REASONS AND INFLUENCES FOR ENERGY CONSERVATION PRACTICES OF SELECTED OKLAHOMA FAMILIES

By

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REASONS AND INFLUENCES FOR ENERGY CONSERVATION PRACTICES OF SELECTED OKLAHOMA FAMILIES

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PREFACE

The first step in energy education program development is to determine where people are in terms of energy use. Given a certain ecomomic and social environment, it is important to access reasons for conserving household energy and factors that influence conservation efforts. The purpose of this study is to provide such information.

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TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

A major problem of families today is the lack of ability to cope with rapidly rising prices. Consumer prices rose by thirteen percent in 1979, while personal income increased by an average of only eleven percent. An annual inflation rate of eighteen percent was reported in 1980 (Anderson, Thomas, Borger, DeFrank, Shannon, and Dentzer, 1980, p. 55). When compared with the base year of 1967, the purchasing power of the consumer's dollar was reduced to $.512 in 1978 (U.S. Bureau of the Census, 1979, p. 474).

To maintain their standard of living, Americans have reduced savings and increased indebtedness. Inflation ravaged consumers are "desperately struggling to stay afloat by borrowing and spending" (Anderson et al., 1980, p. 54). Energy costs are a primary contributing factor to the double-digit inflation (Anderson et al., 1980, p. 54). High energy consumption has been part of the American way of life. The increasing energy prices and shortages may call for reexamination of consumption habits and dramatic changes in life styles (Less, 1979, p. 22).

The consumer price index rose dramatically in 1978. For housing fuel and other utilities, the consumer price index rose to 216.0; fuel oil, coal and bottled gas rose to 298.3;

fuel oil alone rose to 296.9; and piped gas and electricity rose to 232.6 in 1978 as compared to 100.0 in 1967 (U.S. Bureau of the Census, 1979, p. 484).

Since the winter of 1973-74, changes in the supplies and prices of energy have affected most families in some way. "The 1970's brought a 65 percent rise in home oil-heating bills, a 37 percent increase in the natural gas bill and a 25 percent rise in the electricity bill (in constant 1976 dollars)" (Peterson, 1979, p. 5).

In the Michigan State Family Energy Project, 478 households were interviewed concerning their energy consumption. Sixty percent of the households indicated that increased prices of gasoline, heating fuel, and electricity are a "great problem" for the family (Morrison, Gladhart, Zuiches, Keith, Keefe and Long, 1978). According to Paolucci and Hogan (1973, p. 15), the American public has ". . . a sense of alienation and powerlessness, because we have lost sight of our dependence on and linkage to the natural environment". Cornille, Oransky and Pestle (1979, p. 36) report that American families "find it hard to believe that they are faced with a situation (the energy crisis) that they are not equipped to handle with their usual behaviors".

Authorities in the field of Home Economics also feel that energy resource management is an important concern. Paolucci and Hogan (1973, p. 1) state that energy research relating to family decisions and energy use are tasks for home economists. Rudd (1978, p. 1) points out, ". . .

research must be an intergral part of home economists' efforts to promote household conservation of energy". Rudd (1978, p.1) goes on to state that, "we need to know why families of various types aren't conserving". Cornille, Oransky and Pestle (1979, p. 37) report that home economist can contribute answers to energy crisis questions. Morrison and Gladhart (1976, p. 18) state that for home economists, future energy research is a must. In another study, Morrison, Gladhart, Zuiches, Keith and Long (1978, p. 21) recommend home economists do more research in energy conservation and then educate people formally and informally about energy.

Oklahoma families have identified energy as a prime concern since spring of 1975 through the Home Economics Cooperative Extension Service Program Planning and Advisory Committee (PPAC). This grassroots organization is made-up of lay leaders from each county in the state.

Leaders meet on a county basis with the professional Extension staff to discuss local concerns, these concerns are then listed and prioritized. At district meetings, county representatives discuss county concerns, which are then listed and prioritized for the district. Energy conservation has continued to be listed as a priority each year by the District Home Economics Program Planning and Advisory Committees (Home Economics District P.P.A.C. Report 1975, 1976, 1977, 1978, 1979, 1980).

