reflected the

¹Likert-type scoring is a measurement technique based on the use of uniformly weighted response categories. It assumes that each response choice has approximately the same intensity as the other response choices for that question (Babbie, 1979).

²Expert review is an acceptable methodological step for establishing the face validity of an index (Sonquest and Dunkelberg, 1977). Content, or face validity, simply refers to agreement among professionals that a measure taps that which it is supposed to tap. There must be a consensus about the presumed relevancy of the items' (within the index) ability to place survey respondents along an underlying dimension.

³The reviewers were: Cynthia Fridgen, Human Environment and Design; Dr. Peter Gladhart, Family and Child Ecology; Dr. Willett Kempton, Research Associate, Institute for Family and Child Study; Dr. Linda Nelson, Family and Child Ecology; Dr. Beatrice Paolucci, Family and Child Ecology; and Dr. M. Suzanne Sontag, Human Environment and Design.

least intense level of energy use (including direct and indirect consumption).

The six responses were then compared for interrater agreement and found to be in complete agreement on 43 of the 44 items in the Index. The item on which there was disagreement concerned the energy requirements of the total number of persons expected to be living in the household. After looking at the reviewers' written comments, it was evident that the disagreement resulted from variations in interpretation of the item, not in the item itself or in the assigned values of the responses.

Specifically, the disagreement resulted from the fact that two reviewers addressed the energy issue on a per capita basis and indicated that larger households would require less energy per person, whereas, four reviewers interpreted energy needs from a total household perspective, suggesting that the larger households would require more total lifestyle energy. Based upon these comments, and upon empirical findings that looked at household size relative to direct energy consumption, it was decided that the weighting of this item would reflect that each additional household member will require additional levels of total energy for lifestyle support. Higher values were, therefore, assigned to expected larger households.

The reviewers were also asked to indicate any way s/he believed the Index could be improved. Analysis of

these suggestions led to the rephrasing of three items, none of which affected the intent of the original question.

The validity problem in statistical analysis centers around the fact that even clear and precise concepts, that are sufficiently abstract to be broad in scope and, thereby of theoretical interest, generally cannot be measured directly. Each concept may be thought of as having a domain of variables related to it. The researcher must make the assumption that the variables or items used in the index belong to the concept's domain, i.e., that they are valid indicators of the concept (Sonquist and Dunkelberg, 1977, p. 334). Based upon the expert review, and the literature review, this researcher assumed that the Lifestyle Expectation Index had an acceptable level of content or face validity and, furthermore, that the responses were weighted to reflect the relative level of necessary energy consumption to support each lifestyle expectation.

Pretesting the Lifestyle Expectation Index

The revised index was then pretested, for question form and clarity, in three college classes at Michigan State University during the spring and summer terms 1981. With minor wording changes, the measure was next submitted to a second pretest in three adult workshops at Michigan State University during June 1981 (n = 127). In addition to the index items, several household socio-demographic variables were measured in order that some preliminary statistical analysis on the Index could be done.

Since the second pretest sample was small and not randomly selected, the statistical analysis of the data could, in no way, anticipate the findings from the main research effort being reported here. Rather, the analytical procedure was considered a preliminary step, preparatory to working with the research sample of interest to this study.

Project Conserve--The Secondary Data Base

Two major elements in the development of the Lifestyle Expectation Index were 1) the relative energy required to sustain the reported expectations, and 2) the present lifestyle indicators (including direct household energy consumption) considered preexistent to future expectations. For this reason, the research sample base was drawn from participants in Michigan's Statewide Project Conserve.

Project Conserve was a computerized energy information audit program sponsored by the Michigan Energy Administration and administered by a research team at the Institute for Family and Child Study, Michigan State University.¹ Project participants completed forms describing their dwelling units on a number of energy related items. The form was evaluated by computer and

¹For a more complete discussion of the Project Conserve program, see Keith, et al., 1981.

recommendations were then sent to the participating households concerning specific ways to improve energy efficiency.

To evaluate Project Conserve, four groups of households were sampled in an experimental design. Careful attention was given to sample selection methods to insure a random sample within each of the households' strata listed.

An evaluation of the Project Conserve program was implemented by an initial telephone interview in July 1979 and followed by a reinterview in the fall of 1980. Questions related to attitudes, socio-demographic characteristics and adoption of energy conserving practices were asked during both interview waves. During the first interview, participants were also asked to give written permission for the collection of the energy consumption data from the electric and gas utilities and the oil and propane companies for the three year period from July 1977 through June 1980.

Two thousand and sixteen households were interviewed in the 1979 wave; in the 1980 wave, 1288 households were reinterviewed. This resulted in an attrition rate of 36.2 percent. To detect possible biases that may have resulted in the reinterview, the two samples were compared on age, income, education, residence, number in household and number of employed adults. No significant differences were found (Keith, et al., 1981).

Selection of the Research Sample

For a household to be eligible for inclusion in this research sample, three criteria had to be met. First, it was necessary for the same household member to have responded to the two telephone interviews in 1979 and 1980. Secondly, the socio-demographic, attitudinal and behavioral data gathered during the two interview waves had to be complete. Finally, since direct energy use was an important element in this study, the third criterion for sample eligibility was concerned with the completeness of direct household energy consumption for the three year period from July 1977 through June 1980. Permission to obtain this information was requested of the total 2016 cases during the 1979 telephone interview. Fifty-two percent signed a permission for permitting the release of actual household consumption data from appropriate utility and fuel oil companies for the three year period.

In most cases, in which the consumption data were available, they were complete across time and source. In some instances, however, it was necessary to extrapolate consumption for short periods which were missing. A complete explanation of the extrapolation procedure is given in the Final Report of Pilot Project Conserve (Harris, et al., 1980).

Six hundred and fifteen households met these three criteria. Of these, eleven cases were eliminated as they had moved during the July 1977 through June 1980 period,

resulting in 604 households being eligible for the research sample. From this number, 300 were randomly selected for this study as a representative sample of the Michigan households.

Description of the Research Sample

Comparisons between selected demographic and structural characteristics describing the households surveyed for this study and the Michigan population are presented in Tables 3.1 through 3.6. Although this research was designed to test and refine a measuring instrument, not to necessarily extrapolate the findings to the target population, the comparisons do provide a basis for determining the representativeness of the sample.

In 1975, the median income for Michigan households was \$15,385 (Andrews and Boger, (Eds.), 1980, p. 61); 56 percent of the state population had incomes below the \$15,000 level while 44 percent had incomes above. On the other hand, 29 percent of the sampled households reported incomes in the range below \$15,000 and 81 percent fell within the range above. The sample thus overrepresented high income groups.

Project Conserve data provided measures of educational attainment for both the respondent and the second adult in the household (if present). Sample respondents attained higher levels of education than did the general Michigan population. Over 40 percent of the sample respondents and 35 percent of the second adults had education

Table 3.1. Income Distribution: Comparison of Research Sample, 1980, and Michigan Households, 1976 a,b

<u>Income Class</u>	<u>Research Sample</u>		<u>Michigan Households (In Thousands)</u>	
	<u>%</u>	<u>N</u>	<u>%</u>	<u>N</u>
\$ 5,000 or less	7.3	22	15.9	478
5,000 - \$ 9,999	9.3	28	18.8	570
10,000 - 14,999	12.0	36	21.1	640
15,000 - 19,999	16.7	50	17.5	530
20,000 - 24,999	16.7	50	12.0	365
25,000 - 29,999	13.0	39		
30,000 - 34,999	6.3	19		
35,000 - 39,999	3.7	11	14.7	445
40,000 or more	8.7	26		
Not Available	6.3	19	--	--
	100.0	300	100.0	3029 ^c

Source: David I. Verway (Ed.), Michigan Statistical Abstract, 14th ed., Graduate School of Business Administration, Michigan State University, East Lansing, 1979, p. 347.

^aPercentages have been rounded in some instances.

^bIncome data for the state pertain to 1975; for the sample to 1979.

^cNote: column does not equal this total (see Verway, 1979, p. 347).

beyond the high school level. In the general statewide population, however, only 28 percent of Michigan adults had attained these higher levels.

Considering age, the sample adequately represented 25-34, 35-44, and 45-54 categories. It did, however, underrepresent the youngest and oldest age groups, while it overrepresented those in the later-middle years: 55-64 and 65-74, respectively.

Smaller households were represented more in the sample than in the state data. The mean household size of the sample was 2.98, whereas, it was 3.46 for the state population (Andrews and Boger (Eds.), 1980, p. 28). Specifically, the sample overrepresented one or two person households and households of five members, while it underrepresented households of three, four, and six or more persons.

Pertaining to housing characteristics, the sample predominately represented homeowners living in larger dwellings. Ninety-six percent of the sample households owned their houses; while, in the state, 75 percent owned their own dwellings. The majority of Michigan households lived in dwelling units consisting of one through five rooms; 44 percent lived in dwellings with six or more rooms. On the other hand, sample households lived in larger structures, 70 percent reporting six or more rooms.

In summary, then, the households in the research sample were representative of homeowners with high

Table 3.2. Educational Attainment: Comparison of Research Sample, 1980 and Michigan Population, 1976 a,b

Educational Attainment	Research Sample				Michigan Population (In Thousands)	
	Respondent		2nd Adult If Present		%	N
	%	N	%	N		
Less than High School	19.0	57	13.0	39	72.2	3,569
High School Graduate	39.0	117	42.0	126		
Some College	23.0	69	16.3	49	27.8	1,376
College Graduate	10.3	31	12.0	36		
Graduate Work	8.7	26	6.7	20		
Not Available	--	--	10.0	30	--	--
	100.0	300	100.0	300	100.0	4,945

Source: David I. Verway (Ed.), Michigan Statistical Abstract, 14th ed., Graduate School of Business Administration, Michigan State University, East Lansing, 1979, p. 156.

^aPercentages have been rounded in some instances.

^bFigures are not strictly comparable as the research sample includes the educational attainment of the respondent, while the Michigan data includes the educational attainment of men and women 25 and older (combined in this table).

Table 3.3. Age Characteristics: Comparison of Age of Respondent in Research Sample, 1979 and Age of Household Heads in Michigan, 1976 ^a

Age	Research Sample		Michigan Population (In Thousands)	
	%	N	%	N
25 or younger	5.3	16	8.1	246
25 - 34	19.1	57	21.6	655
35 - 44	16.3	49	18.0	545
45 - 54	19.0	57	19.3	584
55 - 64	21.7	65	15.9	481
65 - 74	17.0	51	10.4	315
75 and older	1.3	4	6.6	200
Not available	.3	1	--	--
	100.0	300	100.0	3,029 ^b

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 334, "Demographic, Social and Economic Profile of States: Spring, 1976", Washington, D.C., Government Printing Office, 1979, p. 25.

^aPercentages have been rounded in some instances.

^bNote: column does not equal this total (see Department of Commerce, 1979, p. 25).

Table 3.4. Size of Household: Comparison of Research Sample, 1980 and Michigan Population, 1976 ^{a,b}

<u>Size of Household</u>	<u>Research Sample</u>		<u>Michigan Population (In Thousands)</u>	
	<u>%</u>	<u>N</u>	<u>%</u>	<u>N</u>
One or Two	40.7	122	35.3	846
Three	18.7	56	21.1	506
Four	18.3	55	21.3	511
Five	14.0	42	11.4	273
Six or More	7.6	23	10.8	259
Not Available	.7	2	--	--
	100.0	300	100.0	2398

Source: Mary P. Andrews and Robert P. Boger (Eds.), Michigan Family Sourcebook, 1st ed., College of Human Ecology, Michigan State University, 1980, East Lansing, 1980, pp. 29 and 33.

^a Percentages have been rounded in some instances.

^b Figures are not strictly comparable as the research sample defines household size, while the Michigan data defines family size according to census definitions (See Andrews and Boger (Eds.), 1980, p. 17.

Table 3.5. Form of Tenure: Comparison of Research Sample, 1980 and Michigan Households, 1976 ^a

<u>Form of Tenure</u>	<u>Research Sample</u>		<u>Michigan Population (In Thousands)</u>	
	<u>%</u>	<u>N</u>	<u>%</u>	<u>N</u>
Owner Occupied	95.7	287	74.7	2,264
Renter Occupied	3.7	11	2.4	716
Not Available	.7	2	--	--
	<u>100.0</u>	<u>300</u>		<u>3,029</u> ^b

Source: David I. Verway, (Ed.), Michigan Statistical Abstract, 14th ed., Graduate School of Business Administration, Michigan State University, East Lansing, 1979, p. 81.

^aPercentages have been rounded in some instances.

^bNote: Column does not equal this total; source indicates figures are the only current estimates available (see Verway, 1979, p. 81).

Table 3.6. Number of Rooms in Dwelling Unit: Comparison of Research Sample, 1980, and Michigan Households, 1970 ^{a,b}

<u>Number of Rooms</u>	<u>Research Sample</u>		<u>Michigan Population (In Thousands)</u>	
	<u>%</u>	<u>N</u>	<u>%</u>	<u>N</u>
1 room	--	0	1.2	31
2 - 5 rooms	23.3	70	54.9	1,457
6 - 7 rooms	48.3	145	34.4	912
8 or more rooms	22.0	66	9.5	253
Not Available	6.3	19		
	<u>100.0</u>	<u>300</u>	<u>100.0</u>	<u>2,653</u>

Source: David I. Verway, (Ed.), Michigan Statistical Abstract, 14th ed., Graduate School of Business Administration, Michigan State University, East Lansing, 1979, p. 81.

^aPercentages have been rounded in some instances.

^bNote: Number of rooms does not include bathrooms.

education and income levels. Age distribution was adequate, although those at either end of the age spectrum had lower representation and those in the later-middle years had higher representation. Smaller households living in larger housing units were also characteristic of the 300 households queried for this study.

Two factors could account, in part, for the distributional differences between the sample characteristics and those of the statewide population. First, there is a difference in reporting years between the two distributions. Data pertaining to the research sample were obtained during the 1979 and 1980 interview waves, whereas, data describing the Michigan population reflect state characteristics as they existed in 1976, or, in the case of dwelling unit size, in 1970.

Secondly, Project Conserve, designed as an energy information program, was primarily directed at homeowners. The larger housing units reported by the sample were probably a result of the high percentage of home ownership. Rental units, located mostly in multiunit structures, rather than in single household dwellings, are usually smaller in size and have fewer rooms. Homeowners, who are commonly in their middle to later-middle years, are also often associated with higher levels of income and education. Smaller households are likewise often associated with higher economic and educational status.

Collection of the Research Data

The primary data used to construct the Lifestyle Expectation Index was collected during telephone interviews with the 300 Michigan households during October 1981. Responses were obtained from the person who had been interviewed in the Project Conserve evaluation program. The interviews (approximately 15 minutes in length) were conducted by Survey Data Research, Inc. of Birmingham, Michigan.¹ Survey Data Research was responsible for coding and keypunching the questionnaire data, for doing a 100 percent verification check on the data, and for providing a formatted computer tape and a codebook for the tape. The researcher further verified the tape against the raw questionnaire data (10 percent check) and found no discrepancies.

The Project Conserve program provided the secondary data analyzed for this research, including socio-demographic and housing characteristics, energy attitudes, adoption of conservation behaviors, and total measured consumption of direct household energy over a three year period.

Analysis Procedures

The primary objective of this study was the development, testing and refinement of an instrument designed to

¹The complete telephone interview schedule is presented in Appendix A.

measure the relative energy intensiveness of a household's expected living style, five years hence. Both statistical and nonstatistical procedures have been utilized to establish a level of validity, reliability and utility for the Lifestyle Expectation Index.

To Establish Validity of the Lifestyle Expectation Index

Broadly speaking, validity means the extent to which a measured variable corresponds to the theoretical concept. The problem of validity occurs because measurement of psychological phenomena is indirect. It is never possible, therefore, to be completely certain that a testing instrument measures the precise characteristics for which it was designed. Thus, it is necessary to gather evidence which provides confidence that a test score does, in fact, represent what it appears to represent.

To determine a validity level for the index as a measuring instrument, and to explore various modes of refinement, it was subjected to the following procedures. First, six expert reviewers were employed to determine the content or face validity of the index and to confirm the proposed weighting of the response scores. Secondly, guided by the work of Babbie (1979) and Leonard-Barton and Rogers (1980), three statistical tests were conducted. A bivariate item analysis was utilized to determine the correlation between each item and the index score. To extract the initial underlying factors, the Lifestyle Expectation Index was factor analyzed. Using the Index score as the

dependent variable and the items within the index as the independent variables, a stepwise multiple regression was used to determine the amount of index variance explained by each of the items.

To Establish Reliability of the Lifestyle Expectation Index

From expectation theory, the Lifestyle Expectation Index was considered to be an attitudinal measure; the application of a reliability test was thus appropriate.

Reliability may be thought of as the level of internal consistency or stability of the measuring device. The same measurement instrument applied to the same individual or object, in the same way, should yield the same value over time.

For the sample tested in this study, Cronbach's alpha test was employed to obtain a minimum estimate of the LEI's internal consistency. This test required only a single administration of the instrument to one sample and provided a relatively conservative gauge of the index's reliability.

To Establish Utility of the Lifestyle Expectation Index

Lifestyle expectations are future oriented attitudes; the reality of their outcome for energy consumption or conservation cannot be measured in the present. Other variables, however, assumed to have a preexistent relationship to lifestyle expectations, can be measured in the present. Thus, they can become surrogates for the relative

energy intensiveness of the future lifestyle expectations measured by the index.

To evaluate the potential utility of the Lifestyle Expectation Index, three statistical procedures were employed where the LEI was used as the dependent variable.

Stepwise multiple regression was used to establish the power of present lifestyle indicators in predicting the future relative energy intensiveness of respondents' future lifestyle expectations.

Discriminant analysis was used to detect significant differences in socio-demographic characteristics, housing, conservation attitudes and energy consumption. Further, descriptive (zero-order) analyses of subjective and objective measures were used to construct a profile of those households with energy intensive, energy moderate, and energy conservative lifestyle expectations.

In this study, the independent variables used in these three statistical procedures were developed from Project Conserve data and are external to the index itself. They included the following.

Household Income. Household income was defined as the total annual monetary resource available to a household, and was conceptually viewed as the primary tool by which the household obtains the goods and services it deems necessary to maintain a valued style of living.

Household income level, as a determinant of lifestyle, has been positively related to consumption of direct

and indirect energy (Morrison, 1981; Gladhart, 1977; Morrison and Gladhart, 1976; Newman and Day, 1975). It has also been positively related to expectations for personal economic well-being (Katona, 1964).

Income was measured as a categorical variable with the following nine levels defining the distribution: 1) Under \$5,000; 2) \$5,000 through \$9,999; 3) \$10,000 through \$14,999; 4) \$15,000 through \$19,999; 5) \$20,000 through \$24,999; 6) \$25,000 through \$29,999; 7) \$30,000 through \$34,999; 8) \$35,000 through \$39,999; 9) \$40,000 and over.

Household Life Cycle. Conceptualized as an umbrella variable, the developmental stage in the life cycle of a household took into account the age of its female head, as well as the age of the oldest child, if present. Previous research has shown a curvilinear relationship between household energy use and life cycle stages with consumption of household energy highest during the middle stages of the life cycle. This relationship can generally be attributed to the fact that midstages are associated with larger household sizes, older children and higher earning power.

The six life cycle categories constructed include: 1) female head less than 40 years of age with no children living at home; 2) oldest child equal to or less than six years of age; 3) oldest child greater than six and equal to or less than 12; 4) oldest child greater than 12 and less than 18; 5) oldest child equal to or greater than 18;

6) female head equal to or greater than 40 with no children living at home.

Adoption of Voluntary Simplicity Behaviors. Drawing from the work of Leonard-Barton and Rogers(1980), Elgin and Mitchell (1977) and Gregg (1977), Wilhelm (1982) conceptualized Voluntary Simplicity as the extent to which a household practices behaviors which have been theoretically defined as a less energy intensive lifestyle. The behaviors, she states, are considered indirect energy conservation based on reduced purchases of goods and services and the substitution of human energy for fossil fuel energy. She found Voluntary Simplicity to be positively related to an ecoconsciousness perspective ($p = .000$) and negatively related to income adequacy and age ($p = .022$ and $p = .020$, respectively).

A continuous scale score, measuring intensity of voluntary simplicity behaviors, was formulated by averaging the responses to 11 voluntary simplicity questions.¹ Coding of the responses was such that a low value reflected a higher adoption rate of voluntary simplicity behaviors.

Educational Attainment. Cunningham (1977) summarized the relationship between education and energy when he wrote, "the issue of education then leads to more

¹A discussion of the development of the voluntary simplicity scale can be found in Wilhelm, 1982.

specific concerns: knowledge of energy matters as agents of change as well as the use of information sources."

Discrete categories of educational attainment, for both the household respondent and the second adult head of household (when present) were available in the Project Conserve data. Level of formalized schooling was established by five categories: 1) less than high school; 2) finished high school; 3) some college or post high school education; 4) finished college; and 5) graduate work.

Age. Merkley (1981) viewed age as having chronological, psychological and social dimensions. Her findings revealed a positive relationship between age and energy consumption ($\text{Beta} = .114$, $p = .02$). Others report a curvilinear relationship (Morrison, et al., 1979; Newman and Day, 1975). Merkley also reported a negative relationship between age and energy conservation ($\text{Beta} = -.114$, $p = .05$), which was found earlier by the Morrison, et al., study.

Relative to economic expectations, work at the Institute for Social Research at Ann Arbor showed that expectations for personal financial well-being were largely a function of age and income, with age playing a bigger role than income in shaping them.

Project Conserve data provided the chronological age of household respondents. In this study, the age variable was utilized both in its continuous form and in a categorical form incorporating seven ranges: 1) less than 25 years; 2) 25 through 34 years; 3) 35 through 44 years;

4) 45 through 54 years; 5) 55 through 64 years; 6) 65 through 74 years; and 7) 75 years or older.

Household Employment Pattern. The decade of the seventies witnessed a dramatic rise in the number of women, especially married women with children, who were employed outside the house (Andrews and Boger (Eds.), 1980). The resulting dual income households could be expected to have higher incomes and thus greater ability to purchase goods and services outside the household. They might also be expected to have less time available to perform household tasks and thus be more inclined to purchase additional labor saving items and/or services outside the household.

The employment pattern variable was developed from measures of employment status for the head(s) of household and stratified into three categories: 1) two income earner households; 2) one income earner households; and 3) no income earner households (retired or unemployed).

Total Direct Household Energy Consumption and Percent Change in Direct Household Energy Consumption.

Although some studies (notably Morrison, 1981; 1975) recognize the interrelatedness of lifestyle and consumption of energy, most research models have conceptualized existing lifestyle characteristics as precursors to energy use. Thus, the use of and change in the use of energy have been utilized as dependent variables. In this research effort, however, the level of direct household energy use and change in the use were considered preexistent to

expectations for future lifestyle. Therefore, they were employed as independent variables in the regression procedure used as a test for utility.

Direct household energy consumption was determined by measuring the total amount of direct energy used within the dwelling unit during the heating years 1977-78 through 1979-80. For ease of comparison and computation, measures for each energy source used were converted to British thermal units. (See Relevant Definitions, p. 20 for conversion factors used.) Annual household consumption was obtained by summing the Btus.

To achieve a more valid consumption measure, yearly Btu consumption levels were adjusted to reflect the Michigan weather conditions during the relevant three years. By dividing total Btu consumption by the number of degree days, this standardization was realized. A mean annual consumption level for each household was formed by summing the three yearly weather-adjusted figures and then dividing by three. The resulting continuous variable was used for analysis.

To derive a figure representing the change in household energy use between 1977-78 and 1979-80, total Btus consumed per heating degree-day in year one was simply subtracted from year three total. The resulting difference was then divided by the original level of weather-adjusted Btu consumption in 1977-78. This resulted in two continuous variables that captured the change in energy use

relative to the base amount used, in both Btus and in percentages.

Ecoawareness Scale. An energy-ecological awareness has been reported to be positively related to self-reported conservation behaviors (Hogan, 1976) and to a reduction in direct household energy use (Hungerford, 1978; Keith, 1977). It likewise has been reported as positively related to the acceptance of public policies directed at reducing energy use and negatively related to the rate of energy consumption per room (Gladhart, et al., 1978).

Six questions, each containing five categorical response possibilities, probed attitudes concerning personal responsibility for helping to solve the energy problem.¹ Each question was coded so a high response value reflected a pro-ecological conservation attitude. A continuous scale score was obtained by averaging the six categorical answers.

Intensity of Conservation Measures. The literature review revealed that measures to conserve energy are being reported by increasing numbers of Americans and that the aggregated effect of these practices can be a reduction in household energy use.

¹The Likert-type scale was developed by a research team at the Institute for Family and Child Study, Michigan State University. A discussion of the development and reliability of the attitude scale can be found in Gladhart, et al., 1978; a discussion of its use and a second reliability test can be found in Knutson, 1978.

While it is recognized that each conservation measure falls somewhere along a technical-behavioral continuum, the measure is generally considered to be more of one than the other in nature. To reflect this dichotomy, 18 variables, constructed to measure adoption of a given conservation technique during the three year period from July 1977 through June 1980, were structured into two conservation scales. Each scale was in continuous form, being summed from the number of measures adopted during the three year Project Conserve period.

One scale measured installation of technical conservation techniques (ten variables). A technical conservation measure may be thought of as one which pertains to methods or techniques of an art or science. It usually involves an investment of capital and is done once. The scale measuring the installation of technical conservation techniques, in this study, was comprised of ten variables related to some degree of alteration of the physical housing environment. They included insulating the hot water tank, insulating the heat ducts, installing a clock thermostat, planting trees for shade or wind barriers, weatherstripping doors and windows, adding insulation in the ceiling, walls or basement, adding storm windows, and adopting wood heat as a significant heat source.

Behavioral conservation measures involve habits and are repetitive. Time and reoccurring thought processes are invested. Assuming that consumption behaviors are

habitual in nature, changes in energy use may, in time, lead to new habits and consequently to a change in living style. Eight variables were used to measure the adoption of behavioral conservation practices in this study. They included lowering the hot water temperature, using less hot water, using a clothesline to dry clothes, wearing warmer clothes during the winter, reducing the number of rooms heated, lowering the winter heat thermostat when no one is in the house, and reducing the day and/or night thermostat settings during the winter heating season.

Type and Location of Dwelling Unit. The importance of the type (single or multiunit) and location (urban, suburban, or rural) of a household's dwelling unit in defining lifestyle is well documented in the literature. Indeed, even the popular media often employs phrases such as "urban lifestyle" or "rural living" to differentiate peoples' living styles. Those involved in real estate development likewise use location and type of housing in advertising appeals to their target markets.

Location and type of housing in determining energy use is also noted in Newman and Day (1975). Although the popular conception of rural living is for an "uncomplicated, simple, less intense" way of living, research findings suggest that living in a rural setting requires more total energy than does urban living.

For this sample, Project Conserve data contained only two questions relative to housing type. The first

referred to the style of housing unit (one-story, two-story, Cape Cod, etc.); the second referred to its physical attachment to other dwelling units. Therefore, the variable designed to measure the type of dwelling unit was categorized into the following: 1) single family, detached; not mobile; 2) single family, detached; mobile; 3) single family, attached.

The geographic location variable reflected the urbanization or rurality of the housing unit and was measured by six categories: 1) Large City (over 500,000); 2) Medium City (50,000 - 500,000); 3) Small City (10,000 - 50,000); 4) Small Village or Town (under 10,000); 5) Open Country, Nonfarm; and 6) Farm.

These, then, were the independent variables utilized in testing the utility function of the Lifestyle Expectation Index.

Assumptions Underlying the Study

This study was based upon the following assumptions, which have been accepted as reasonable.

1. An index is an appropriate instrument by which lifestyle expectations can be measured.
2. A composite index provides a measure of the variable of interest; that is, the successive scores on the index arrange cases in a rank order in terms of that variable.
3. It is possible to combine primary analysis with secondary analysis.

4. Telephone interviews and mailed questionnaires are appropriate research instruments for collecting information concerning objective and subjective household characteristics, dwelling characteristics, and expectations about future lifestyle.
5. Responses from a single, adult head of household are representative of household responses.
6. It is possible to convert multiple measures of energy, depending on type (fuel oil, natural gas and electricity), to a standard measure, in this case, the British thermal unit, without loss in measurement reliability.

Limitations of the Study

The limitations of this study related to several issues. First, the unit of analysis for this study was the household, yet, interviews were conducted with only one adult head of that household. A primary assumption of this study was that responses from a single, adult head of household are representative of household responses. Support for this assumption comes from Melson (1980). She concluded that within a household, individual differences in perception of the environment exist because each person has a different history, experiences and temperament. Despite these differences, however, "when the family is considered as a group . . . a family perceptual style

emerges that varies in distinctiveness" (Melson, 1980, p. 66).

Relative to energy attitudes, some empirical evidence suggests that husbands and wives who share the meaning of ecoconsciousness (the relationships between humans and nature) were, as a unit, high adoptors of energy conservation practices (Hogen, 1976). A further testing of this basic assumption was not possible, in this study, given the data available in Statewide Project Conserve as well as budgetary considerations.

Secondly, the dimensions represented in the expectation index were suggested in the literature as indicators of lifestyle related to energy use. Because the lifestyle concept is ambiguous and complex, however, it was not possible to anticipate all dimensions of lifestyle expectations.

Finally, the research sample was selected from households which had already participated in two Project Conserve interviews and had given permission for their utility records to be released. As volunteer subjects, and primarily homeowners, the study sample can not be considered a completely representative sample of the entire target population (State of Michigan households).

CHAPTER IV

FINDINGS AND DISCUSSION

Three dimensions of instrument testing and refinement which guided this study are validity, reliability and utility. The statistical procedures which the literature suggests are appropriate for empirical validation of an index can also serve a secondary function--to streamline the composite measure. Both purposes are therefore discussed in the first section of this chapter. In the second section, utilization of the Lifestyle Expectation Index as an attitudinal variable linked to present lifestyle characteristics is discussed.

Validation of the Lifestyle Expectation Index¹

Exploration of Instrument Reduction

The 44 item index was initially subjected to the following statistical investigations: 1) bivariate

¹Expert review is an important part of the empirical process for index validation. For temporal and organizational clarity, discussion of the use of six expert reviewers to establish the content or face validity of the Lifestyle Expectation Index was presented in the preceding Methodology Chapter. The reader is referred to pages 73-76.

correlation, which revealed the strength and direction of the relationships between each individual item and the index score; 2) identification of underlying factors inherent in the index, through factor analysis; and 3) step-wise multiple regression, which provided a measure of the relative influence of each item on the composite score. Measures of central tendency--i.e., means distribution--were also examined.

From these statistical examinations, the ability of selected items to meaningfully contribute to the LEI was disclosed. Six abridged versions of the 44 variable Life-style Expectation Index were thus constructed in an effort to discern which, if any, could be a parsimonious measure of the energy intensiveness of a household's anticipated living style without compromising its validity and/or reliability. The shorter indices were constructed according to the criteria described below. For clarity, each new index was given an acronym according to how it was formulated: LEICORR3, LEICORR2, LEIFACT, LEIREG7, LEIREG9, and LEIALPHA.

LEICORR3 and LEICORR2. All correlations between items and the LEI were positive and ranged from zero to .42. According to Borg and Gall (1979, pp. 513-514), variables with correlations ranging from .35 to .65 show a moderate relationship with each other and have meaning in exploratory research. Variables whose correlations range from .20 to .35 are slightly related and have

limited meaning in exploratory research. In the other literature reviewed, correlations at or above the $\pm .30$ level were considered meaningful. Babbie (1979) further claims that a given item, unrelated to the composite measure, probably should be dropped from consideration.

Using these criteria, then, two smaller measures were built from the original Lifestyle Expectation Index. LEICORR3 contained the 13 index variables whose correlations with the index score were greater than .30. Eighteen other variables correlated with the composite index in the .20 to .30 range; these, together with the 13 in LEICORR3 formed a 31 variable measure designated LEICORR2.¹

LEIFACT. The single most distinctive characteristic of factor analysis is its instrument reduction capability (Kim, J-O, in Nie, et al., 1975, p. 469). Fourteen factors emerged from the data, each having from two to five variables with loadings equal to or greater than .30. Sonquist and Dunkleberg (1977, p. 345) state that it is statistically possible to extract 36 factors from 44 items. Following the lead of Leonard-Barton and Rogers (1980), another shorter index was formulated from the one item which loaded most heavily on each of the 14 factors; that

¹A complete listing of those variables in LEICORR2 and LEICORR3 is presented in Appendix C.

is, explained the most variance in each factor. The resulting measure, named LEIFACT, thus reduced the LEI by 20 variables, yet represented all the factors.¹

LEIREG7 and LEIREG9. Stepwise multiple regression was selected as another perspective from which to approach the validity and instrument reduction issues. This statistical procedure was viewed as a descriptive tool which allowed the examination of the relative influence made by individual variables on the variance in index score.

As expected, the collective influence of all 44 items accounted for virtually the entire variance in index scores ($r^2 = .99$). Of greater interest, however, was the discovery that three-fourths of the score variance ($r^2 = .74$) was accounted for by about one-fourth (12) of the items, while approximately nine-tenths of the variance ($r^2 = .86$) was found in half of the 44 items. Therefore, to further explore this explanatory influence, two more indices were formulated from the original LEI. One, called LEIREG7, contained the 12 variables explaining 75 percent of the index variance, whereas LEIREG9 embodied the 22 variables which comprised 90 percent of the variance.²

LEIALPHA. The alpha test provided a means for evaluating the multiple-item index through the computation

¹A complete listing of those variables in LEIFACT is present in Appendix C.

²A complete listing of those variables in LEIREG7 and LEIREG9 is presented in Appendix C.

of a coefficient of reliability. For the 44 item index, Chronbach's alpha equalled .60. However, test statistics indicated that the index would be more reliable (i.e., have a higher alpha level) if selected items were deleted from the measure. Fourteen variables, whose exclusion would result in a greater reliability coefficient, were eliminated from the Lifestyle Expectation Index to form a sixth shortened version, designated LEIALPHA.¹ These variables were also the only ones to display very low (less than $\pm .10$) item-total correlations as formulated by the Chronbach's alpha test.

It is interesting to note that three variables were common to all compacted versions: 1) expected number of rooms in the housing unit, 2) the number of weekend trips expected per year, and 3) the expected propensity to can foods for later use. The four lifestyle dimensions designed into the index--housing, transportation, nutrition, and behaviors--are represented within these three common variables.

As Table 4.1 shows, further alpha tests on each of the shortened measures revealed three to be far less reliable than the 44 item LEI. With alpha levels of .40, .58, and .38, the indices formed from results of the multiple regression (LEIREG7 and LEIREG9) and the one formed from

¹A complete listing of those variables in LEIALPHA is presented in Appendix C.

Table 4.1. Comparison of Measures of Central Tendency, Alpha Levels, Number of Item-Total Correlations Equal to or Greater Than .30, and Number of Index Factors for the Lifestyle Expectation Index (LEI) and the Six Refined Measures^a

Statistical Properties	Lifestyle Expectation Index	LEIALPHA	LEICORR2	LEICORR3	LEIREG9	LEIREG7	LEIFACT
Number of Items	44.00	30.00	31.00	13.00	22.00	12.00	14.00
Alpha Level	.60	.69	.68	.64	.58	.40	.38
Number of Factors	14.00	10.00	11.00	4.00	--	--	--
Number of Item-Index Correlations $\geq$.30 (30%)	13.00 (30%)	20.00 (67%)	18.00 (58%)	--	--	--	--
Measures of Central Tendency							
Mean	3.17	2.97	3.21	3.23	3.26	3.38	3.44
Median	3.19	2.97	3.20	3.23	3.27	3.36	3.43
Mode	3.00	2.80	3.39	3.08	3.14	3.33	3.27
Standard Deviation	.30	.38	.40	.54	.41	.49	.42
Standard Error	.02	.02	.02	.03	.02	.03	.02
Distribution Properties							
Skewness	.01	.05	.06	-.07	-.04	-.12	.02
Kurtosis	.09	.23	.40	.04	.41	.13	-.37
Range	2.05-4.16	1.72-4.09	1.81-4.52	1.70-4.77	1.73-4.55	1.75-4.83	2.29-4.57

^aNumbers have been rounded in some instances.

the results of the factor analysis (LEIFACT) were eliminated from consideration as an appropriate refined measure of lifestyle expectations. Examinations of their distributional properties also served to support their elimination.

Three indices displayed reliability levels higher than the 44 variable index. When their mean distributions were graphically plotted, however, it was clear that the LEICORR3 measure did not display a normal distribution. It, too, was therefore eliminated from consideration as an appropriate refined version of the LEI.

The remaining two indices, LEIALPHA ($\alpha = .69$) and LEICORR2 ($\alpha = .68$) both demonstrated normal distributions when plotted graphically. With the exception of LEICORR2 having several extreme scores to the right (i.e., high scores), they also displayed similar properties relative to other measures of central tendency. Therefore, to evaluate them further as refined measures, the correlations between each item and its respective composite score were examined; the factors underlying each index were also studied. Table 4.1 shows that LEIALPHA had more higher correlations between its items and its index score than did the LEICORR2 measure. It also shows that ten readily interpretable factors evolved out of the LEIALPHA. These factors were similar to ten of the 11 factors found in LEICORR2, though not necessarily in the same emergence order.

Considering the properties (summerized in Table 4.1) of each of the six possible refined indices, then, the 30 item measure, heretofore designated LEIALPHA, was determined to be a valid, reliable, as well as a parsimonious measure of the relative energy intensiveness of a household's expected living style, five years hence. Hereafter, this 30 variable refined index will again be called the Lifestyle Expectation Index or LEI.

In the remaining part of this first section (in this chapter), discussion will focus on the properties of the revised Lifestyle Expectation Index, as disclosed by the distribution of scores, bivariate correlations, factor analysis and multiple regression.

Distribution of the Refined Index Scores

A household's score on the Lifestyle Expectation Index could range from one (reflecting energy conservative lifestyle expectations) to five (reflecting energy intensive lifestyle expectations). For this research sample, the scores on the 30 item refined index ranged from a low of 1.72 to a high of 4.09. The mean and median household scores were 2.97, only .17 above the mode (2.80). With a standard deviation of .38, 95 percent of all households queried scored between 2.23 and 3.71.

In research designed to project sample findings to population characteristics, the potential degree of discrepancy between the sample mean and unknown population mean is important. The standard error is a measurement

of this potential difference. With a standard error of .02, it is 95 percent certain that, if the Lifestyle Expectation Index were administered to the Michigan population, the true mean would fall between 2.93 and 3.01.

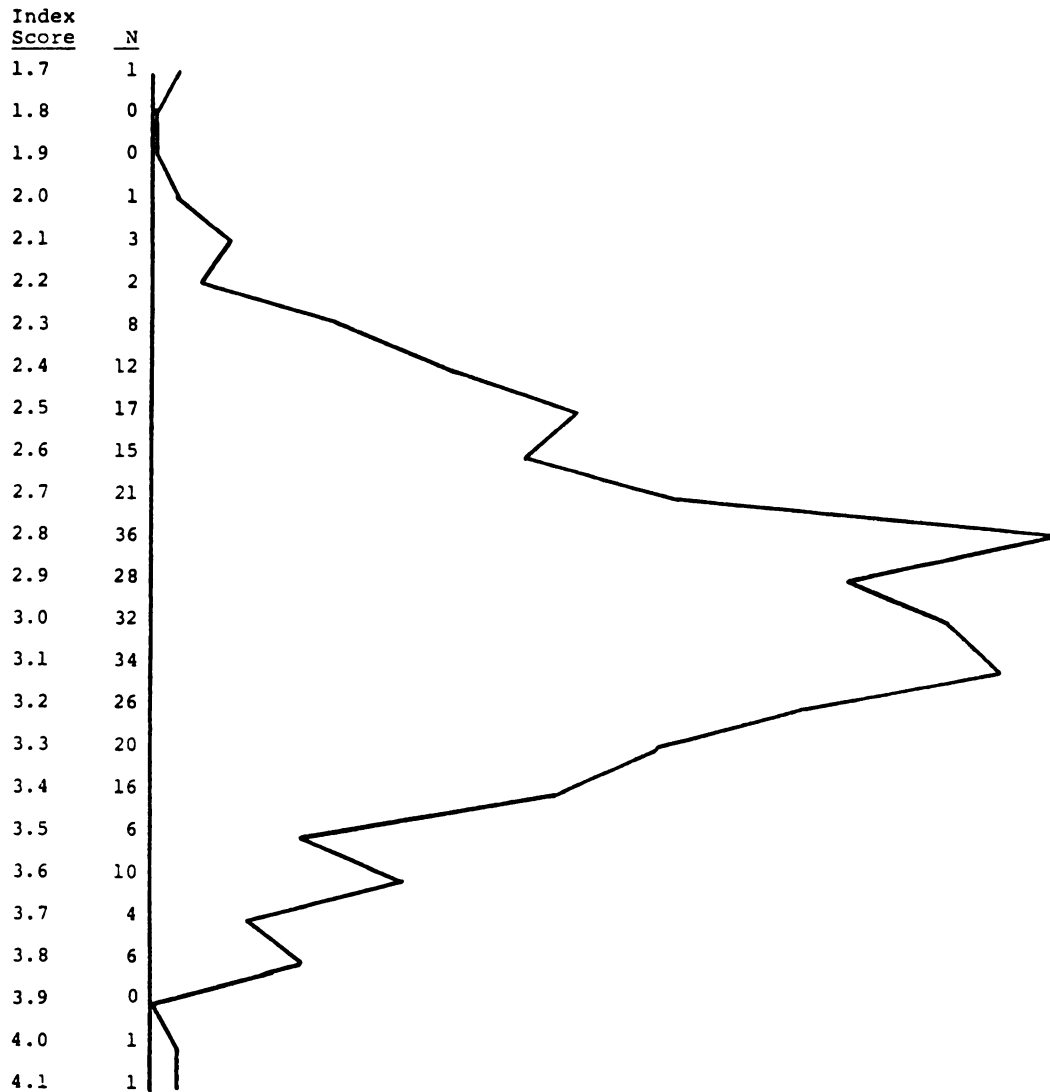
As shown in Figure 4.1, scores from the refined Lifestyle Expectation Index closely approximate a normal distribution. Skewness measures a curve's deviation from symmetry and will take on a value of zero when the distribution is a completely symmetric bell-shaped curve. This sample's skewness value of .05 indicates a curve nearly symmetrical in shape with scores clustered slightly left of the mean.

Kurtosis measures the relative peakedness or flatness of the curve and will have a value of zero when the scores are normally distributed. A kurtosis value of .23 indicates that, for this research sample, the distribution is slightly more peaked (narrow) than would be true for a perfectly normal distribution--i.e., there's a concentration of values around the mean.