The Cooperative Extension Service provides families with informal research based education on all phases of agri-

culture and home economics. Oklahoma Cooperative Extension Home Economics Program Planning and Advisory Committees mandate energy education programs. Montgomery states (1973, p.22), "There is increasing need for Cooperative Extension Service, representatives of utility companies and other suppliers of energy to coordinate and expand their efforts to teach energy conservation". Hogan (1978, p. 21) says that home economists in Extension have a "golden opportunity to help families make energy decisions". Rudd and Longstreth (1977, p. 9; 1978, p. 42) agree that easy to understand information on energy conservation techniques should be readily avilable, through the Cooperative Extension Service. It is important, however, that energy programs be high quality and educational. Extension educators need to know their roles and capabilities. "The energy arena is a crowded one, and extension organizations are commonly either 'first arrivals' in the arena or holders of the strongest credentials" (Born, 1980, p. 9). Born (1980, p. 10) goes on to state that Extension needs ". . .to do some of the program development homework in energy. . ." that has been done in other areas. For effective energy programming, Extension must find "where or what are the real needs and who are the potential clients" (Born, 1980, p. 10).

These experts point to the need of home economists to continue research in family energy consumption and conservation efforts. Cooperative Extension Service is also noted as being capable of effective energy management programming.

The present study was designed to provide information to add to the body of knowledge related to energy use of Oklahoma families. Futher, the study provides information on the factors that influence energy conservation decisions of selected Oklahoma families. This information contributes to the development and dissemination of energy education programs through the Oklahoma Cooperative Extension Service.

Purpose and Objective

Oklahoma families have asked for help in order to successfully cope with energy problems. Cooperative Extension can provide effective energy education programs to help families (Hogan, 1978; Rudd and Longstreth, 1977, 1978; Born, 1980). Additional information, however, is needed to strengthen and clarify program stratigies.

The first step in energy education program development is to determine where people are, in terms of energy use, at a given point in time. Given a certain economic and social environment, it is important to assess reasons for conserving household energy and factors that influence conservation efforts. The purpose of this study was to provide such information.

The objectives of this study were: 1) to assess differences between the reasons for adopting energy conserving practices of two groups of Oklahoma consumers; 2) futher the study assessed differences between the influence for household energy conservation of these two groups.

The two groups studied were: 1) consumers with the tendency to reduce household energy use by modifying the structure of the house and 2) consumers with the tendency to reduce household energy use through behavior modification. (Figure 1).

Hypotheses

The following null hypotheses were formulated for the research study. They are:

Ho_1: There is no significant difference between the perceived reasons for adopting household energy conservation practices of the structural modification group and the behavioral modification group.

Ho_2: There is no significant difference between the perceived influences for adopting housedhold energy conservation practices of the structrual modification group and the behavioral modification group.