If, then, the assumption is made that within the possible range of index scores (one through five), the distribution of values is normal around a midpoint of three, the lifestyle expectations reported by the research sample may be considered normally distributed.¹

¹In a normal distribution, the mean, median, and mode are equal.

Figure 4.1. Distribution of Scores on the Refined 30 Item Lifestyle Expectation Index. (N = 300)



Mean ($\bar{X}$) = 2.97
 Median = 2.97
 Mode = 2.80
 Standard Deviation = .39
 Standard Error = .02
 Skewness = .05
 Kurtosis = .23

Range: 1.72 - 4.09
 68% of Cases: 2.58 - 3.36
 95% of Cases: 2.21 - 3.73
 95% of Confidence Interval: 2.90 - 3.01

Bivariate Correlations of the Refined Index
And Items Within the Index

Two-thirds of the 30 LEI variables showed moderate correlations with the index score, that is, at or above the .30 level. Table 4.2 presents these 20 variables along with the nine having correlations in the .20 to .30 range, and the one variable displaying a relationship of less than .20.

The bivariate relationships between each of the index items and the index score suggested several points. First, no single variable had a strong correlation with the composite score. Indeed, four variables shared the highest correlation of .41 (number of weekend trips; not canning foods; number of vehicles; number of vacations) followed closely by the expected number of bathrooms with a correlation of .40. Since each individual variable expresses a separate, but often interrelated, aspect of the global concept, lifestyle expectations, this finding was not unexpected.

It was also noted that almost all variables had robust communality coefficients, indicating that up to two-thirds of the variance in some variables was shared by the other 29 variables. Therefore, stronger relationships between items and the total may be masked by the interaction of all variables.

A second point suggested by the bivariate correlations supported the notion, reported in the literature,

that both behavioral and technical factors are related to energy requirements. For instance, of the 20 variables showing correlations at or above .30, one-fourth clearly related to the nutritional aspect of future expected lifestyle. While a household's expectations about growing fruits and vegetables for its own use or the extent to which it will eat its main meals in or out of the house imply different behaviors, they also require different energy and technological elements throughout the food chain. Considering that 12 to 17 percent of the United States' energy supply is used in the total food system (Olabode, et al., 1976, p. 1), this finding has meaning.

Another example of the relationship between the behavioral-technical continuum and the energy requirements of anticipated lifestyles can be found in the items relating to recreational expectations. Again, patterns of recreational activities are generally behavioral in nature; however, each demands different outlays of technological and energy elements. Travel, recreation and vacationing are vital parts of the national, as well as geographically specific, economy--as well as a "cornerstone of living style."¹ There have been recent disruptions to the business and pleasure of recreation and tourism, with unemployment,

¹By several accounts, recreation activity and tourism business generate jobs and dollars, with dollar estimates as high as seven to nine billion within the State of Michigan (Fridgen, 1981, p. 1).

Table 4.2. Bivariate Correlations Between the Refined Lifestyle Expectation Index (30 Items) Score and the Index Items ^a (n = 300)

<u>Index Item</u> ^b	<u>Bivariate Correlation</u> ^c	<u>Communality</u> ^c
Weekend Trips/Year	.41	.50
Not Can Foods	.41	.62
Number of Vehicles	.41	.42
Vacations/Year	.41	.38
Number of Bathrooms	.40	.37
Living and Family Rooms	.38	.33
Not Dry Clothes on Line	.38	.26
Number Work at Home	.37	.51
Not Buy at Resale Shop	.36	.60
Eat Lunch/Breakfast Out	.36	.37
Eat Main Meal Out	.36	.52
Number Employed	.35	.78
Separate Bedrooms	.35	.23
Number of Rooms	.34	.44
Not Grow Fruits/Vegetables	.33	.42
Clothing Fashions Important	.32	.16
Have Second Home	.31	.25
Not Freeze Foods	.31	.44
Have Boat	.30	.25
Not Use Only Local Foods	.30	.27
Not Have Meatless Suppers	.28	.26
Not Make Clothes	.27	.23
Not Use Only Seasonal Foods	.26	.66
Not Buy at Garage Sales	.24	.66
Not Walk/Bike on Errands	.24	.56
Not Barter/Exchange	.24	.25
Have Snowmobile	.22	.27
Not Recycle	.20	.08
Not Have Red Meats	.20	.66
Not Share Equipment/Tools	.18	.21

^aP < .0000 for all items.

^bComplete wordings of the items are presented in Appendix A.

^cCorrelations and Communalities have been rounded in some instances.

inflation and energy problems being the most obvious. Indirectly, these economic and social issues are intertwined technically and behaviorally as they weave their way through the American lifestyle (Fridgen, 1981).

The other lifestyle dimensions of housing and transportation (which are closely tied to recreation) are also well evidenced in the items showing moderate correlations with the LEI. They, too, have behavioral components although they are generally considered more technical (physical) in nature.

These points support the notion postulated by Melson (1980): household energy needs form a hierarchy, meaning that different sources of energy become important for the household as it articulates its needs.¹

Analysis of Factors Inherent in the Refined Index

The factor-analytic technique permitted the identification of the underlying patterns of relationships within the data. Initial factors were extracted and, then, rotated to terminal factors using the varimax rotation method. Varimax is a method of orthogonal rotation which

¹The reader is referred to page 27 for a more thorough discussion of Melson (1980).

centers on simplifying the columns of the factor matrix--i.e., centers on producing conceptually pure factors.^{1,2}

Table 4.3 shows the ten factors that were identified, each having one to five variables with loadings equal to or greater than .30. As indicated by the relatively strong loadings, they are quite robust and can be easily interpreted.

The ten factors identified in the data collected from the sample of 300 households may be characterized as 1) Self-Sufficiency; 2) Employment Particularities; 3) Housing; 4) Recycling Goods; 5) Recreation; 6) Meal Location; 7) Agricultural Dependency; 8) Protein Source; 9) Sharing; and 10) Walk or Bike.

While each of these factors has its own unique conceptual structure of variables, several have common dimensions. For example, while Factor Three clearly deals with the physical characteristics of the dwelling unit, and Factor Ten is related more to the locational opportunities to walk or use a bicycle to do errands, they both are consistent with the housing dimension.

¹Orthogonal rotation maintains the 90-degree angles between the reference or initial factors.

²In the unrotated solution, every variable is accounted for by two significant common factors, while in the rotated solution, each variable is accounted for by a single significant common factor. Therefore, the rotated factor loadings are conceptually simpler than the unrotated ones--the ultimate goal of rotation being to obtain some theoretically meaningful factors and, if possible, the simplest factor structure (Nie, et al., 1975, pp. 468-486).

In like manner, Factors Six, Seven, and Eight tap the lifestyle dimension of nutrition, yet each reflects its own unique aspect of it. Factor Five, and again Ten, seem consistent with the transportation dimension, while the clearly behavioral factors dealing with self-sufficiency, recycling, and sharing (One, Four and Nine, respectively) appear to reflect what Elgin and Mitchell (1977) termed self-determination.

Interestingly, the second factor seems to belong to a dimension unto itself: one which reflects the essence of employment particularities. Since employment is paramount to household income level, this finding would suggest support for the importance which Newman and Day (1975) placed on the relationship between household income and household energy use (direct and indirect).

While the self-sufficiency factor accounted for one-fourth of the variance in the Lifestyle Expectation Index score, the first three factors contributed to over half (57.5 percent) of the variance; the first five factors explained more than three-fourths of the score variance (75.9 percent).

At first glance, the emergence of ten factors might seem incongruent with the index's goal of tapping four major components of future lifestyle expectations: housing, transportation, nutrition and behavior. When viewed within the complexity of the lifestyle concept, however, the several factors could be considered

Table 4.3. Loadings in the Varimax Rotated Factor Matrix of Items in the Refined (30 Item) Lifestyle Expectation Index ^{a,b} (N=300)

Index Item ^c	Factor 1 Self- Sufficiency	Factor 2 Employment Particularities	Factor 3 Housing	Factor 4 Recycling Goods	Factor 5 Recrea- tion	Factor 6 Meal Location	Factor 7 Agricult. Dependency	Factor 8 Protein Source	Factor 9 Sharing	Factor 10 Walk or Bike
Not Can Foods-	.75									
Not Freeze Foods	.64									
Not Grow Food	.63									
Not Make Clothes	.36									
Not Barter/Exchange	.36									
Number Employed-		.83								
No. Work at Home	.67									
No. Vehicles		.45								
No. Rooms-			.30							
Living/Family Rooms			.57							
No. Bathrooms			.55							
Separate Bedrooms			.54							
No. Bathrooms			.38							
Not Buy Garage Sale-				.77						
Not Buy Resale Shop				.72						
No. Weekend Trips-					.57					
Have Second Home					.48					
Have Boat					.47					
No. Vacations					.42	.35				
Have Snowmobile					.34					
Eat Main Meal Out-						.68				
Eat Lunch/Breakfast Out						.55				
Not Use Only Seasonal Foods-							.80			
Not Use Only Local Foods							.41			
Not Have Red Meats-								.79		
Not Have Meatless Suppers								.44		
Not Share Equipment/ Tools-									.40	
Not Walk/Bike on Errands-										.66

^a For purposes of clarity, factor loading of less than .30 are not shown in this table. Three items did not load on any factor at this level: 1) Not dry clothes on line, 2) Clothing fashion important, and 3) Not recycle.

^b The item which loads most heavily on each factor is underlined. Factor loadings have been rounded in some instances.

^c Complete wordings of the items are presented in Appendix A.

representative of the interrelatedness of lifestyle's multidimensional aspects. This conclusion finds support in the communality of the variables, indicating that for each variable which loaded on a factor at or above .30, at least one-quarter of its variance could be attributed to its interaction with the other 29 variables in the index.

Multivariate Analysis of the Refined Index

The regression procedure provided the means by which the collective contributions of the 30 items on the index score variance were examined and the relative influence of individual variables on that variance was evaluated.

Again, the collective influence of all items accounted for nearly all the variance in index score ($r^2 = .994$). However, three-fourths of the score variance ($r^2 = .743$) was accounted for by nine of the items, while 90 percent of the variance ($r^2 = .897$) was found in 17 of the 30 items.

Represented within the nine items of the index that explain three-quarters of the variance are variables tapping the future lifestyle dimensions previously mentioned. These nine items also revealed six different factors, although they are not necessarily the same items which loaded most heavily on their respective factors. Within the 17 variables that collectively exhibit nine-tenths of the score variance, eight separate factors are represented as are the four dimensions of expected lifestyle.

Table 4.4. Stepwise Multiple Regression of Refined Lifestyle Expectation Index (30 Items) on Total Scores for Lifestyle Expectations a,b (n = 300)

Step	Index Item ^c	Multiple R	R Squared	Unstandardized Beta Coefficient	Standard Error of Beta	Standardized Beta Coefficient ^d
1	Weekend Trips/Year	.414	.171	.023	.001	.106
2	Not Can Foods	.596	.355	.030	.002	.121
3	Number of Vehicles	.679	.416	.033	.003	.073
4	Not Dry Clothes/Line	.734	.539	.033	.002	.102
5	Living & Family Rooms	.770	.592	.032	.001	.149 (1)
6	Have Snowmobile	.797	.635	.031	.002	.109
7	Not Use Only Seasonal Food	.822	.675	.033	.001	.131 (5)
8	Not Walk/Bike Errand	.846	.715	.032	.001	.122
9	Number of Rooms	.862	.743	.029	.002	.082
10	Second Home	.876	.767	.033	.001	.118
11	Not Grow Fruit/Vegetables	.888	.789	.033	.002	.101
12	Not Buy Resale Shop	.903	.815	.032	.002	.092
13	Number Work at Home	.915	.838	.025	.001	.132 (3)
14	Eat Lunch/Breakfast Out	.924	.855	.030	.002	.100
15	Separate Bedrooms	.932	.868	.031	.001	.140 (2)
16	Have Boat	.940	.884	.030	.001	.131 (4)
17	Not Recycle	.947	.897	.032	.001	.119
18	Not Use Only Local Foods	.954	.910	.034	.001	.124
19	Not Barter/Exchange	.960	.922	.036	.002	.102
20	Clothing Fashion Important	.967	.935	.031	.001	.114
21	Not Have Meatless Suppers	.972	.945	.033	.002	.096
22	Not Make Clothes	.977	.954	.031	.002	.095
23	Vacations/Year	.981	.962	.030	.002	.083
24	Not Share Equipment/Tools	.984	.968	.036	.002	.090
25	Not Buy Garage Sales	.987	.974	.033	.002	.096
26	Not Have Red Meats	.989	.979	.031	.002	.103
27	Eat Main Meal Out	.992	.984	.032	.002	.085
28	Number of Bathrooms	.994	.989	.033	.002	.092
29	Not Have Red Meats	.996	.992	.029	.002	.069
30	Number Employed	.997	.994	.015	.002	.065
	Constant			.069		.017

a p < .0000 for all items; P < .0000 for the regression equation.

b Numbers have been rounded in some instances.

c Complete wordings of the items are presented in Appendix A.

d Number in parentheses in this column indicate the rank order of the five most influential variables in the regression equation.

Degrees of Freedom = 30

Residual = 269

Individually, the variable measuring a household's expected propensity to can food registered the most predictive influence on the score variance (change in r^2 between steps one and two = .184). As previously noted, this variable also exhibited the highest bivariate correlation with the index (r^2 = .41) and loaded most heavily on its respective factor (Factor One: Self-Sufficiency: .75).¹

It seems appropriate to note, at this point, that while some research has been directed at the relative energy intensiveness of various commercial aspects of food processing and marketing, little if any has been done to examine the comparative energy requirements of household-processed foods and their commercially processed counterparts (Olabode, et al., 1976). The strength of the not canning food variable, revealed in this study, would suggest that increased attention could be directed towards this comparison.

The second strongest variable, in terms of explanation of variance, was the number of weekend trips a household expected to take during a year (r^2 change = .171). It, too, exhibited a moderate correlation with the index

¹This same pattern held true when the original 44 item LEI was analyzed. For the can food variable, r^2 change in the regression was .174; the bivariate correlation with the index was .42, and the factor loading was .75.

score ($r = .41$) and loaded first on Factor Five: Recreation (.57).¹

Together, these two variables explained more than a third of the Lifestyle Expectation Index score.

For this study, it was worthwhile to also examine the regression coefficients relative to the influence of individual variables. Interestingly, the unstandardized regression coefficients of the 17 variables accounting for 90 percent of the variance were relatively uniform (Table 4.4). In fact, this uniformity was apparent across all 30 items, the coefficient range being only .021. This means, that in terms of magnitude of influence, a unit change in each variable produced approximately the same incremental change in the index score.

When there are two or more independent variables measured in different units (for example, in this study, items measured diverse variables such as expected number of vehicles and expected location of dwelling unit), standardized Beta coefficients provide a way to compare the relative effect on the dependent variable of each independent variable. Consideration of the standardized regression coefficients in Table 4.4 dispels the apparent suggestion of uniformity. Expecting to have both a family room and a living room was revealed as the most influential

¹This pattern again held for the 44 item index: the regression r^2 change was .143, the bivariate correlation was .36, and the first loading on Factor Six was .51.

variable (Beta = .149) followed closely by expecting to have separate bedrooms for each household member other than head(s) (Beta = .140). These were followed somewhat more distantly by the number of household members expected to do at least some of their work in their house, expectation of having a boat, and of not using only seasonal foods (Beta = .132, .131, and .131, respectively).

Summary of Findings Relative to Index Validation and Refinement

Expert review and statistical techniques were employed to establish the validity and reliability of the 44 item Lifestyle Expectation Index. By studying 1) the bivariate relationships between each variable and the composite index, 2) the composition of the underlying factors, 3) the relative influence of each variable on the score variance, and 4) the reliability coefficients, several items were identified which did not meaningfully contribute to the LEI.

Six smaller indices, consisting of various combinations of meaningful index variables and ranging in length from 12 to 31 items, were formulated according to defined statistical criteria. These abridged indices were further examined, revealing the 30 item refined index (constructed from those variables whose elimination would not further enhance LEI's reliability level) as the most appropriate refinement of the original 44 item measure.

The refined index was then further evaluated. Findings indicated that the index scores were normally distributed around a mean of 2.97 (only .03 from the midpoint of the possible range between one and five). With a reliability level of .69, the index correlated with two-thirds of its items at .30 or above, while 90 percent of its variance was explained by 57 percent of its variables. Ten factors were also identified. Expected lifestyle dimensions of housing, transportation, nutrition and market consumption behaviors were evidenced through each statistical test.

Utilization of the Lifestyle Expectation Index
As an Attitudinal Variable Linked to
Present Lifestyle Characteristics

Multiple Regression Analysis

To access the predictive capability of present lifestyle factors, the continuous criterion variable of energy intensive lifestyle expectations was regressed on 17 household characteristics. The results of this statistical procedure are shown in Table 4.5 and presented in order of the variables' ability to predict the index score. The results indicate that eight lifestyle characteristics, significant below the .10 level, accounted for more than a third of the expectation score. Of these, income appeared to be the major predictor variable ($r^2 = .18$; $p = 0.0$), while three others, closely allied with income--respondent's age, educational attainment and pattern of household

Table 4.5. Stepwise Multiple Regression Analysis of Energy Intensive Lifestyle Expectation Index Scores on Selected Present Lifestyle Characteristics^a

Step	Present Lifestyle Characteristic	R Squared	Lifestyle Expectation Index Score				Probability of Sampling Error
			Unstandardized Beta Coefficient	Standard Error of Beta	Standardized Beta Coefficient		
1	Household Income	.180	.078	.022	.246	0.0	
2	Household Life Cycle	.229	-.147	.041	-.333	.000	
3	Voluntary Simplicity	.281	.219	.068	.186	.000	
4	Respondent's Education	.301	.091	.045	.149	.012	
5	Respondent's Age	.312	.125	.052	.254	.062	
6	Household Employment Pattern	.327	.208	.076	.197	.024	
7	Percent Change in Btu per Degree Day: 1977-78-1979-80	.340	.005	.003	.100	.040	
8	Ecoawareness	.349	.207	.133	.093	.072	
9	Adoption of Conservation Behaviors	.354	-.044	.033	-.076	.199	
10	Number of Rooms	.358	.037	.027	.086	.284	
11	Average Annual Btu Consumption	.361	-.000	.000	-.058	.299	
12	Type of Dwelling Unit	.362	-.108	.147	-.043	.448	
13	Housing Tenure	.364	-.179	.219	-.047	.453	
14	Household Size	.365	-.017	.032	-.035	.542	
15	Second Adult's Education	.365	.011	.040	.019	.778	
16 ^b	Installation of Technical Conservation Measures	.365	-.007	.032	-.012	.829	
Constant			.706	.752	.881		

^a Statistics have been rounded in some instances.^b F level or tolerance was insufficient for the housing location variable to be included in the regression equation.Multiple R = .604
R Squared = .365Degrees of Freedom = 16
Residual = 216F = 7.776
Significance = .000

employment ($p = .062, .012$ and $.024$, respectively)--also were significant predictors of expected energy living styles, ranking second, sixth and fourth in predictive influence. It is noteworthy that each was positively related to the criterion variable, signifying that, in general, as income, age, education, and number of household workers increased, there was a rise in the energy intensiveness of the anticipated style of living.

The stage in a household's life cycle was also considered an affiliate of income and its allied variables, but unlike the others, it displayed a significant ($p = .000$) negative predictive relationship with the criterion variable. This indicated that the relative energy needs of an expected mode of living decreased as the household moved through its successive developmental stages. Expressed differently, as a household unit matured, it expected a future lifestyle less demanding on energy systems.

Interestingly, such a conclusion appears incongruent with a curvilinear relationship found by previous research between life cycle stage and household energy consumption. Two key factors may account for this difference, however. One lies in the temporal dimension of the energy use. The curvilinear pattern had been found between existing life cycle stage and existing level of energy use, whereas the negative direction found in this study was between existing life cycle stage and an expected future lifestyle indicative of levels of energy use.

The second factor lies in the research sample itself. More than one-third (133 households) had a female head over 40 with no children at home; another 31 households were in the stage where the oldest child was past high school age. Together, these two groups accounted for over half of the sample and may have, therefore, expressed reduced energy lifestyle expectations, perhaps anticipating fewer persons, smaller housing units and/or simpler food and clothing needs, five years into their future.

The composite variable which measures adoption of voluntary simplicity techniques was the third ranked predictor ($p = .000$) of the index score and related in a positive manner. This directional influence must be carefully understood, however, to avoid the possible misconception that a higher rate of voluntary simplicity behaviors is related to higher energy expectations. As reported in the methodology chapter, the 11 questions which comprised the voluntary simplicity variable were coded such that a low score reflected a higher adoption rate, while a high score indicated low adoption. With this in mind, the revealed positive direction becomes clear; that is, households which have already adopted methods of indirectly conserving energy (low score), based upon reduced purchases of goods and services, hold expectations for less energy intensive living, whereas households which did not practice voluntary simplicity (high score) reported expectations for more energy intensive lifestyles.

Attitudes concerning personal responsibility for helping to solve the energy problem, as gauged by the ecoawareness variable, also exhibited a positive predictive relationship with the 30 item LEI ($p = .072$). Here again, caution must be exercised in interpreting the directionality of this relationship. In this study, households that reported a high level of ecoawareness likewise expressed lifestyle expectations that were relatively high in energy demands. These two attitudes may appear incompatible. A possible explanation may come from previous research which has associated an energy-ecological awareness with households having higher education and income levels, and which also displayed more energy demanding lifestyles (Hungerford, 1978; Hogan, 1976). In this context, then, the positive direction of the ecoawareness measure was better understood.

For the research being reported here, direct household energy consumption was considered a major present lifestyle indicator. An interesting finding, therefore, was that the percent change in Btu consumption per degree-day between 1977-78 and 1979-80 appeared to be positively related to the composite index score ($p = .040$), meaning that the more households increased their Btu consumption per degree-day over the three year period, the more likely they were to report greater energy intensity in their expected living styles.

Discussion of the multiple regression findings has, to this point, centered on the ability of existing lifestyle characteristics to explain (i.e., predict) the variance in household energy related lifestyle expectations, relative to future energy demands. Of interest, also, is the degree to which each unit change in each characteristic influences the index score. Here, stage in the life cycle was revealed as the variable of greatest incremental influence (Beta = $-.333$), with its allied variables--respondent's age (Beta = $.254$), education (Beta = $.149$) and household income (Beta = $.246$)--also showing moderate incremental impacts. The employment indicator likewise showed a moderate influence (Beta = $.197$).

Percent change in Btu consumption per degree-day, as a measure of direct energy use, and adoption of voluntary simplicity techniques, as a measure of indirect energy use, were found to have modest incremental impacts on the index score (Beta = $.100$ and $.183$, respectively) while the lone attitudinal variable, ecoawareness, displayed a relatively low influence (Beta = $.093$).

Stepwise Discriminant Analysis

Scores of the refined LEI were found to be normally distributed about a mean of 2.97. By dividing the range of scores into quartiles, categories of Intensive Energy Lifestyle Expectations (High), Moderate Energy Lifestyle Expectations (Medium), and Conservative Energy Lifestyle Expectations (Low) were established. The lower quartile

was designated as representing conservative lifestyle expectations, whereas the upper quartile was defined as representing intensive energy lifestyle expectations. Moderate energy expectations were represented by the middle two quartiles. The three discrete categories thus had the following characteristics:

<u>LEI Category</u>	<u>Range of Scores</u>	<u>Number of Cases</u>
Conservative (Low)	$\leq$ 2.7419	80
Moderate (Medium)	2.7420 - 3.1874	139
Intensive (High)	$\geq$ 3.1875	81

To describe the households with varying levels of energy intensive lifestyle expectations, contingency table analysis was used in conjunction with the discriminant analysis procedure. While the discriminant analysis statistically forced the three groups to be as distinct as possible, the joint frequency distributions permitted an investigation of the descriptive relationships between households in each LEI category and their present lifestyle indicators.

Rao's V, a generalized distance measure resulting in the greatest overall separation of the groups, was selected as an appropriate stepwise method of discriminant analysis. Of the 17 variables entered into the analysis, eight were found to statistically discriminate among the three index levels. They are listed in Table 4.6 along with the two other variables that met the F level,

Table 4.6. Stepwise Discriminant Analysis of Low, Medium and High Energy Intensive Lifestyle Expectation Scores on Selected Present Lifestyle Characteristics ^a

Step	Present Lifestyle Characteristic	Lifestyle Expectation Index Score			
		Wilks Lambda	Significance	Rao's V	Significance
1	Income	.817	.0000	51.36	.0000
2	Household Life Cycle	.768	.0000	69.36	.0001
3	Voluntary Simplicity	.716	.0000	90.97	.0000
4	Respondent's Education	.696	.0000	100.27	.0095
5	Respondent's Age	.685	.0000	105.41	.0764
6	Household Employment Pattern	.667	.0000	113.07	.0217
7	Percent Change in Btu per Degree Day: 1977-78 to 1979-80	.655	.0000	120.56	.0236
8	Ecoawareness	.645	.0000	125.15	.0613
9	Installation of Technical Conservation Measures	.635	.0000	129.61	.1767
10 ^b	Dwelling Unit Location	.630	.0000	131.87	.3230
Canonical Discriminant Functions					
After Function		Wilks Lambda	Chi-Square	Degrees of Freedom	Significance
0		.630	104.36	20	.0000
1		.973	6.17	9	.7231

^a Statistics have been rounded in some instances.

^b F level or tolerance or Rao's V insufficient to allow seven variables to enter the regression equation: 1) Number of Rooms in House, 2) Size of Household, 3) Education of Second Adult, 4) Housing Tenure, 5) Number of Behavior Conservations Adopted, 6) Type of Dwelling Unit, and 7) Average Annual Btu consumption.

tolerance and Rao's V for entering the equation, but were not statistically significant.

Tables 4.7 through 4.10 contain the descriptive characteristics of the three LEI strata on these discriminating variables. The tables are organized to reflect the pattern of present lifestyle indicators presented in the research model. An elaboration of this model, shown in Figure 4.2, on page 132, contains both the existing lifestyle indicators and the specific operationalizing variables that were established as discriminators in this study. Table 4.7, then, shows the three socio-demographic variables of age, education and income; in Table 4.8 are found the household characteristics of life cycle and employment pattern; ecoawareness, as an attitudinal measure, is found in Table 4.9. Finally, two energy consumption measures are presented in Table 4.10: adoption of voluntary simplicity behaviors as a measure of indirect energy use and percent change in Btu per degree-day from 1977-78 to 1979-80 as a measure of direct energy use.

No present housing characteristics were found to significantly discriminate among the three index levels. However, the two which did enter the equation--location of the dwelling unit and number of technical conservation

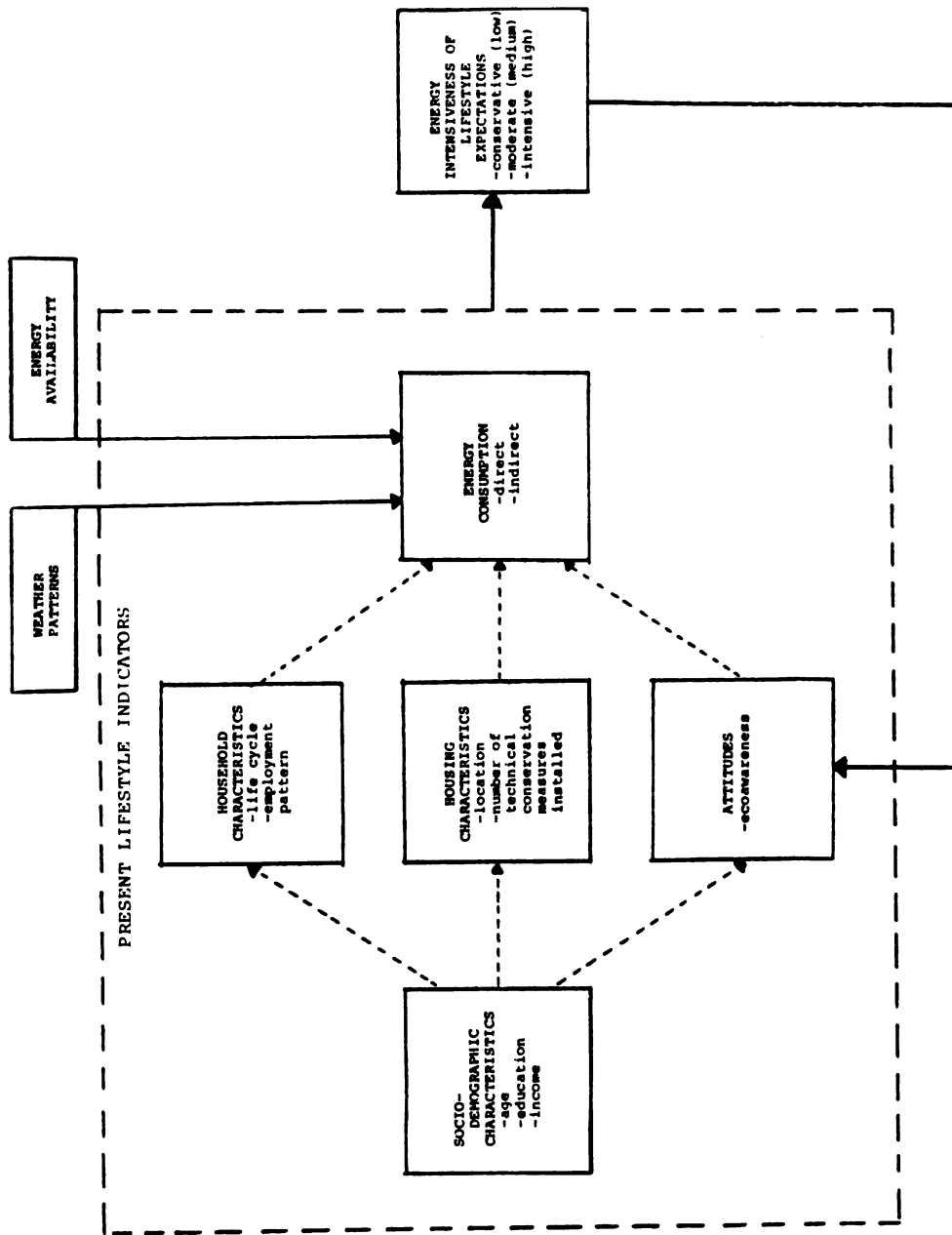


Figure 4.2. Elaboration of the Research Model: Discriminating Variables of Households with Low, Moderate and High Energy Lifestyle Expectations.

measures installed--were considered meaningful and therefore shown in Table 4.11.¹

Socio-demographic Discriminating Characteristics: Age, Education and Income

Age. Those households which anticipated a future living style indicative of low energy needs were generally older, nearly 60 percent being at least 55 years of age. The moderate expectations group was somewhat younger, 75 percent being in the prime employment years of 25 to 64, whereas the high LEI stratum was younger still, more than three-quarters being below 54 years of age.

This distribution implies a negative relationship between respondents' age and the index score, which is seemingly incompatible with the positive relationship found in the multiple regression. The apparent contradiction may be reconciled within the context of the statistical procedures themselves.

The regression technique disclosed a slight overall positive relationship ($\text{Beta} = .254$) between the respondents' age and the energy intensity of anticipated living styles. When the LEI was stratified by low, medium, and high index scores, the discriminant analysis provided evidence (change in Rao's $V = 5.14$; $p = .0764$) that, indeed, respondents' age was a significantly distinguishing present lifestyle

¹Since installation of the technical measures was considered a direct alteration of the physical housing setting itself, they were included in the dwelling characteristics.

characteristic for households in these three groups. However, when the joint frequency distribution was examined, contingent associations appeared which reversed the direction of that relationship. This finding indicates the association between age and the energy intensiveness of anticipated styles of living should be considered within the parameters of the two variables. If, for instance, the LEI were to be dichotomized into halves, or trichotomized by plus or minus one standard deviation from the mean, the resulting distribution may reflect the positive direction found in the regression. In like manner, if the age variable were to be categorized differently, a positive direction may emerge.

Education. A pattern of higher expectations being held by those with higher educational attainment was also evident in the data. Approximately three-fourths of the low LEI respondents had no more than a high school diploma. Of those in the moderate expectations level, almost half finished high school, while a fourth had some college. Eleven percent received their baccalaureate degree. Almost 60 percent of those households with high index scores had some education beyond high school, and nearly half of these finished their undergraduate work.

Income. More than half of those households which scored low on the expectation index reported an annual income of \$15,000 or less. Households with moderate energy lifestyle expectations also had moderate incomes, half

falling into the \$15,000 to \$30,000 range (while the mean income category was \$15,000 to \$20,000). A propensity for higher incomes was found in the high LEI households. With a mean income of approximately \$25,000, 57 percent of these households had incomes above this amount while nearly a third of this group said their annual incomes were at least \$40,000.

The relationships between these first-order variables and the index score suggest, then, that the energy intensivity of lifestyle expectations increases for higher income households which are headed by younger to middle-aged persons with higher educations.

Household Discriminating Characteristics: Life Cycle And Employment Pattern

Life Cycle. Approximately two-thirds of the low LEI group were in what is often termed the "empty-nest" stage of life cycle, having one or two persons and reporting no children living with them.¹ Proportionately, the moderate expectation households were in the later middle life cycle stages, although 45 percent still reported they no longer had children at home. Two-thirds had two to four persons in the home. Again, with primarily two to four persons present, high energy expectations were found in

¹Size of household was not a significant discriminator among the three index groups. The cross distributional characteristics were, however, significant at a probability level of .0001. Mean household sizes were, respectively, 3, 3.5 and 3.5, for the low, moderate and high expectation households.

Table 4.7. First Order Present Lifestyle Socio-Demographic Discriminating Characteristics by Low, Moderate, and High Energy Lifestyle Expectation Index Scores: Respondent's Age, Respondent's Education, and Household Income. ^a

Present Lifestyle Characteristics	Energy Intensiveness of Lifestyle Expectations ^b					
	Low		Moderate		High	
	%	N	%	N	%	N
<u>Respondent's Age</u>						
Less than 25	<u>3.7</u>	(3)	<u>4.3</u>	(6)	<u>4.7</u>	(4)
25-34	<u>17.5</u>	(14)	<u>19.4</u>	(27)	<u>24.7</u>	(20)
35-44	<u>7.5</u>	(6)	<u>18.0</u>	(25)	<u>22.2</u>	(18)
45-54	<u>12.5</u>	(10)	<u>18.7</u>	(26)	<u>25.9</u>	(21)
55-64	<u>32.5</u>	(26)	<u>18.0</u>	(25)	<u>17.3</u>	(14)
65 or Older	<u>26.2</u>	(21)	<u>21.6</u>	(30)	<u>4.9</u>	(4)
	100.0	(80)	100.0	(139)	100.0	(81)
<u>Respondent's Education</u>						
Less than High School	<u>31.3</u>	(25)	<u>17.3</u>	(24)	<u>2.7</u>	(8)
High School	<u>42.5</u>	(34)	<u>41.0</u>	(57)	<u>32.1</u>	(26)
Some College	<u>18.8</u>	(15)	<u>23.7</u>	(33)	<u>25.9</u>	(21)
College Graduate	<u>5.0</u>	(4)	<u>10.8</u>	(15)	<u>14.8</u>	(12)
Graduate School	<u>2.5</u>	(2)	<u>7.2</u>	(10)	<u>17.3</u>	(14)
	100.0	(80)	100.0	(139)	100.0	(81)
<u>Household Income Level</u>						
Less than \$15,000	<u>58.3</u>	(42)	<u>28.2</u>	(37)	<u>9.0</u>	(7)
\$15,000 - \$29,999	<u>39.8</u>	(28)	<u>51.9</u>	(68)	<u>55.1</u>	(43)
\$30,000 or More	<u>2.8</u>	(2)	<u>19.8</u>	(26)	<u>35.9</u>	(28)
	100.0	(72)	100.0	(131)	100.0	(78)

^a Percentages have been rounded in some instances.

^b Underlining denotes a probability sampling error less than .05 for the joint frequency distribution.

households whose life cycle was about midpoint. More than half had at least one school age (or older) child at home.

Employment Pattern. One income earner was the norm for the entire research sample, as over half of each LEI group was in this classification. When considering the distribution of the remaining households in each expectations level (between no income earners and two income earners) a distinct pattern emerged. As the number of present income earners in the household increased, there was a corresponding increase in the energy intensity of lifestyle expectations. A third of those in the low stratum had no income earners present; the moderate households were more evenly divided between no workers and two workers; on the other hand, 41 percent of the high LEI households said that two members were earning incomes.

Attitudinal Discriminating Characteristics: Ecoawareness

Ecoawareness. Low LEI expectation households (84 percent) exhibited low energy-ecological awareness. Seventy-seven percent of the households whose future lifestyle expectations implied moderate energy needs were likewise found to have a low awareness of the energy-ecological relationship. This low awareness fell to 64 percent for the high group. While the sample, as a whole, did not appear to hold positive attitudes concerning personal responsibility for helping to solve the energy problem, there was a slight rise in awareness as the energy expectations

Table 4.8. Present Lifestyle Household Discriminating Characteristics by Low, Moderate and High Energy Lifestyle Expectation Index Scores: Household Life Cycle and Household Employment Pattern ^a

Present Lifestyle Characteristic	Energy Intensiveness of Lifestyle Expectations ^b					
	Low		Moderate		High	
	%	N	%	N	%	N
<u>Household Life Cycle</u>						
Female Head Less than 40, no children	<u>6.3</u>	(5)	<u>2.9</u>	(4)	<u>8.8</u>	(7)
Oldest Child 5 or younger	<u>1.0</u>	(3)	<u>12.3</u>	(17)	<u>4.4</u>	(13)
Oldest Child 6 - 12	<u>11.2</u>	(9)	<u>12.3</u>	(17)	<u>17.5</u>	(14)
Oldest Child 13-17	<u>5.0</u>	(4)	<u>17.4</u>	(24)	<u>21.2</u>	(17)
Oldest Child 18 or Older	<u>8.8</u>	(7)	<u>10.1</u>	(14)	<u>12.5</u>	(10)
Female Head 40 Years or More No Children	<u>65.0</u>	(52)	<u>44.9</u>	(62)	<u>23.8</u>	(19)
	<u>100.0</u>	(80)	<u>100.0</u>	(138)	<u>100.0</u>	(80)
<u>Household Employment Pattern</u>						
No Income Earner	<u>32.9</u>	(24)	<u>18.9</u>	(25)	<u>5.0</u>	(4)
One Income Earner	<u>56.2</u>	(41)	<u>51.5</u>	(68)	<u>53.7</u>	(43)
Two Income Earners	<u>11.0</u>	(8)	<u>29.5</u>	(39)	<u>41.3</u>	(33)
	<u>100.0</u>	(73)	<u>100.0</u>	(132)	<u>100.0</u>	(80)

^a Percentages have been rounded in some instances.

^b Underlining denotes a probability sampling error less than .05 for the joint frequency distribution.

Table 4.9. Present Lifestyle Attitudinal Discriminating Characteristics by Low, Moderate and High Energy Lifestyle Expectation Index Scores: Ecoawareness Level ^a

Present Lifestyle Characteristic	Energy Intensiveness of Lifestyle Expectations ^b					
	Low		Moderate		High	
	%	N	%	N	%	N
<u>Level of Ecoawareness</u>						
Low	<u>83.6</u>	(61)	<u>76.6</u>	(98)	<u>64.0</u>	(48)
Moderate	<u>15.1</u>	(11)	<u>21.2</u>	(27)	<u>28.0</u>	(21)
High	<u>1.4</u>	(1)	<u>2.3</u>	(3)	<u>8.0</u>	(6)
	<u>100.0</u>	(73)	<u>100.0</u>	(128)	<u>100.0</u>	(75)

^a Percentages have been rounded in some instances.

^b Underlining denotes a probability sampling error less than .05 for the joint frequency distribution.

also rose. This correlation may be, in part, reflective of household educational attainments.

Energy Consumption Discriminating Characteristics:
Voluntary Simplicity and Percent Change in Btu per Degree-
Day Consumption

Voluntary Simplicity. Conservative energy ways of living were anticipated by households which were already practicing indirect conservation through moderate (54 percent) to high (30 percent) adoption of voluntary simplicity techniques. Indirect conservation of energy, through voluntary simplicity, was likewise moderately practiced by 52 percent of the middle LEI stratum. The remaining half was evenly divided between those who reported adoption of few of the simplicity measures and those which adopted many. A moderate level of indirect conservation was reported by 61 percent of those with high energy expectations while another 28 percent said that they adopted few of these measures. Although it is true that the majority of each LEI group fell into the moderate adoption category, a trend in utilization of voluntary simplicity was more discernible when the distributional characteristics of the remaining respondents were considered. Clearly, the propensity to anticipate living styles of low energy demands was more commonly reported by those who have already engaged in more simplistic modes of living. Given this trend, and the findings presented in Tables 4.7 and 4.8, it might be theorized that it was the older, retired person who had both the time and/or skills to participate in these

activities. Perhaps, also, limited financial resources made activities such as changing oil in the household car or making gifts instead of buying them economic necessities.

Percent Change in Btu Per Degree-Day Consumption.

Households expressing expectations for low energy lifestyles showed, on the average, a decrease in their annual per degree-day use of total direct energy (Mean = -2.7 percent or -1212 Btus). This resulted in an average yearly consumption level of 236 million Btus for the low expectation group.¹ With an average yearly use of 255 million Btus, the middle index stratum also exhibited a small reduction in per degree-day Btu consumption (Mean = -2.4 percent or -813 Btus). High energy expectation households were in the only group to post an average increase in direct Btu use per degree-day, but it was so slight as to be considered no change in consumption during the three monitoring years (Mean = +.4 percent or 296 Btus). An average annual consumption level of 299 million Btus was found for this last group.

Analysis of the cross frequency distribution served to clarify these statistics. Approximately 60 percent of each index group exhibited per degree-day consumption changes within the -9 percent to +9 percent range. However, the largest percentage of those who decreased

¹The cross distributional characteristics of the average three year Btu consumption was meaningful at a probability level of .0852.

their consumption at least ten percent (26.3 percent) were discovered in households with low LEI scores, whereas the largest percentage of those who had increased their Btu per degree-day levels by ten percent or more (16.5 percent) had also expressed higher energy expectations. Thus, a scenario emerged in which the directionality in percent change of total direct household energy use was found to follow a path somewhat similar to the intensity of energy lifestyle expectations.

Housing Characteristics: Location and Technical Conservation Techniques Installed

As previously reported, the two housing characteristics shown in Table 4.11 did not emerge as significant discriminators among the three LEI groups. They are presented here, however, as 1) they were the only other variables that met the F level and tolerance for entry into the discriminant regression equation, and 2) they represent the housing aspect of present lifestyle indicators, thereby rendering a more complete profile of each LEI cohort, according to the research model.

Location. Half of those households which scored low on the index lived in smaller metropolitan areas (50 percent in small cities, villages or towns), while another third lived in rural settings (30 percent in open country, farm, or nonfarm). Those scoring in the medium LEI category were more evenly dispersed across geographic locations with concentrations in medium sized cities and rural nonfarm

Table 4.10. Present Lifestyle Indirect and Direct Energy Consumption Discriminating Characteristics by Low, Moderate and High Energy Lifestyle Expectation Index Scores: Adoption of Voluntary Simplicity Measures and Percent Change in Btus Per Degree-Day, from 1977-78 to 1979-80 ^a

Present Lifestyle Characteristic	Energy Intensiveness of Lifestyle Expectations ^b					
	Low		Moderate		High	
	%	N	%	N	%	N
<u>Level of Voluntary Simplicity Adoption</u>						
Low	<u>16.2</u>	(13)	<u>23.9</u>	(33)	<u>24.4</u>	(23)
Moderate	<u>53.7</u>	(43)	<u>52.2</u>	(72)	<u>60.5</u>	(49)
High	<u>30.0</u>	(24)	<u>23.9</u>	(33)	<u>11.1</u>	(9)
	<u>100.0</u>	<u>(80)</u>	<u>100.0</u>	<u>(138)</u>	<u>100.0</u>	<u>(81)</u>
<u>Percent Change in Btus Per Degree-Day 1977-78 to 1979-80</u>						
Decrease: -10% or More	26.3	(21)	23.2	(32)	22.8	(18)
-9% through +9%	58.8	(47)	63.0	(87)	60.8	(48)
Increase: +10% or More	15.0	(12)	13.8	(19)	16.5	(13)
	<u>100.0</u>	<u>(80)</u>	<u>100.0</u>	<u>(138)</u>	<u>100.0</u>	<u>(79)</u>

^a Percentages have been rounded in some instances.

^b Underlining denotes a probability sampling error less than .10 for the joint frequency distribution.

settings. The high energy expectation households were either more urbanized, a third living in medium or large cities, or suburban, a fourth living in open country but not on a farm.

If geographic residence is viewed as a dichotomy--that is, urban or rural--the proportions of households with low, moderate or high energy expectations that lived in a country setting were similar (low: 30 percent; moderate: 32 percent, and high: 25 percent). Correspondingly, the proportions who lived in metropolitan environments were also similar (low: 70 percent, moderate: 68 percent, and high: 75 percent). If however, the place of residence is viewed in the context of the six locations listed in Table 4.11, there was a slight tendency for those who lived in highly urbanized centers to have expressed an anticipated high energy lifestyle, while a less energy intense living mode was looked forward to by those in less urbanized situations.

Installation of Technical Conservation Techniques.

Of the ten technical conservation measures in this variable, the range reported was between one and eight installed during the three years monitored.¹ The majority of

¹As reported in Chapter III, this scale was constructed from technical measures installed only between 1977-78 and 1979-80. Some households may have installed these techniques before the monitoring period or have lived in a housing unit in which these conservation investments were built or installed prior to their occupancy.

households within each LEI group reported installing one or two conservation measures in their dwelling settings. Ten percent more of the high index stratum, than the moderate or low strata, reported incorporating three or four technical measures.

Summary of Findings Relative to Utilization of the
Lifestyle Expectation Index as an Attitudinal Variable
Linked to Present Lifestyle Characteristics

Multiple regression is similar to discriminant analysis in that both statistical techniques involve two or more predictor variables (in this study, the present lifestyle indicators) and a single criterion variable (in this study, the Lifestyle Expectation Index Score). Multiple regression is useful whenever the criterion variable is in the form of a continuous variable; if the criterion variable is in the form of categories reflecting discrete groups, discriminant analysis is utilized (Borg and Gall, 1979, p. 510).

In this research effort, then, households were viewed from both perspectives. The regression procedure allowed for evaluation and measure of the overall dependency of the LEI score on the selected present lifestyle variables. On the other hand, the discriminant analysis procedure, in concert with the joint frequency distributions, permitted a clearer understanding of the existing lifestyle indicators that distinctly characterize households with expected lifestyles of intensive, moderate, and conservative energy use.

Table 4.11. Present Lifestyle Housing Characteristics of Households with Low, Moderate and High Energy Lifestyle Expectation Index Scores: Housing Location and Number of Technical Conservation Techniques Installed ^a

Present Lifestyle Characteristic	Energy Intensiveness of Lifestyle Expectations ^b					
	Low		Moderate		High	
	%	N	%	N	%	N
<u>Housing Location</u>						
Large City	<u>8.8</u>	(7)	<u>10.4</u>	(14)	<u>13.7</u>	(11)
Medium City	<u>11.2</u>	(9)	<u>20.7</u>	(28)	<u>20.0</u>	(16)
Small City	<u>22.5</u>	(18)	<u>18.5</u>	(25)	<u>20.0</u>	(16)
Village or Town	<u>27.5</u>	(22)	<u>18.5</u>	(25)	<u>21.2</u>	(17)
Open Country, Non-Farm	<u>15.0</u>	(12)	<u>23.0</u>	(31)	<u>23.8</u>	(19)
Farm	<u>15.0</u>	(12)	<u>8.9</u>	(12)	<u>1.2</u>	(1)
	<u>100.0</u>	(80)	<u>100.0</u>	(135)	<u>100.0</u>	(80)
<u>Number of Technical Conservation Techniques Installed</u>						
1 or 2	57.9	(44)	61.7	(82)	49.3	(37)
3 or 4	32.9	(25)	33.0	(44)	42.7	(32)
5 or 6	7.8	(6)	5.3	(7)	6.7	(5)
7 or 8	1.3	(1)	0.0	(0)	1.3	(1)
	<u>100.0</u>	(76)	<u>100.0</u>	(133)	<u>100.0</u>	(75)

^a Percentages have been rounded in some instances.

^b Underlining denotes a probability sampling error less than .10 for the joint frequency distribution.

Results from these statistical procedures were congruent in that the same eight existing lifestyle indicators were identified, in the same order, as significant elements in the predictive and discriminatory profiles of households with varying levels of energy intensive lifestyle expectations. Confidence was, therefore, enhanced in the following profiles of households with low, moderate, and high energy lifestyle expectations (Table 4.12).

Table 4.12. Profiles of Present Lifestyle Characteristics of Households With Low, Moderate and High Energy Lifestyle Expectations ^a

Present Lifestyle Characteristic	Energy Intensiveness of Lifestyle Expectations		
	Low	Moderate	High
Lifestyle Expectation Index Score	<2.7419	2.7420 - 3.1874	>3.1875
Socio-Demographic			
Respondent's Age (Average Age)	Older: (52 Years)	Middle: (49 Years)	Middle: (45 Years)
Respondent's Education	High School or Less	High School-Some College	College
Annual Household Income (Average Category)	Low: \$10,000-\$15,000	Middle: \$15,000-\$20,000	High: \$20,000-\$25,000
Household			
Stage in Life Cycle	Late: "Empty-Nest"	Later-Middle: Older Children Either Gone or Still at Home	Middle: School Age Children
Employment Pattern	No/Or One Income Earner	One Income Earner	One Or Two Income Earners
Attitudinal			
Ecoawareness ^b (Average Score)	Lowest (1.2)	Lower (1.3)	Low (1.4)
Housing			
Geographic Location	Small Urban Centers	Medium Urban Centers or Open Country	Larger Urban Centers or Open Country
Installation of Technical Conservation Measures (Average Number)	Low (2.6)	Low (2.3)	Low (2.7)
Energy Consumption			
Adoption of Voluntary Simplicity Measures (Indirect Energy)	High to Moderate	Moderate	Moderate to Low
Average Percent Change in Total Btu Consumption: 1977-78/1979-80 (Direct Energy)	Decrease -2.7%	Decrease -2.4%	Increase +.4%
(Average Annual Btu Consumption)	(236 million)	(255 million)	(299 million)

^aProfiles based upon data shown in Tables 4.7 through 4.11.

^bThe Low ecoawareness category had a range of 1.0 - 2.7.

CHAPTER V

CONCLUSIONS AND IMPLICATIONS

From the findings set forth in the previous chapter, two types of conclusions may be drawn. One is an analytical conclusion, inductively formulated from the results of the statistical procedures used to test and refine the index; it is concrete--pertaining to the energy expectations reported by the 300 Michigan households queried for this study. The other is a speculative conclusion which is reflective or conjectural in nature and proposes to extrapolate the analytical conclusion to a more generic statement. Both are discussed in this chapter.

Also discussed within this chapter are several implications drawn from the findings in this research effort. They concern further research, educational programs, and policy development by governmental decision-makers.

Conclusions

Analytical Conclusion

In this study, the Lifestyle Expectation Index was determined to be a valid and reliable instrument for

measuring the relative energy intensiveness of expected lifestyles, five years hence. An acceptable level of index utility was also established.

Consensus among six expert reviewers confirmed the content or face validity of a 44 item index and the weighting of item response choices (1 = energy conservative response through 5 = energy intensive response). In other words, the reviewers concluded that the selected items did indeed form an index representative of the concept of energy intensive lifestyle expectations, and further, that the aggregate responses to these items could place survey households along a continuum reflecting that underlying concept.

By utilizing several statistical techniques, however,--bivariate correlations, factor analysis, stepwise multiple regression, alpha test, and measures of central tendency--a 30 item refinement of the original questionnaire was revealed to be a more parsimonious measure of the relative energy intensiveness of a household's expected living style, five years into the future.

This refined measure was again subjected to the same testing procedures mentioned in the previous paragraph. Findings showed that its statistical validity was improved. Scores from the refined instrument were found to have a normal distribution around a mean of 2.97 (.03 from the midpoint of the possible score range between one and five). Items in the index showed acceptable correlations with the

composite measure, two-thirds exhibiting correlation coefficients of at least .30. Ten factors were readily identified, each factor having at least one variable loading at or above the .30 level. While 17 variables were found to explain 90 percent of the variance in index scores, the most influential variables were the expectation to have both family and living rooms and to have separate bedrooms for each household member other than head(s) (Beta = .149 and .140, respectively). Thus, it may be concluded that, in this research, the anticipated size of dwelling unit, relative to the size and composition of the household, will have a major impact on, or correlation with, the energy demands of expected lifestyle. This conclusion suggests further support for the importance placed on the housing variable, relative to both lifestyle indicator and energy demand, noted by previous research (Socolow, 1978; Morrison, 1975; Newman and Day, 1975; Michelson and Reed, 1970).

A reliability coefficient of .7 (.69) was considered to be very acceptable for the initial testing of the Lifestyle Expectation Index. Sonquist and Dunkelberg (1977, p. 331) state that while there appears to be no generally accepted criterion, "serious efforts should be made to develop measures that have reliability levels of at least .7."

Results from this study also suggested that the LEI has a potential utility to profile households with intensive

to conservative energy lifestyle expectations. Predictive discriminators of low, moderate, and high LEI households were statistically significant for eight present lifestyle characteristics: household income, household life cycle, adoption of voluntary simplicity measures, respondent's education, respondent's age, household employment pattern, percent change in Btus per degree-day over three years, and ecoawareness.¹ In other words, selected indicators of a household's existing lifestyle were able to estimate the relative energy demands of the style in which that household expected to be living in the near future. A relationship between present lifestyle and energy intensive lifestyle expectations was thus indicated.

In this study, household income was conceptualized as the primary tool by which a household obtains the goods and services (resulting in some level of direct and indirect energy consumption) it considers necessary to maintain its valued living style. It is of interest, therefore, that present household income was the major predictive variable in the regression equation ($r^2 = .18$, $p = 0.0$) and the primary discriminating variable in the discriminant analysis (change in Rao's $V = 51.36$; $p = .0000$). This finding supports the key analytical conclusion drawn by Newman and Day (1975); that is:

¹The reader is referred to Table 4.12 in Chapter IV (page 148) for a complete profile of households in each of the three index strata.

without doubt . . . the more money you have, the more energy (direct and indirect) you use . . . regardless of any other condition--climate; how and how far you commute to work; the size of your house; your age; number of people in your household; and whether or not your house is protected from the weather by insulation, for instance (pp. xxiii-xxiv).

Speculative Conclusion

Energy has been called the most crucial of resources, as it is the key to all others, including human resources (Jones, 1980; Toeffler, 1980). If energy were unlimited, it could be used to make abundant quantities of drinkable water from the sea, to produce food and fibers for untold numbers of people, to excavate mineral deposits in the depths of the earth or sea or outer space, and to run the machinery of industrial production. Energy, then, is the resource for gaining access to every other resource; energy is that resource upon which existing American lifestyles have been built.

This study points to the fact that, relative to energy use, a relationship exists between how a household currently lives and how it expects to live in the near future. Households are apparently extrapolating present energy lifestyle experiences into future energy lifestyle expectations.

In light of probable energy shortfalls, coupled with anticipated escalating costs, it seems uncertain whether these energy expectations can be fully realized. The responses people--individually and as households--give

to the projected near term imbalance between human demands for energy and the capacity of the environments (natural and built) to supply them, will, to a large extent, determine the aggregate response of the American culture. Unseld, et al. (1979), states that:

The structure and functioning of institutions, the face of the land, and the manner in which individuals lead their daily lives all promise to change in the future as we grapple with solutions to the energy problem. The reverse is also true--changing social trends promise to exert important influences on energy sources (p. 3).

If this is the case, an overriding question becomes: How readily will Americans (the majority of which have been socialized in the unprecedented period of technological and economic growth following World War II) adapt to different lifestyles, based upon what is now generally agreed to be coming decades of costly and uncertain energy supplies?

Dissonance theory would propose that people will more easily accept new lifestyle realities if they are not sharply different from their expectations--i.e., if there is a gradual, not sudden, transition to new lifestyles. Broadly speaking, then, it is apparent that the issue of energy and lifestyle expectations is inextricably linked to time. If conservation efforts reduce energy demand, and/or if technological advances allow unforeseen increases in affordable energy supplies, the time transition to new lifestyles can be elongated, speculatively resulting in

less dissonance. If, however, neither conservation nor technology can increase that time span, unfavorable consequences, relevant to discrepancies between energy expectations and energy realities, may be assumed.

The next 20 years are certain to contain serious shocks, most probably involving short-term supply interruptions of energy supplies and price instability (Schurr, 1979; Stobaugh and Yergin, 1979). What the impact of such shocks will be on lifestyle and on expectations can only be conjecture at this point. The degree and scope of lifestyle changes during a period of energy shortages are necessarily functions of the seriousness and the timing of the shortages.

Implications of the Research

Implications for Future Research

According to Babbie (1979) and Sonquist and Dunkelberg (1977), beginning or exploratory studies are valuable in social scientific research. They are essential whenever new ground is being broken and can almost always yield new insights into a topic for further research. They often serve to clarify and articulate relationships between concepts and can develop methodological approaches and specific measuring techniques. They further note that a specific objective of such an exploratory study may be the development and testing of an index.

Replication. This study was a beginning--and just a beginning--in a large complex domain. Future research needs to be done to further test the validity, reliability and utility of the measuring instrument developed, tested and refined in this study. Replication of this research endeavor with random samples drawn from other populations would, therefore, be of value. The households selected for this study were primarily homeowners in a state (Michigan) whose economy has been problematic during recent years. Conditions such as high unemployment in the automobile and supporting industries and rapidly escalating heating costs during long, cold winters could have affected how the respondents perceived their future lifestyles.

In the telephone interviews, at which time primary data for the index was collected, the respondents were also asked what economic conditions they expected in five years, as compared with today.¹ These questions related to the United States, the State of Michigan, the local area or community, and the respondent's family.

Replies yielded two points. First, across all index groups, respondents expected the national and state economics to ameliorate, with a somewhat higher proportion expressing optimism about the improvement in the United States' economy than the Michigan economy. For their local

¹The reader is referred to questions 45 through 48 on the interview schedule, Appendix A.

communities, respondents expected prevailing economic conditions to continue. Within this outline, a slight trend surfaced showing the more favorable economic outlooks to be associated with those expressing higher energy intensive lifestyle expectations.

The other point concerned the respondents' economic expectations for their own families. Less than half of each index group expected their economic conditions to be better five years hence; however, the largest proportion expressing expectations for improved personal economic conditions were found in the high LEI households. Almost half of the middle LEI households and a majority of the low LEI households thought their families would be in about the same economic lot. The distribution of responses implied, that, on the personal level, too, there was a positive relationship between a household's energy lifestyle expectations and its expected economic state.

The suggestions might be offered, then, that 1) these respondents, although somewhat optimistic, perceived economic recovery to be a long term prospect, and 2) they view economic recovery as a "trickle down" process--that is, the national climate will improve before the state and local conditions.

It would, therefore, be beneficial to repeat this study in other states and other regions of the country. In a recent statistical examination of national quality of life studies, clear regional differences in psychological

well-being were discovered (Rubenstein, 1982). Since expectations are psychological attributes, it might be that differences in their energy intensivity exist, vis à vis different states or regions.

Longitudinal Studies. Consideration likewise needs to be given to utilizing the LEI in longitudinal studies, which provide empirical information describing processes over time. It would appear useful to employ trend studies of samples drawn from general populations (state, regional, or national) and cohort studies of samples drawn from more specific subpopulations (for example, high income households, or young couples in the first stage of their life cycle or adopters of alternative heating systems such as solar, wind, and wood). Especially valuable would be panel studies of the same sample over time. One natural example would be a subsample of the 300 households who participated in this research effort.

Longitudinal studies are, of course, costly both in terms of time and in terms of research dollars. The mobility characterizing American households further increases the difficulty of time-series studies, while household energy consumption records are not always accessible from utility or fuel oil companies.

Such longitudinal studies are considered essential in future research concerning household energy consumption, however. They would expand the capacity not only to analyze overall trends in energy lifestyle expectations,

but would also have the added advantage of showing the precise patterns of persistence and change in those expectations, relative to energy demand.

Model Development and Testing. The research model used in this study (Figure 1.2, page 15) presented a graphic representation of a theoretical relationship between selected indicators of present lifestyle and the energy intensiveness of lifestyle expectations. Implicit in this model is the ecosystem concept of feedback, manifested in the reflexive direction of those expectations.¹ In the model, energy intensive lifestyle expectations are defined as intervening attitudinal variables which affect the energy consumption patterns of the household. To test this attitude/behavior linkage, research efforts should be directed towards refining this embryonic model, and towards developing a research design that utilizes the LEI as a predictor of measured rates of energy consumption and/or conservation.² Katona (Newcomb, 1972, p. 113), in fact, theorizes that the importance of expectations is not as dependent variables (how they arise), but as independent variables (what they give rise to).

¹Feedback is defined as a process by which an individual or household system used information concerning its own actions to direct its subsequent functioning (Melson, 1980, p. 262).

²The importance of using actual measured rates of consumption, rather than self-reported estimates, in attitude-energy behavior studies was documented in the Review of Literature, Chapter II.

Implications for Educational Programs

A crucial implication of this research is that energy education programs, both formal and informal, should incorporate an evaluation of indirect energy costs into their educational strategies. (By necessity, this further implies a concerted effort to determine the total energy costs of consumer goods and services.) In a broader sense, this requires not only the presentation of energy information, *per se*, but also the integration of social, political, economic and moral questions inherent in the energy-lifestyle issue.

Such an ecological format has been implemented in several senior seminar classes at Michigan State University. Indications of heightened ecoawareness and a greater willingness to adapt lifestyle to new energy circumstances were reported by students who had participated in the integrative classroom experience (Knutson, 1978).

The energy problem is, in essence, a consumer economic problem. As the costs of energy increase, Americans will look to alternative styles of living to save not only energy, but money as well. Citing his "Boomerang Law of Energy Conservation," Hayes (1976, p. 63) cautions that whenever money is saved, energy is in fact also saved, but whatever that money is spent on also required energy to produce. Unless careful, he says, the dollar savings may be spent on something that required more energy to make than the item given up in order to conserve

energy. To support his point, he cites an example developed by Professor Bruce Hannon at the University of Illinois:

A commuter who ordinarily rides the bus to work each morning may begin bicycling to save energy. The switch from busses to bicycles saves about 51,000 Btus per dollar expenditure. If the roundtrip fare were \$1.00, the commuter would save \$5.00 (and 225,000 Btus) each week by riding a bicycle. The commuter saves \$5.00 per week or \$260 per year in this conservation effort. If those savings are spent on anything requiring more than 51,000 Btus per dollar, no total energy will have been conserved--yet, the lifestyle will have been altered.

This example serves to illustrate the fact that purchases of energy, especially indirect energy, pose an especially difficult problem for consumers concerned with energy conservation. At both the micro (individual or household) level and macro (aggregate or national) level, the projected changing energy lifestyle patterns require the conscious shift of purchases to less total energy intensive goods and services.

Implications for Public Policy

Research has clearly indicated that, relative to energy, Americans have been more supportive of voluntary policies and policies that will not alter current lifestyles. The overall range and distribution of LEI scores found in this study give rise to the speculation that people are, in fact, not expecting future energy lifestyles to be too different than those being presently experienced. Based upon such findings, behavioral scientists have suggested

that public policy be directed towards attempts to alter energy production and consumption patterns (Schwartz, 1978).

Policies currently in vogue (i.e., "supply-side" economics) are attempting to address the energy production issue for the short run. Instigation of public policies and programs directed at reducing near term energy use patterns have been problematic for several reasons, the most critical of which is the high levels of direct and indirect energy consumption presently built into all systems such as housing, transportation, and commercial and industrial facilities.

To change energy consumption patterns in the long run, extensive investments of time, as well as public and private capital, would be required. Initiation of such massive long term investments does not seem viable in a foreseeable future of uncertain economic conditions. Retrofitting and adaptation of existing systems are, therefore, mandated as short term transitions to a more energy efficient environment. The following housing example will serve to illustrate this important implication.

In the past, policies established at all levels of government fostered the development of suburban communities. Federal policies allowed for affordable loans, favorable tax deductions, and expansion of the national highway system. State policies encouraged development of agricultural lands by business and industry, which were then accompanied by residential and commercial development.

Local policies, permitted by state enabling legislation, established zoning ordinances whereby larger single family detached units became the prevalent form of housing.

Over the past 30 years, decreasing household size has furnished evidence that energy abundance (and affluence) encouraged separate living arrangements. Energy problems and budget restrictions are among social changes that are fostering household conditions such as increasing numbers of smaller households (many headed by a single adult), a resurgence of multigenerational households, or cohabitation by unrelated adults or families. Insofar as living arrangements are constrained by energy availability (especially price), existing housing stock could be adapted within the parameters of changing household characteristics. It is apparent, then, that relative to housing, sound public policy should address needed adaptations within the realm of acceptable social norms.

Innovative adaptations are beginning to surface throughout the country.¹ In the affluent residential community of Westport, Connecticut, for instance, single-family zoning laws have been termed obsolete and an anachronism in light of today's need for larger numbers of smaller housing units. The community is thus considering

¹Examples include Westport, Connecticut; Eugene, Oregon; Evanston, Illinois; and Lincoln City-Lancaster County, Nebraska.

adoption of zoning ordinances which would permit, under certain conditions, the use of accessory apartments in single-family houses. It is estimated that already, there are 15,000 such accessory apartments on Long Island, New York alone. Across the nation, the total may run as high as 2.5 million (Porter, 1982). Widespread local interest in such zoning modifications has prompted the American Association of City Planners to prepare a manual on amendment zoning to permit such dual living arrangements while reflecting the overriding concern of local policymakers with protecting the character of single-family neighborhoods.

To be acceptable, public policy must use concepts that appear to represent established or traditional perceptions of reality, are feasible within existing conditions, and meet with some level of executive, legislative and public approval. The housing illustration serves to demonstrate how a public policy can meet these criteria and serve the dual functions of conserving energy and utilization of existing capital stock. From an ecological perspective, implementing energy-efficient housing (land use) policy has important benefits beyond directly saving energy. It can affect public service costs, fiscal balances, housing costs, preservation of prime farmland, and revitalization of neighborhoods and urban centers.

Concern, by policymakers, for energy use appears to have ebbed and flowed with fluctuations in costs and

supplies, although the long-term direction has been toward planning for energy conservation. Whether implemented in piecemeal or comprehensive fashion, policies (at all levels), such as the housing example cited here, can make a difference in total energy use, both now and in the future when perhaps other unforeseeable crises will have convinced the public of the need for accelerated conservation and changing energy lifestyles.

LIST OF REFERENCES

LIST OF REFERENCES

- Abt, Clark C. "Energy Shortages and Changing Lifestyles." Technological Forecasting and Social Changes, 10, 2 (1977): 113-120.
- Anderson, Dennis, and Cullen, Carmen. "Energy Research from a Consumer Perspective: An Annotated Bibliography." Faculty of Administrative Studies, University of Manitoba, Consumer and Corporate Affairs, Canada, 1978.
- Anderson, Dennis C., and McDougall, Gordon H.G. "Consumer Energy Research: An Annotated Bibliography." Prepared for the Consumer Research and Evaluation Branch of Consumer and Corporate Affairs, Canada, 1980.
- Andrews, Mary P., and Boger, Robert P. (Eds.). Michigan Family Sourcebook. East Lansing, Michigan: Institute for Family and Child Study, College of Human Ecology, Michigan State University, 1980.
- Angell, Bee and Associates. A Qualitative Study of Consumer Attitudes Toward Energy Conservation. Chicago: Bee Angell and Associates, 1975.
- Appley, M. H. Adaption-Level Theory: A Symposium. New York: Academic Press, 1971.
- Babbie, Earl R. The Practice of Social Research. Belmont, California: Wadsworth Publishing Company, 1979.
- Barnaby, David J., and Reinzenstein, Richard C. "Profiling the Energy Consumer: A Discriminant Analysis." Unpublished manuscript, University of Tennessee, 1975.
- Barnet, Richard. The Lean Years: Politics in the Age of Scarcity. New York: Simon & Schuster, 1980.

- Bartell, Ted. "The Effects of the Energy Crisis on Attitudes and Lifestyles of Los Angeles Residents." Paper presented at the American Sociological Association, Montreal, August 1974. Revised as "Political Orientation and Public Response to the Energy Crisis," Social Science Quarterly, 57 (1976): 430-436.
- Becker, Lawrence J.; Seligman, Clive, and Darley, John M. "Psychological Strategies to Reduce Energy Consumption: Project Summary Report." Princeton: Center for Energy and Environmental Studies, Princeton University, 1979.
- Bergman, Barbara. "The Economics of Expectation." The New York Times, September 20, 1981.
- Borg, Walter R., and Gall, Meredith D. Educational Research. New York: Longman, 1979.
- Broderick, C. B. "Beyond the Five Conceptual Frameworks: A Decade of Development in Family Theory." Journal of Marriage and Family, 33, 1 (1971): 139-159.
- Brooks, Harvey, and Gington, Edward L. Energy in Transition 1985-2010. Final Report: Committee on Nuclear and Alternative Energy Systems (CONAES), National Research Council. Washington, D.C.: National Academy of Science, 1980.
- Bubolz, Margaret; Eicher, Joanne, and Sontag, M. Suzanne. "The Human Ecosystem: A Model." Journal of Home Economics (Spring 1978): 28-31.
- Bullard, Clark W. II. "Energy Impact of Consumption Decisions." Proceedings of the IEEE, 63 (March 1975).
- Bultana, Gordon L. "Public Response to the Energy Crisis: A Study of Citizens' Attitudes and Adaptive Behaviors." Department of Sociology Report No. 130, Iowa State University, 1976.
- Burr, Wesley R.; Hill, Ruben; Nye, F. Ivan, and Reiss, Ira L. Contemporary Theories About the Family, Vol. I. New York: The Free Press, 1979 (a).
- _____. Contemporary Theories About the Family, Vol. II. New York: The Free Press, 1979 (b).

Campbell, Angus, and Converse, Philip E. The Human Meaning of Social Change. New York: Russell Sage Foundation, 1972.

Campbell, Angus; Converse, Philip E., and Rogers, Willard L. The Quality of American Life: Perceptions, Evaluations, and Satisfactions. New York: Russell Sage Foundation, 1976.

Committee on Measurement of Energy Consumption. Energy Consumption Measurement. Washington, D.C.: National Academy of Sciences, 1977.

Committee on Science and Technology. "Energy Demand, Conservation Potential and Probable Lifestyle Changes." Hearings before the Subcommittee on Advanced Energy Technologies and Energy Conservation Research, Development and Demonstration of the Committee on Science and Technology. U.S. House of Representatives: 95th Congress, 1st Session, April 4-5, 1977.

Compton, Norma H., and Hall, Olive A. Foundations of Home Economics Research: A Human Ecology Approach. Minneapolis: Burgess Publishing Company, 1972.

Corr, Michael, and MacLeod, Dan. "Getting It Together." Environment, 14, 9 (November 1972): 2-10.

_____. "Home Energy Consumption as a Function of Lifestyle." In Energy and Human Welfare-A Critical Analysis, Vol. III. New York: MacMillan Information, 1975.

Cunningham, William H., and Lopreato, Sally Cook. Energy Use and Conservation Incentive: A Study of the Southwestern United States. New York: Praeger Special Studies, 1977.

Curtin, Richard T. "Consumer Adaptation to Energy Shortages." Journal of Energy and Development, 1 (1976): 12-21.

DeHloff, John A. "Public Opinion Constraints on Energy Policy-Making." Paper presented at Energy Use Management International Conference, Tucson, Arizona, October 1977.

Eichenberger, Mary Ann. "A Comparison of Ownership of Selected Household Appliances and Residential Energy Use by Employed and Nonemployed Homemakers in the Lansing, Michigan Area." M.A. thesis, Michigan State University, 1975.

Elgin, D. S, and Mitchell, A. "Voluntary Simplicity: Life-style of the Future?" The Futurist, 11 (August 1977): 200-209; 253-261.

"Energy: Facing Up to the Problem, Getting Down to Solutions: A Special Report in the Public Interest." National Geographic. Washington, D.C.: National Geographic Society, 1981.

Erley, Duncan; Mosen, David, and Gil, Efraim. "Energy-Efficient Land Use." Report No. 341, Planning Advisory Service, American Planning Association, Chicago, May 1979.

Farhar, Barbara C.; Weis, Patricia; Unseld, Charles T., and Burns, Barbara A. Public Opinion About Energy: A Literature Review. Golden, Colorado: Solar Energy Research Institute (SERI), Division of Midwest Research Institute, 1979.

Ferber, S. "More on Energy: A Look at Research." American Psychological Association Monitor (April 1977).

Foresight-Volume II Energy Conservation in Cities.

Prepared for the Subcommittee on Advanced Energy Technologies and Energy Conservation Research, Development and Demonstration of the Committee on Science and Technology. U.S. House of Representatives, 95th Congress, 2nd Session. Washington, D.C.: U.S. Government Printing Office, December 1978.

Fridgen, Joseph D. "Tourism and Recreation Behavior: Energy Impacts." Paper presented at Cooperative Extension Service Energy Programming Retreat, November 13, 1981.

Fritsch, Albert J. The Contrasmers: A Citizens Guide to Resource Conservation. New York: Praeger, 1974.

Galbraith, John K. The Affluent Society. Boston: Houghton Mifflin Company, 1958.

Gil, Efraim. "Energy Efficient Planning: An Annotated Bibliography." ASPO Planning Advisory Service, No. 315, American Society of Planning Officials, 1976.

Gladhart, Peter M. "Energy Conservation and Lifestyles: An Integrative Approach to Family Decision Making." Journal of Consumer Studies and Home Economics, 1 (1977): 265-277.

- Gladhart, Peter M., and Roosa, Mark W. "Family Life Style and Energy Consumption: A Family-Energy Adaptation Model." Family Energy Project Occasional Paper No. 10, Institute for Family and Child Study, Michigan State University, November 1978.
- Gladhart, Peter M.; Zuiches, James J., and Morrison, Bonnie M. "Impacts of Rising Prices Upon Residential Energy Consumption, Attitudes, and Conservation Policy Acceptance." In Energy Policy in the United States: Social and Behavioral Dimensions. New York: Praeger, 1978.
- Gottlieb, David, and Matre, Mark. "Sociological Dimensions of the Energy Crisis: A Follow-up Study." The Energy Institute, Houston, Texas, 1976.
- Gregg, Richard. "Voluntary Simplicity." Visva-Bharati Quarterly (1936). Reprinted in Manas, 1974.
- Grot, Richard A., and Socolow, Robert H. "Energy Utilization in a Residential Community." In Energy. Cambridge: MIT Press, 1974.
- Guilford, J. P., and Fruchter, B. Fundamental Statistics in Psychology and Education. New York: McGraw-Hill, 1965.
- Hamrin, Jan. "Energy-Savings Homes: Don't Bet On Technology Alone." Psychology Today (April 1979): 18-19, 32-33.
- Hannon, Bruce M. "An Energy Standard of Value." The Annals of the American Academy of Political and Social Science, 410 (November 1973): 139-153.
- _____. "Energy Conservation and the Consumer." Science (July 11, 1975): 95-102.
- Harris, Craig K., and Keith, Joanne G. "Preliminary Findings on the Evaluation of Pilot Project Conserve in Michigan: A Computerized Residential Energy Audit Program." Institute for Family and Child Study, Michigan State University, June 1980.
- Harris, Craig K.; Keith, Joanne G., and Wilhelm, Mari S. "Final Report on the Evaluation of Pilot Project Conserve in Michigan: A Computerized Residential Energy Audit Program." Institute for Family and Child Study, Michigan State University, August 1980.

- Hass, Jane W.; Bagley, Gerold S., and Rogers, Ronald W. "Coping with the Energy Crisis: Effects of Fear Appeals Toward Attitudes Toward Energy Consumption." Journal of Applied Psychology, 60, 6 (1975): 754-756.
- Hayes, Dennis. "Energy: The Case For Conservation." Worldwatch Paper 4, January 1976.
- Hitch, Charles J. (Ed.). Energy Conservation and Economic Growth. American Association for the Advancement of Science. Boulder, Colorado: Westview Press, 1978.
- Hogan, Mary Janice. "Energy Conservation: Family Values, Household Practices, and Contextual Variables." Ph.D. dissertation, Michigan State University, 1976.
- Honnold, J. A., and Nelson, L. D. "Voluntary Rationing of Scarce Resources: Some Implications of an Experimental Study." Paper presented at the Annual Convention of the American Sociological Association, New York, September 1976.
- Hook, N. C., and Paolucci, Beatrice. "The Family As An Ecosystem." Journal of Home Economics, 62 (May 1970): 315-318.
- "How to Live Better with Less--If You Can Stand the People." The Futurist (August 1977): 207-209, 254.
- Hubbert, M. King. "Survey of World Energy Resources." Mining and Metallurgical Bulletin, 66 (July 1973): 37-53.
- Hummel, C. F.; Levitt, L., and Loomis, R. J. "Perceptions of the Energy Crisis: Who is Blamed and How Do Citizens React to Environmental-Lifestyle Trade-offs?" Environment and Behavior, 10 (1978): 37-88.
- Hungerford, Nancy. "Relationship of Husband/Wife Ecoconsciousness Value to Direct Household Energy Consumption." Ph.D. dissertation, Michigan State University, 1978.
- Issac, Stephen, and Michael, William B. Handbook in Research and Evaluation. San Diego: EDITS Publishers, 1980.

- Jaguaribe, H. "World Order, Rationality and Socio-economic Development." Daedalus (Spring 1966): 607-626.
- Jones, Landon Y. Great Expectations. New York: Coward, McCann & Geoghegan, 1980.
- Kantor, David, and Lahr, William. Inside the Family. New York: Harper Colophon Books, 1975.
- Katona, George. Essays on Behavioral Economics. Ann Arbor, Michigan: Survey Research Center, Institute for Social Research, University of Michigan, 1980.
- _____. The Mass Consumption Society. New York: McGraw-Hill, 1964.
- _____. "Theory of Expectations." In Human Behavior in Economic Affairs. Amsterdam: Elsevier, 1972.
- Katona, George, and Mueller, Eva. Consumer Expectations 1953-1956. Ann Arbor, Michigan: Institute for Social Research, Survey Research Center, University of Michigan, 1956.
- Keith, Joanne Goodman. "Direct Household Energy Consumption, 1973-74, 1975-76: The Impact of Family Microdecisions Upon Levels of Consumption." Ph.D. dissertation, Michigan State University, 1977.
- Keith, Joanne G.; Harris, Craig K.; Tortorici, Joseph S., and Wilhelm, Mari S. "Final Report of the Evaluation of Statewide Project Conserve in Michigan: A Computerized Residential Energy Audit Program." Institute for Family and Child Study, Michigan State University, December 1981.
- Knutson, Bonnie J. "Energy Information Classroom Experiment: A Measure of Student Beliefs and Attitudes." M.A. thesis, Michigan State University, 1978.
- Kranzberg, Melvin; Hall, Timothy A., and Schieber, Jane L. Energy and the Way We Live. San Francisco: Boyd and Fraser Publishing Company, 1980.
- Landsberg, Hans H. Energy: The Next Twenty Years. Cambridge: Ballinger Publishing Company, 1979.

- Latta, Robert; Woteki, Thomas H.; Carlson, Lynda; Thompson, Wendel, and Vagts, Kenneth. The National Interim Energy Consumption Study. U.S. Department of Energy, Energy Information Administration, Washington, D.C.: U.S. Government Printing Office, 1981.
- Lazer, W. "Life Style Concepts and Marketing." In Toward Scientific Marketing. Chicago: The American Marketing Association, 1963.
- Leonard-Barton, Dorothy, and Rogers, Everett M. "Voluntary Simplicity in California: Precursor or Fad?" Paper presented at the American Association for the Advancement of Science, San Francisco, January 1980.
- Lopreato, Sally C., and Meriwether, Marion C. Energy Attitudinal Surveys: Summary Annotations, Research Recommendations. Washington, D.C.: U.S. Energy Research and Development Administration, 1976.
- Market Facts of Canada, Limited. "Residential Energy Conservation Attitude and Trade-off Study." Report prepared for Canadian Electrical Association, Montreal, Ontario, Canada, 1979.
- Melson, Gail F. Family and Environment: An Ecosystem Perspective. Minneapolis: Burgess Publishing Company, 1980.
- Merkley, Susan L. "The Effects of Past Experience on Current Energy Consumption and Conservation Patterns: The Interaction of Historical Time, Social Time and Life Time." Ph.D. dissertation, Michigan State University, 1981.
- Michelson, William. Environmental Choice, Human Behavior, and Residential Satisfaction. New York: Oxford University Press, 1977.
- Michelson, William, and Reed, Paul. "The Theoretical Status and Operational Usage of Life Style in Environmental Research." Paper presented at the American Sociological Association, Washington, D.C., August 1970.
- Milstein, Jeffrey S. "Attitudes, Knowledge and Behavior of American Consumers Regarding Energy Conservation with Some Implications for Governmental Action." Washington, D.C.: U.S. Department of Energy, Office of Conservation and Solar Applications, 1977.

Milstein, Jeffrey S. "How Consumers Feel About Energy: Attitudes and Behavior." Unpublished manuscript, Federal Energy Administration, June 1976.

Morgan, James N. The Economics of Personal Choice. Ann Arbor: University of Michigan Press, 1980.

Morgan, James N.; Strumpel, Bernhard, and Zahn, Earnest. Human Behavior in Economic Affairs: Essays in Honor of George Katona. San Francisco: Jossey-Bass, Inc., 1972.

Morrison, Bonnie M. "The Energy Problem and Family Lifestyle." Draft for chapter in forthcoming book, Energy and Family Lifestyle. Institute for Family and Child Study, Michigan State University, January 1981.

_____. "Energy Problem: Several Perspectives." Draft for chapter in forthcoming book: Energy and Family Lifestyle. Institute for Family and Child Study, Michigan State University, May 1980.

_____. "The Importance of a Balanced Perspective: The Environments of Man." Man-Environment Systems, 4 (1974): 171-178.

_____. "Socio-Physical Factors Affecting Energy Consumption in Single-Family Dwellings: An Empirical Test of a Human Ecosystems Model." Ph.D. dissertation, Michigan State University, 1975.

Morrison, Bonnie M., and Gladhart, Peter M. "Energy and Families, the Crisis and the Response." Journal of Home Economics (January 1976): 15-18.

Morrison, Bonnie Maas; Keith, Joanne G., and Roosa, Mark. "Household Energy Conservers and Non-Conservers: A Discriminant Analysis Profile." Paper presented at Michigan Home Economics Association Conference, Research Reporting Session, Mackinac Island, Michigan, August 11, 1978.

Morrison, Bonnie M.; Keith, Joanne G., and Zuiches, James J. "Impacts on Household Energy Consumption: An Empirical Study of Michigan Families." In Sociopolitical Effects of Energy Use and Policy. Study of Nuclear and Alternative Energy Systems, Supporting Paper 5. Washington, D.C.: National Academy of Science, 1979.

- Morrison, Denton E. "Coercive and Voluntaristic Solutions to the Problems of Growth." Unpublished manuscript, Department of Sociology, Michigan State University, 1974.
- Murray, J. R.; Minor, M. J.; Bradburn, N. M.; Cotterman, R. F.; Frankel, M., and Pisarski, A. E. "Evolution of Public Response to the Energy Crisis." Science, 184 (1974): 257-263.
- National Research Council on Measurement of Energy Consumption. Energy Consumption Measurement: Data Needs for Public Policy. Washington, D.C.: National Academy of Science, 1977.
- Newcomb, T. M. "Expectations as a Social-Psychological Concept." In Human Behavior in Economic Affairs: Essays in Honor of George Katona. San Francisco: Jossey-Bass, Inc., 1972.
- Newman, Dorothy K., and Day, Dawn. The American Energy Consumer. Cambridge: Ballinger Publishing Company, 1975.
- Nie, Norman H.; Hull, C. Hadlai; Jenkins, Jean G.; Steinbrenner, Karen, and Bent, Dale H. Statistical Package for the Social Sciences. New York: McGraw-Hill, 1975.
- Nietzel, M. T., and Winett, R. A. "The Relationship of Demographics, Environmental Attitudes, and Time to Energy Conservation Among Two Groups of People." American Journal of Community Psychology, 5 (1977): 195-205.
- Odum, Howard. "Energy, Ecology and Economics." Man Environment Systems, 4 (1974): 227-234.
- Odum, H., and Odum, E. Energy Basis for Man and Society. New York: McGraw-Hill, 1980.
- Olabode, Hamilton A.; Standing, Charles N., and Chapman, Paul A. "Total Energy to Produce Food Servings as a Function of Processing and Marketing Modes." Paper presented at The 36th Annual Meeting of the Institute of Food Technologies, Anaheim, California, June 6-9, 1976.
- Olsen, Marvin E., and Goodnight, Jill A. Social Aspects of Energy Conservation. Seattle: Battelle Hisman Affairs Research Centers, 1977.

- Oppenheim, A. N. Questionnaire Design and Attitude Measurement. New York: Basic Books, Inc., 1966.
- ORC. Volume XXIV. Princeton: Opinion Research Corporation, 1976.
- Paolucci, Beatrice. "Energy Decisions and Quality of Living." Journal of Home Economics, 70, 5 (1978): 22-23.
- Perlman, Robert, and Warren, Roland. Families in the Energy Crisis: Impacts and Implications for Theory and Policy. Cambridge: Ballinger Publishing Company, 1977.
- Pierotti, Anne, and Fritsch, Albert J. Lifestyle Index-77. Washington, D.C.: Center for Science in the Public Interest, 1976.
- Porter, Sylvia. "Zoning Laws Turn Obsolete." Lansing State Journal, February 22, 1982.
- Rappeport, M. "Consumer Attitudes and Behaviors Resulting From Issues Surrounding the Energy Shortage." Research Report, Opinion Research Corporation, Princeton, February 1975.
- Real Estate Research Corporation, Chicago, Illinois. "The Cost of Sprawl." Report prepared for the U.S. Council on Environmental Quality; the U.S. Department of Housing and Urban Development; and the U.S. Environmental Protection Agency. Washington, D.C.: U.S. Government Printing Office, April 1974.
- Rogers, Willard. "Analysis of Survey Data." Ann Arbor: Psychology-Sociology 616, University of Michigan, 1975 (Mimeographed).
- Rosson, Philip J., and Sweitzer, Robert W. "Demographic and Lifestyle Correlates of Inefficiency in Home Heating Oil Consumption." Halifax, Nova Scotia: Dalhousie University, 1979 (Mimeographed).
- Rubenstein, Carin. "Regional States of Mind." Psychology Today (February 1982): 22-30.
- Rudd, Nancy M. "Energy Use: The Need for Research." Journal of Home Economics, 70, 5 (1978): 24-26.
- Schipper, Lee. "Energy Conservation: Its Nature, Hidden Benefits and Hidden Barriers." Energy Communications, 2, 4 (1976): 333-414.

- Schnorr, Janet K. "Effectiveness of Energy Conservation Programs on Consumer Attitudes and Behaviors." In Changing Energy Use Future. New York: Pergamon Press, 1979.
- Schurr, Sam H. Energy in America's Future: The Choices Before Us. Resources for the Future National Energy Strategies Project, 1979.
- Schutz, H. G. "Energy, Community and Quality of Life in California: A Survey of Urban, Suburban and Rural Communities." Journal of Energy and Development, 2, 2 (1977): 224-238.
- Schwartz, T. P. "Short End of the Shortage: An Appraisal of the Social Consequences of the 1973-74 Energy Crisis and of Related Research." Paper presented at the Social and Behavioral Implications of the Energy Crisis Symposium, University of Houston Energy Institute, 1977.
- Seligman, C.; Kriss, M.; Darley, J. M.; Fazio, R. H.; Becker, L. J., and Pryor, J. B. "Predicting Residential Energy Consumption from Homeowner's Attitudes." Journal of Applied Psychology, 9, 1 (1979): 70-90.
- Shippee, Glenn. "The Psychology of Energy Consumption and Conservation: A Review and Conceptual Analysis." East Lansing: Department of Psychology, Michigan State University, 1980 (Mimeographed).
- Shippee, Glen, and Leedom, Nancy. "Conservation as a Renewable Resource and the Role of Social Science." Unpublished manuscript, Department of Psychology, Michigan State University, 1980.
- Socolow, Robert H. "Energy Conservation in Housing: Concepts and Options." In Future Land Use, Energy, Environmental, and Legal Constraints. New Brunswick: Rutgers University, 1975.
- _____. Saving Energy in the Home: Princeton's Experiments at Twin Rivers. Cambridge: Ballinger Publishing Company, 1978.
- Sommers, Lawrence M.; Wood, Garland A.; Johnson, James J. Jr., and Miller, Tracy C. "Household Energy Consumption in Oakland and Livingston Counties, Michigan: Some Patterns, Alternatives and Policy Implications." Report for the Michigan Community Action Agency Association and the Oakland-Livingston Human Service Agency. Michigan State University, June 1981.

- Sonenblum, Sidney. The Energy Connections: Between Energy and the Economy. Cambridge: Ballinger Publishing Company, 1978.
- Sonquist, John A., and Dunkelberg, William C. Survey and Opinion Research: Procedures for Processing and Analysis. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1977.
- Sontag, M. Suzanne; Bubolz, Margaret M., and Slocum, Ann C. "Perceived Quality of Life of Oakland County Families: A Preliminary Report." Research Report 380, Agricultural Experiment Station, Michigan State University, July 1979.
- Stobaugh, Robert, and Yergin, Daniel. Energy Future. New York: Random House, 1979.
- Thompson, Phyllis T., and MacTavish, John. "Energy Problems: Public Beliefs, Attitudes and Behaviors." Urban and Environmental Studies Institute, Grand Valley State College, Allendale, Michigan, 1976.
- Titus, James. "The Road to Conservation: Some Social Obstacles." Human Ecology Forum, 8, 3 (Winter 1978): 17-18.
- Toffler, Alvin. The Third Wave. New York: William Morrow and Company, Inc., 1980.
- Unseld, Charles T.; Morrison, Denton E.; Sills, David L., and Wolf, Charles P. Sociopolitical Effects of Energy Use and Policy, Supporting Paper 5. Report to the Sociopolitical Effects Resource Group, Risk and Impact Panel of the Committee on Nuclear and Alternative Energy Systems, National Research Council. Washington, D.C.: National Academy of Science, 1979.
- Warkov, Seymour. Energy Policy in the United States: Social and Behavioral Dimensions. New York: Praeger, 1978.
- Wasco, Nancy E.; Cook, Steward W., and Beatty, Richard. "The Effects of Fear Appeals Upon Behavioral Intentions Towards Energy Consumption: A Replication." Unpublished manuscript, University of Colorado, 1976.
- "What Do Homeowners Think?" Solar Age, April 1981: 22-26.

- Wilhelm, Mari S. "Direct and Indirect Conservation of Fossil Fuel Energy: The Influence of Financial and Philosophical Motivators and Available Human Resources." Ph.D. dissertation, Michigan State University, 1982.
- Woteki, T. "The Princeton Omnibus Experiment: Some Effects of Retrofits on Space Heating Requirements." Center for Environmental Studies, Report No. 43, Princeton University, 1977.
- Zimmerman, Carle C. "The American Family in Transition to the Solar Age." International Journal of Sociology of the Family, 8 (1978): 123-144.
- Zuiches, James J. "Coercion and Public Acceptance: The Case of Energy Policies." Paper presented at The Annual Meeting of the Society for the Study of Social Problems, New York, August 1976.

APPENDICES

APPENDIX A

LIFESTYLE EXPECTATION INDEX

TELEPHONE INTERVIEW SCHEDULE: FALL 1981 *

* A circle encapsulating the question number (O) denotes the 30 items retained in the refined Index.

RESPONDENT NAME _____

ID# _____

PHONE #: _____

LIFESTYLE EXPECTATION INDEX

TELEPHONE INTERVIEW SCHEDULE: FALL 1981

ASK TO SPEAK TO THE SAME PERSON ON THE CALL-RECORD SHEET:
IF THIS PERSON IS NOT AVAILABLE, GET A CALL-BACK TIME:

CALL-BACK: (Time) _____ (Date) _____

CALL-BACK: (Time) _____ (Date) _____

CALL-BACK: (Time) _____ (Date) _____

Hello, I'm _____ from Survey Data Research, a marketing research firm in Birmingham, Michigan. We are conducting a statewide study for Michigan State University on how Michigan families expect to be living in the near future. Your family is one of 300 that has been randomly selected to represent the State of Michigan. We need your help in gaining information about the kind of lifestyle your family expects to have five years from now. In other words, I would like to ask you some questions about what you REALISTICALLY THINK your style of living will be in 1986, or in another five years. This survey should take about 15 minutes of your time. OK?

INTERVIEWER NOTE: (DO NOT READ)

DID RESPONDENT ASK WHETHER THIS INTERVIEW IS CONNECTED WITH
THEIR PARTICIPATION IN PROJECT CONSERVE?

1- [] YES

2- [] NO



Yes, the 300 families being interviewed were selected from the 2016 which participated in Project Conserve.

FIRST. WE WOULD LIKE TO START WITH YOUR FAMILY'S HOUSING.

1. In which type of residence do you expect your family to be living?
(INTERVIEWER: CHECK ONLY ONE.)

1- [] Single family house

2- [] Multiple family building with 2, 3 or 4 units

3- [] Small apartment or multiple unit building with 5 to 10 units

4- [] Large apartment building with 11 or more units

5- [] Mobile or modular home

6- [] Other _____

(Write in)

2. Which of the following best describes where you expect to live? (READ CHOICES)

1- [] On a farm or in open country not on a farm

2- [] In or near a village or town with less than 10,000 people

3- [] In or near a small city with 10 to 50,000 people

4- [] In or near a medium city with 50 to 500,000 people

5- [] In or near a large city with more than 500,000 people

3. Counting parents, children and other relatives or boarders, how many persons do you expect to be living in your household five years from now? (DO NOT READ CHOICES.)

1- []	1-2 persons	
2- []	3-4 persons	7- _____ persons
3- []	5-6 persons	(Write in exact amount)
4- []	7-8 persons	
5- []	9 or more persons	
6- []	Don't know (DON'T READ)	8- [] Expect to be deceased (DON'T READ)

4. Do you expect your house to have both a living room and a family room or den? Would you say you definitely expect, probably, probably not, definitely do not expect or are you undecided?

1- [] Definitely
 2- [] Probably
 3- [] Undecided
 4- [] Probably not
 5- [] Definitely not

5. Do you expect it will be air-conditioned? Would you say . . . (REPEAT SCALE)

1- [] Definitely
 2- [] Probably
 3- [] Undecided
 4- [] Probably not
 5- [] Definitely not

6. For its primary and secondary heating source, do you think your house will have an alternative heating system; for example, solar or wood?

1- [] Definitely
 2- [] Probably
 3- [] Undecided
 4- [] Probably not
 5- [] Definitely not

7. Do you expect to have a separate bedroom for each child or persons other than the heads of household? (REPEAT SCALE)

1- [] Definitely
 2- [] Probably
 3- [] Undecided
 4- [] Probably not
 5- [] Definitely not

8. Do you think your house will have a household electrical generating unit; for example, one powered by a windmill or solar? (REPEAT SCALE)

1- [] Definitely
 2- [] Probably
 3- [] Undecided
 4- [] Probably not
 5- [] Definitely not

9. How many bathrooms do you expect to have in your house?

1- [] 1 full bathroom
 2- [] 1 full bathroom and one half bathroom
 3- [] 2 full bathrooms
 4- [] 2 full bathrooms and one half bathroom
 5- [] 3 or more full bathrooms
 6- [] Don't know (DON'T READ)

10. Not counting bathrooms, basements, or laundry rooms, how many rooms do you expect to have in your house?

1- []	3	
2- []	4	7- _____ Rooms
3- []	5	(Write in)
4- []	6	
5- []	7 or more	
6- []	Don't know (DON'T READ)	

AGAIN. THINKING ABOUT 5 YEARS FROM NOW, OR 1986, PLEASE THINK ABOUT
TRANSPORTATION - HOW MEMBERS IN YOUR HOUSEHOLD WILL GET FROM ONE
PLACE TO ANOTHER.

11. How often would you expect that members of your family would walk or ride a bicycle to work?

1- [] Very often
2- [] Fairly often
3- [] Sometimes
4- [] Rarely
5- [] Never
6- [] Don't know (DON'T READ)

12. How often would you expect them to walk or ride a bicycle on short errands (within 2 miles) rather than use a car?

1- [] Very often
2- [] Fairly often
3- [] Sometimes
4- [] Rarely
5- [] Never
6- [] Don't know (DON'T READ)

13. How often would you expect your family to use public mass transportation; for example, trains, buses, subways.

1- [] Very often
2- [] Fairly often
3- [] Sometimes
4- [] Rarely
5- [] Never
6- [] Don't know (DON'T READ)

14. In all, how many automobiles, RVs, vans and trucks or pick-ups do you expect your family to have for its use?

1- [] None
2- [] 1
3- [] 2
4- [] 3
5- [] 4 or more
6- [] Don't know (DON'T READ)

7- _____ vehicles
Write in

15. Do you think yearly model changes in automobiles, vans or trucks will be important to your family?

1- [] Definitely
2- [] Probably
3- [] Undecided
4- [] Probably not
5- [] Definitely not

16. FOR RECREATION, do you expect your family will have a boat?

1- [] Definitely
2- [] Probably
3- [] Undecided
4- [] Probably not
5- [] Definitely not

17. Do you expect your family will use a camper or motorhome?

1- [] Definitely
2- [] Probably
3- [] Undecided
4- [] Probably not
5- [] Definitely not

(18.) Do you expect that your family will use a snowmobile?

- 1- [] Definitely
- 2- [] Probably
- 3- [] Undecided
- 4- [] Probably not
- 5- [] Definitely not

(19.) Do you expect your family will have a "second" or vacation home?

- 1- [] Definitely
- 2- [] Probably
- 3- [] Undecided
- 4- [] Probably not
- 5- [] Definitely not

(20.) How often would you expect that members of your family would take weekend trips away from home?

- 1- [] Once a year
 - 2- [] Twice a year
 - 3- [] Three times a year
 - 4- [] Four times a year
 - 5- [] Five or more times a year
 - 6- [] Don't know (DON'T READ)
- 7- _____ weekend trips
(Write in)

(21.) How often do you expect to take a vacation away from home?

- 1- [] Never
 - 2- [] Less than once a year
 - 3- [] Once a year
 - 4- [] Twice a year
 - 5- [] Three or more times a year
 - 6- [] Don't know (DON'T READ)
- 7- _____ vacations
(Write in)

22. Where do you expect to spend most of your vacation time? READ CHOICES.
CHECK AS MANY AS APPLY. IF MORE THAN ONE -- ASK THE PERCENTAGE
OF TOTAL VACATION TIME.

	<u>Percent</u>
1- [] At home	_____ %
2- [] Within 100 miles or two driving hours of home	_____ %
3- [] Within the State of Michigan	_____ %
4- [] Within the United States, outside of Michigan	_____ %
5- [] In other countries	_____ %
6- [] Don't know (DON'T READ)	100% (ADD TO 100%)

THE NEXT SEVERAL QUESTIONS ARE RELATED TO THE FOOD YOU EXPECT YOUR FAMILY WILL USE ABOUT FIVE YEARS FROM NOW.

(23.) How often do you think your family members will eat lunch or breakfast in a restaurant? (READ CHOICES.)

- 1- [] More than once a week
- 2- [] Once a week
- 3- [] Once a month
- 4- [] Once a year
- 5- [] Never
- 6- [] Don't know (DON'T READ)

(24.) How often do you expect your family will eat their main meal in a restaurant? (READ CHOICES.)

- 1- [] More than once a week
- 2- [] Once a week
- 3- [] Once a month
- 4- [] Once a year
- 5- [] Never
- 6- [] Don't know (DON'T READ)

25. How often do you expect your family will eat meatless suppers or dinners? Would you say that you expect to very often, fairly often, etc. . .

1- [] Very often
 2- [] Fairly often
 3- [] Sometimes
 4- [] Rarely
 5- [] Never
 6- [] Don't know (DON'T READ)

26. Beef and pork are considered red meats. How often do you expect your family will eat red meats? Would you say that you expect to very often, fairly often, etc. . . .

1- [] Very often
 2- [] Fairly often
 3- [] Sometimes
 4- [] Rarely
 5- [] Never
 6- [] Don't know (DON'T READ)

27. How often do you expect members of your family to can fresh foods for later use? (READ CHOICES)

1- [] Very often
 2- [] Fairly often
 3- [] Sometimes
 4- [] Rarely
 5- [] Never
 6- [] Don't know (DON'T READ)

28. How often do you expect members of your family to freeze fresh foods for later use?

1- [] Very often
 2- [] Fairly often
 3- [] Sometimes
 4- [] Rarely
 5- [] Never
 6- [] Don't know (DON'T READ)

29. Of the fruits and vegetables your family will use, how many would you expect to grow yourselves?

1- [] None
 2- [] Some
 3- [] Many
 4- [] Most
 5- [] All
 6- [] Don't know (DON'T READ)

30. Do you expect your family to use fresh fruits and vegetables only when they are in season?

1- [] Definitely
 2- [] Probably
 3- [] Undecided
 4- [] Probably not
 5- [] Definitely not

31. Do you expect your family will use only locally grown fresh foods?

1- [] Definitely
 2- [] Probably
 3- [] Undecided
 4- [] Probably not
 5- [] Definitely not

NOW, THINK OF THE THINGS YOU WOULD EXPECT THAT PEOPLE IN YOUR FAMILY WILL BE DOING FIVE YEARS FROM NOW.

32. When thinking about minor home repairs and maintenance such as painting, changing the oil in automobiles or replacing door hinges, how many would you expect your family to do itself?

1- [] None of them
 2- [] Some of them
 3- [] Many of them
 4- [] Most of them
 5- [] All of them
 6- [] Don't know (DON'T READ)

33. When thinking about major home repairs and maintenance such as electrical or plumbing repairs, how many would you expect your family to do itself?

1- [] None of them
 2- [] Some of them
 3- [] Many of them
 4- [] Most of them
 5- [] All of them
 6- [] Don't know (DON'T READ)

34. What amount of clothing for the family do you think someone in your family will make? (READ CHOICES)

1- [] Most of the clothing
 2- [] Many items
 3- [] Some items
 4- [] A few small items
 5- [] None of the clothing
 6- [] Don't know (DON'T READ)

35. How often do you think your family will buy clothing or furnishings at a resale (second-hand) shop? (READ CHOICES)

1- [] Never
 2- [] Rarely
 3- [] Sometimes
 4- [] Fairly often
 5- [] Very often
 6- [] Don't know (DON'T READ)

36. How often do you think your family will buy clothing or furnishings at a garage sale? (READ CHOICES)

1- [] Never
 2- [] Rarely
 3- [] Sometimes
 4- [] Fairly often
 5- [] Very often
 6- [] Don't know (DON'T READ)

37. How often do you think someone in your family will barter; that is, exchange goods and services with other people in place of cash? (READ CHOICES)

1- [] Never
 2- [] Rarely
 3- [] Sometimes
 4- [] Fairly often
 5- [] Very often
 6- [] Don't know (DON'T READ)

38. What amount of the family clothes and linens do you expect will be dried on a clothesline? (READ CHOICES)

1- [] None
 2- [] Some items
 3- [] Many items
 4- [] Most items
 5- [] All
 6- [] Don't know (DON'T READ)

39. Do you expect changes in clothing fashions will be important to members of your family? (READ CHOICES)

1- [] Definitely
 2- [] Probably
 3- [] Undecided
 4- [] Probably not
 5- [] Definitely not

40. Do you expect your family will belong to a cooperative or buying club -- trading services or goods such as food, household necessities or child care?

1- [] Definitely
 2- [] Probably
 3- [] Undecided
 4- [] Probably not
 5- [] Definitely not

41. Of equipment such as lawnmowers or power tools you family would use, how many would you expect will be shared with friends or relatives? (READ CHOICES)

1- [] None
 2- [] Some items
 3- [] Many items
 4- [] Most items
 5- [] All
 6- [] Don't know (DON'T READ)

42. Do you expect your family will save and recycle non-refundable glass, paper, or (any) aluminum? (READ CHOICES)

1- [] Definitely
 2- [] Probably
 3- [] Undecided
 4- [] Probably not
 5- [] Definitely not

43. How many persons in your household do you expect to be employed five years from now? (READ CHOICES)

1- [] None (SKIP TO 45)
 2- [] One or two part-time only
 3- [] One full-time only
 4- [] One full-time and one or more part-time
 5- [] Two or more full time
 6- [] Don't know (DON'T READ)

44. Do you expect that any of the employed persons in your family will work at least part-time on his or her job at home? (READ CHOICES)

		<u>HOW MANY?</u>	
1- []	Definitely)		7- _____ persons
2- []	Probably)		
3- []	Undecided		
4- []	Probably not		
5- []	Definitely not		
			(Write in)

FINALLY, I WOULD LIKE TO ASK YOU SOME QUESTIONS ABOUT WHAT YOU EXPECT ECONOMIC CONDITIONS WILL BE LIKE FIVE YEARS FROM NOW, AS COMPARED WITH TODAY.

45. In general, do you expect economic conditions in the United States will be:

1- [] Much better
 2- [] Better
 3- [] About the same
 4- [] Worse
 5- [] Much worse
 6- [] Don't know (DON'T READ)

46. In general, do you expect economic conditions in the State of Michigan will be:

- 1- [] Much better
- 2- [] Better
- 3- [] About the same
- 4- [] Worse
- 5- [] Much worse
- 6- [] Don't know (DON'T READ)

47. In general, do you expect economic conditions of your area or community will be:

- 1- [] Much better
- 2- [] Better
- 3- [] About the same
- 4- [] Worse
- 5- [] Much worse
- 6- [] Don't know (DON'T READ)

48. Generally speaking, do you expect economic conditions of your family will be:

- 1- [] Much better
- 2- [] Better
- 3- [] About the same
- 4- [] Worse
- 5- [] Much worse
- 6- [] Don't know (DON'T READ)

THANK YOU FOR TAKING TIME TO ANSWER THESE QUESTIONS. YOUR HELP IS GREATLY APPRECIATED. GOOD (DAY, EVENING).

INTERVIEWER COMMENTS -- SPECIAL PROBLEMS AND ANY FACTORS WHICH MIGHT INFLUENCE THE RESPONDENT'S COOPERATION ON THIS QUESTIONNAIRE.

APPENDIX B

APPENDIX B

SCORING OF RESPONSE CHOICES FOR THE 44 ITEM IN THE LIFESTYLE EXPECTATION INDEX ^{1,2}

1. In which type of residence do you expect your family to be living?

[5] = Single family house
[3] = Multiple family building with 2, 3 or 4 Units
[2] = Small apartment or multiple unit building with 5 to 10 units
[1] = Large apartment building with 11 or more units
[4] = Mobile or modular home

2. Which of the following best describes where you expect to live?

[5] = On a farm or in open coun-ry not on a farm
[4] = In or near a village or town with less than 10,000 people
[3] = In or near a small city with 10 to 50,000 people
[2] = In or near a medium city with 50 to 500,000 people
[1] = In or near a large city with more than 500,000 people

3. Counting parents, children and other relatives or boarders, how many persons do you expect to be living in your household five years from now?

[1] = 1-2 persons
[2] = 3-4 persons
[3] = 5-6 persons
[4] = 7-8 persons
[5] = 9 or more persons

- ④. Do you expect your house to have both a living room and a family room or den?

[5] = Definitely
[4] = Probably
[3] = Undecided
[2] = Probably not
[1] = Definitely not

¹A value of five was assigned to the response reflecting the most intense use of energy and a score of one was assigned to the response which reflects the most conservative use of energy.

²A circle encapsulating the question number (O) denotes the 30 items retained in the refined Index.

5. Do you expect it will be air-conditioned?

- [5] = Definitely
- [4] = Probably
- [3] = Undecided
- [2] = Probably not
- [1] = Definitely not

6. For its primary and secondary heating source, do you think your house will have an alternative heating system; for example, solar or wood?

- [1] = Definitely
- [2] = Probably
- [3] = Undecided
- [4] = Probably not
- [5] = Definitely not

7. Do you expect to have a separate bedroom for each child or persons other than the heads of household?

- [5] = Definitely
- [4] = Probably
- [3] = Undecided
- [2] = Probably not
- [1] = Definitely not

8. Do you think your house will have a household electrical generating unit; for example, one powered by a windmill or solar?

- [1] = Definitely
- [2] = Probably
- [3] = Undecided
- [4] = Probably not
- [5] = Definitely not

9. How many bathrooms do you expect to have in your house?

- [1] = 1 full bathroom
- [2] = 1 full bathroom and one half bathroom
- [3] = 2 full bathrooms
- [4] = 2 full bathrooms and one half bathroom
- [5] = 3 or more full bathrooms

10. Not counting bathrooms, basement, or laundry rooms, how many rooms do you expect to have in your house?

- [1] = 3
- [2] = 4
- [3] = 5
- [4] = 6
- [5] = 7 or more

11. How often would you expect that members of your family would walk or ride a bicycle to work?

- [1] = Very often
- [2] = Fairly often
- [3] = Sometimes
- [4] = Rarely
- [5] = Never

12. How often would you expect them to walk or ride a bicycle on short errands (within 2 miles) rather than use a car?

[1] = Very often
 [2] = Fairly often
 [3] = Sometimes
 [4] = Rarely
 [5] = Never

13. How often would you expect your family to use public mass transportation; for example, trains, buses, subways.

[1] = Very often
 [2] = Fairly often
 [3] = Sometimes
 [4] = Rarely
 [5] = Never

14. In all, how many automobiles, RVs, vans and trucks or pick-ups do you expect your family to have for its use?

[1] = None
 [2] = 1
 [3] = 2
 [4] = 3
 [5] = 4 or more

15. Do you think yearly model changes in automobiles, vans or trucks will be important to your family?

[5] = Definitely
 [4] = Probably
 [3] = Undecided
 [2] = Probably not
 [1] = Definitely not

16. For recreation do you expect your family will have a boat?

[5] = Definitely
 [4] = Probably
 [3] = Undecided
 [2] = Probably not
 [1] = Definitely not

17. Do you expect your family will use a camper or motor-home?

[5] = Definitely
 [4] = Probably
 [3] = Undecided
 [2] = Probably not
 [1] = Definitely not

18. Do you expect that your family will use a snowmobile?

[5] = Definitely
 [4] = Probably
 [3] = Undecided
 [2] = Probably not
 [1] = Definitely not

- (19) Do you expect your family will have a "second" or vacation home?
- [5] = Definitely
 - [4] = Probably
 - [3] = Undecided
 - [2] = Probably not
 - [1] = Definitely not
- (20) How often would you expect that members of your family would take weekend trips away from home?
- [1] = Once a year
 - [2] = Twice a year
 - [3] = Three times a year
 - [4] = Four times a year
 - [5] = Five or more times a year
- (21) How often do you expect to take a vacation away from home?
- [1] = Never
 - [2] = Less than once a year
 - [3] = Once a year
 - [4] = Twice a year
 - [5] = Three or more times a year
22. Where do you expect to spend most of your vacation time?
- [1] = At home
 - [2] = Within 100 miles or two driving hours of home
 - [3] = Within the State of Michigan
 - [4] = Within the United States, outside of Michigan
 - [5] = In other countries
- (23) How often do you think your family members will eat lunch or breakfast in a restaurant?
- [5] = More than once a week
 - [4] = Once a week
 - [3] = Once a month
 - [2] = Once a year
 - [1] = Never
- (24) How often do you expect your family will eat their main meal in a restaurant?
- [5] = More than once a week
 - [4] = Once a week
 - [3] = Once a month
 - [2] = Once a year
 - [1] = Never
- (25) How often do you expect your family will eat meatless suppers or dinners?
- [1] = Very often
 - [2] = Fairly often
 - [3] = Sometimes
 - [4] = Rarely
 - [5] = Never

26. Beef and pork are considered red meats. How often do you expect your family will eat red meats?

[5] = Very often
 [4] = Fairly often
 [3] = Sometimes
 [2] = Rarely
 [1] = Never

27. How often do you expect members of your family to can fresh foods for later use?

[1] = Very often
 [2] = Fairly often
 [3] = Sometimes
 [4] = Rarely
 [5] = Never

28. How often do you expect members of your family to freeze fresh foods for later use?

[1] = Very often
 [2] = Fairly often
 [3] = Sometimes
 [4] = Rarely
 [5] = Never

29. Of the fruits and vegetables your family will use, how many would you expect to grow yourselves?

[5] = None
 [4] = Some
 [3] = Many
 [2] = Most
 [1] = All

30. Do you expect your family to use fresh fruits and vegetables only when they are in season?

[1] = Definitely
 [2] = Probably
 [3] = Undecided
 [4] = Probably not
 [5] = Definitely not

31. Do you expect your family will use only locally grown fresh foods?

[1] = Definitely
 [2] = Probably
 [3] = Undecided
 [4] = Probably not
 [5] = Definitely not

32. When thinking about minor home repairs and maintenance such as painting, changing the oil in automobiles or replacing door hinges, how many would you expect your family to do itself?

[5] = None of them
 [4] = Some of them
 [3] = Many of them
 [2] = Most of them
 [1] = All of them

33. When thinking about major repairs and maintenance such as electrical or plumbing repairs, how many would you expect your family to do itself?

[5] = None of them
 [4] = Some of them
 [3] = Many of them
 [2] = Most of them
 [1] = All of them

34. What amount of clothing for the family do you think someone in your family will make?

[1] = Most of the clothing
 [2] = Many items
 [3] = Some items
 [4] = A few small items
 [5] = None of the clothing

35. How often do you think your family will buy clothing or furnishings at a resale (second-hand) shop?

[5] = Never
 [4] = Rarely
 [3] = Sometimes
 [2] = Fairly often
 [1] = Very often

36. How often do you think your family will buy clothing or furnishings at a garage sale?

[5] = Never
 [4] = Rarely
 [3] = Sometimes
 [2] = Fairly often
 [1] = Very often

37. How often do you think someone in your family will barter; that is, exchange goods and services with other people in place of cash?

[5] = Never
 [4] = Rarely
 [3] = Sometimes
 [2] = Fairly often
 [1] = Very often

38. What amount of the family clothes and linens do you expect will be dried on a clothesline?

[5] = None
 [4] = Some items
 [3] = Many items
 [2] = Most items
 [1] = All

39. Do you expect changes in clothing fashions will be important to members of your family?

[5] = Definitely
 [4] = Probably
 [3] = Undecided
 [2] = Probably not
 [1] = Definitely not

40. Do you expect your family will belong to a cooperative or buying club--trading services or goods such as food, household necessities or child care?

[1] = Definitely
[2] = Probably
[3] = Undecided
[4] = Probably not
[5] = Definitely not

41. Of equipment such as lawnmowers or power tools your family would use, how many would you expect will be shared with friends or relatives?

[5] = None
[4] = Some items
[3] = Many items
[2] = Most items
[1] = All

42. Do you expect your family will save and recycle non-refundable glass, paper, or (any) aluminum?

[1] = Definitely
[2] = Probably
[3] = Undecided
[4] = Probably not
[5] = Definitely not

43. How many persons in your household do you expect to be employed five years from now?

[1] = None (SKIP TO 45)
[2] = One or two part-time only
[3] = One full-time only
[4] = One full-time and one or more part-time
[5] = Two or more full-time

44. Do you expect that any of the employed persons in your family will work at least part-time on his or her job at home?

[1] = Definitely
[2] = Probably
[3] = Undecided
[4] = Probably not
[5] = Definitely not

APPENDIX C

APPENDIX C

INDEX ITEMS COMPRISING THE SIX REFINEMENTS OF THE 44 VARIABLE LIFESTYLE EXPECTATION INDEX

Item Number	Index Item ^a	LEI	LEICORR 3 ^b	LEICORR 2 ^c	LEIFACT ^d	LEIREG7 ^e	LEIREG9 ^f	LEIALPHA9 ^g
1	Type of Residence	1						
2	Location of Residence	2						
3	Number in Household	3						
4	Living and Family Rooms	4	4	4		4	4	4
5	Air-Conditioning	5		5	5			
6	Alternative Heating System	6						
7	Separate Bedrooms	7		7			7	7
8	Not Have Household Electrical Generating Unit	8			8			
9	Number of Bathrooms	9	9					9
10	Number of Rooms	10	10	10	10	10	10	10
11	Not Walk/Bike to Work	11						
12	Not Walk/Bike on Errands	12		12	12	12	12	12
13	Not Use Public Mass Transportation	13		13	13	13	13	
14	Number of Vehicles	14	14	14		14	14	14
15	Automobile Model Changes Important	15						
16	Have Boat	16		16			16	16
17	Have Camper/Motorhome	17						
18	Have Snowmobile	18						18
19	Have Second Home	19		19				19
20	Weekend Trips/Year	20	20	20	20	20	20	20
21	Vacations/Year	21	21	21	21		21	21
22	Where Spend Vacation	22						
23	Eat Lunch/Breakfast Out	23	23	23				23
24	Eat Main Meal Out	24	24	24	24			24
25	Not Have Meatless Suppers	25		25			25	25
26	Not Have Red Meats	26		26	26			26
27	Not Can Foods	27	27	27	27	27	27	27
28	Not Freeze Foods	28	28	28				28
29	Not Grow Fruits/Vegetables	29	29	29		29	29	29
30	Not Use Only Seasonal Fresh Foods	30		30		30	30	30
31	Not use Only Local Fresh Foods	31		31	31		31	31
32	Not do Minor Home Repairs	32					32	
33	Not Do Major Home Repairs	33			33			
34	Not Make Clothes	34		34				34
35	Not Buy at Resale Shop	35	35	35			35	35
36	Not Buy at Garage Sale	36		36	36			36
37	Not Barter/Exchange	37		37		37	37	37
38	Not Dry Clothes On Line	38	38	38		38	38	38
39	Clothing Fashions Important	39		39		39	39	39
40	Not Belong to Cooperative	40					40	
41	Not Share Equipment/Tools	41		41				41
42	Not Recycle	42		42			42	42
43	Number Employed	43		43	43			43
44	Number Work at Home	44		44			44	44
Total Number of Items		44	13	31	14	12	22	30

^aComplete wording of the index items is found in Appendix A.

^bLEICORR3 contains the 13 index items whose correlations with the index score was equal to or greater than .30.

^cLEICORR2 contains the 31 index items whose correlations with the index score were equal to or greater than .20.

^dLEIFACT was formulated from the one item which loaded most heavily on each of the 14 factors.

^eLEIREG7 contains the 12 variables that explained 75 percent of the index variance.

^fLEIREG9 contains the 22 variables that explained 90 percent of the index variance.

^gLEIALPHA contains the 30 variables whose elimination from the index would not result in a higher level of reliability. In this study, this combination of items was designated as the most valid, reliable and parsimonious refined measure of the relative energy intensiveness of a household's expected living style, five years hence.

^hItems common to all indices.

APPENDIX D

Appendix D.

^a Percentages have been rounded in some instances.

^b Percentages reported are adjusted relative frequencies, based upon the number of responses for that particular item.

^c An asterisk preceding the question number (*) denotes the 30 items retained in the refined index.

^d Respondents were asked whether s/he expected any employed persons would work at home (Question 44) only if the response to the previous question (Question 43) indicated the expectation of one or more household members being employed.

Appendix D. Lifestyle Expectation Index: Distribution of Item Responses for 300 Michigan Households: Item Means and Standard Deviations. ^a

Response Value		Energy Intensity of Response Score										Mean	Standard Deviation	N
		High				3		2		Low				
		5		4						1				
		% ^b	N	%	N	%	N	%	N	%	N			
LIFESTYLE EXPECTATION INDEX (44 items)		--	--	1.7 (5)	86.0 (258)	12.3 (37)	--	--	--	--	3.17	.30	300	
REFINED LIFESTYLE EXPECTATION INDEX ^c (30 items)		--	--	8.7 (26)	81.3 (244)	10.0 (30)	--	--	--	--	2.97	.38	300	
LEI - 44 Items		--	--	1.7 (5)	86.0 (244)	12.3 (37)	--	--	--	--	3.17	.38	300	
Refined LEI - 30 Items		--	--	8.7 (26)	81.3 (244)	10.0 (30)	--	--	--	--	2.97	.38	300	
Item No.	Index Item													
1	Type of Residence	90.3 (270)	3.0 (9)	2.3 (7)	3.0 (9)	1.3 (4)	4.78	.75	299					
2	Location of Residence	17.0 (51)	28.7 (86)	27.7 (83)	16.0 (48)	10.7 (32)	3.25	1.22	300					
3	Number in Household	.3 (1)	1.0 (3)	12.3 (37)	32.7 (98)	53.7 (161)	1.62	.77	300					
*4	Living and Family Rooms	44.0 (132)	15.3 (46)	1.0 (3)	10.0 (30)	29.7 (89)	3.34	1.76	300					
5	Air-Conditioning	15.3 (46)	9.3 (28)	.3 (1)	18.0 (34)	57.0 (171)	2.08	1.53	300					
6	Alternative Heating System	26.2 (78)	18.8 (56)	1.0 (3)	22.8 (68)	31.2 (93)	2.84	1.65	298					
*7	Separate Bedrooms	54.5 (163)	12.4 (37)	.3 (1)	9.0 (27)	23.7 (71)	3.64	1.72	299					
8	Not Have Electrical Generating Unit	53.7 (161)	30.7 (92)	1.0 (3)	11.3 (34)	3.3 (10)	4.20	1.12	300					
*9	Number of Bathrooms	3.0 (9)	6.7 (20)	20.3 (61)	31.0 (93)	39.0 (117)	2.04	1.06	300					
*10	Number of Rooms	34.8 (104)	26.8 (80)	27.8 (83)	9.0 (27)	1.7 (5)	3.83	1.08	299					
11	Not Walk/Bike to Work	68.2 (202)	15.2 (45)	10.5 (31)	2.0 (6)	4.1 (12)	4.42	1.03	296					
*12	Not Walk/Bike on Errands	30.8 (92)	12.7 (38)	26.8 (80)	14.0 (42)	15.7 (47)	3.29	1.43	299					
13	Not Use Public Mass Transportation	41.4 (123)	31.6 (94)	16.8 (50)	4.7 (14)	5.4 (16)	3.99	1.12	297					
*14	Number of Vehicles	4.0 (12)	11.7 (35)	54.0 (161)	27.5 (82)	2.7 (8)	2.89	.80	298					
15	Automobile Model Changes Important	19.7 (59)	12.0 (36)	1.3 (4)	20.0 (60)	46.8 (140)	2.37	1.62	299					
16	Have Boat	20.0 (60)	11.4 (34)	.3 (1)	13.7 (41)	54.5 (163)	2.28	1.66	299					
17	Have Camper/Motorhome	18.7 (56)	14.3 (43)	0.0 (0)	14.3 (43)	52.7 (158)	2.32	1.64	300					
*18	Have Snowmobile	10.0 (30)	5.0 (15)	1.0 (3)	10.3 (31)	73.7 (221)	1.67	1.32	300					
*19	Have Second Home	9.7 (29)	9.0 (27)	2.3 (7)	17.3 (52)	61.7 (185)	1.88	1.36	300					
*20	Weekend Trips/Year	43.9 (119)	15.1 (41)	13.7 (37)	16.6 (45)	10.7 (29)	3.35	1.71	279					
*21	Vacations/Year	11.1 (33)	30.9 (92)	44.3 (132)	5.7 (17)	6.1 (24)	3.31	1.02	298					
22	Where Spend Vacation	2.3 (6)	43.0 (113)	29.7 (78)	11.4 (30)	13.7 (36)	2.71	1.44	263					
*23	Eat Lunch/Breakfast Out	21.4 (64)	31.8 (95)	29.1 (87)	7.0 (21)	10.7 (32)	3.46	1.21	299					
*24	Eat Main Meal Out	14.5 (43)	35.1 (104)	39.9 (118)	6.1 (18)	4.4 (13)	3.49	.96	296					
*25	Not Have Meatless Suppers	8.0 (24)	25.7 (77)	36.0 (108)	19.0 (57)	11.3 (34)	3.00	1.11	300					
*26	Not Have Red Meats	33.4 (100)	41.1 (123)	20.1 (60)	4.7 (14)	.7 (2)	4.01	.91	299					
*27	Not Can Foods	19.7 (59)	17.4 (52)	16.4 (49)	18.1 (54)	28.4 (85)	2.81	1.51	299					
*28	Not Freeze Foods	7.3 (22)	10.0 (30)	18.7 (56)	25.3 (76)	38.7 (116)	2.22	1.26	300					
*29	Not Grow Fruits/Vegetables	23.7 (71)	42.3 (127)	11.7 (35)	17.7 (53)	4.7 (14)	3.63	1.16	300					
*30	Not Use Only Seasonal Fresh Foods	19.7 (59)	21.7 (65)	.3 (1)	36.0 (108)	22.3 (67)	2.80	1.49	300					
*31	Not Use Only Local Fresh Foods	25.3 (76)	36.3 (109)	1.0 (3)	25.7 (77)	11.7 (35)	3.38	1.40	300					
32	Not Do Minor Home Repairs	6.3 (19)	19.7 (59)	6.7 (20)	34.0 (102)	33.3 (100)	2.32	1.29	300					
33	Not Do Major Home Repairs	27.1 (81)	23.7 (71)	8.0 (24)	23.4 (70)	17.7 (53)	3.19	1.50	299					
*34	Not Make Clothes	30.9 (92)	32.6 (97)	24.2 (72)	5.7 (17)	6.7 (20)	3.75	1.15	298					
*35	Not Buy at Resale Shop	28.4 (85)	32.1 (96)	27.4 (82)	7.7 (23)	4.3 (13)	3.73	1.09	299					
*36	Not Buy at Garage Sale	27.4 (82)	33.1 (99)	27.4 (82)	8.7 (26)	3.3 (10)	3.71	1.08	299					
*37	Not Barter/Exchange	24.6 (73)	29.6 (88)	35.0 (104)	7.1 (21)	3.7 (11)	3.64	1.04	297					
*38	Not Dry Clothes On Line	22.7 (68)	39.7 (119)	16.3 (49)	16.0 (48)	5.3 (16)	3.58	1.16	300					
*39	Clothing Fashions Important	15.7 (47)	33.7 (101)	1.3 (4)	31.7 (95)	17.7 (53)	2.98	1.41	300					
40	Not Belong to Cooperative	40.3 (121)	34.0 (102)	1.7 (5)	19.0 (57)	5.0 (15)	3.86	1.27	300					
*41	Not Share Equipment/Tools	41.7 (125)	45.7 (137)	5.3 (16)	3.7 (11)	3.7 (11)	4.18	.96	300					
*42	Not Recycle	11.0 (33)	17.7 (53)	1.7 (5)	36.7 (110)	33.0 (99)	2.37	1.38	300					
*43	Number Employed	29.6 (88)	16.5 (49)	14.5 (45)	5.7 (17)	33.7 (100)	3.03	1.66	297					
*44	Number Work at Home ^d	33.7 (67)	24.1 (48)	1.0 (2)	21.1 (42)	20.1 (40)	2.20	2.03	199					