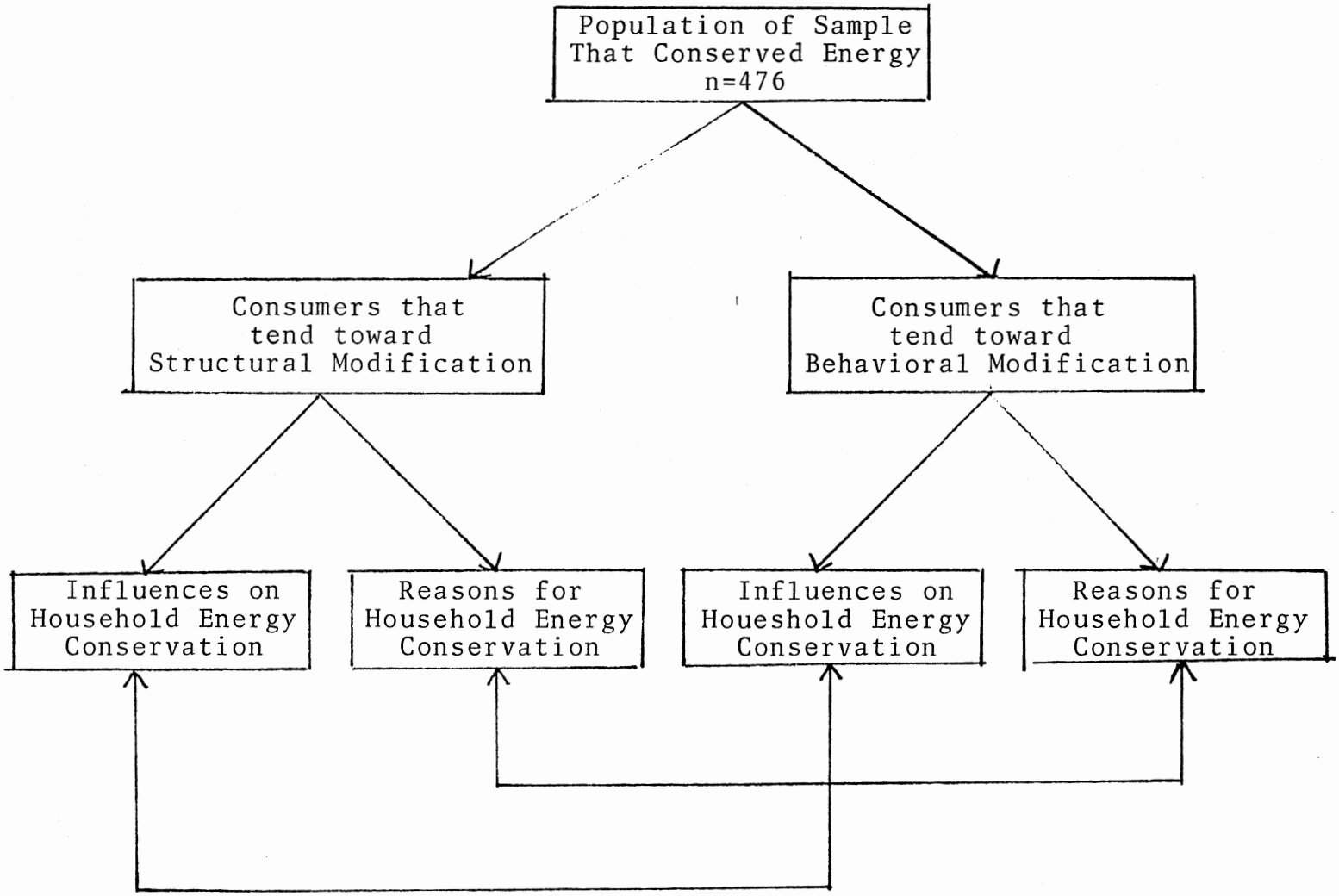

Figure 1. Population Model

Assumptions and Limitations

The following assumptions were made for this research study. They were:

1. Individuals can reduce household energy consumption through behavioral modification.

2. Individuals can reduce household energy consumption through structural modification.

3. Respondents accurately reported the information used in the study.

4. Survey research methods are appropriate to gain information from families.

5. Cooperative Extension educators should be involved in developing and implementing educational energy conservation programs.

The following limitations were established for this research study. They were:

1. Conclusions are limited to families in the Bartlesville and Tulsa, Oklahoma areas.

2. Random selection of the sample was limited to families that have telephone listings in the Bartlesville and Tulsa, Oklahoma telephone directories.

3. Findings are limited to 1978.

Definition of Terms

The meaning of two terms in the data collection questionnaire were defined for this study. They were:

Influences are the effects of a motivator to produce energy conservation practices.

Reasons are the justifications or explanations for energy conservation practices.

Additional terms and concepts were defined for use in the study. They were:

Behavior Modification is "changing individual or family habits and life style to conserve energy" (Williams, Lauener and Braun, 1979, p. 91).

Consumer is "one who purchases and/or uses goods and services" (Lutes, 1972, p. 3).

Energy is "an entity rated as the most fundamental of all physical concepts; usually regarded as the capacity for doing work" (Public Affairs Gulf Oil Corporation, 1977, p. 5).

Energy Conservation is "efficient utilization and avoidance of waste in natural resources application" (Landsberg, Schanz, Schurr and Thompson, 1974, p. 138).

Decision Making is a "deliberate and conscious act of selecting from between at least two alternatives or melding several alternatives into a course of action" (Paolucci, Hall, and Axinn, 1977, p. 54).

Family is "a set of mutually interdependent organisms; intimate, transacting, and interrelated persons who share

some common goals, resources, and a commitment to one another that extends over time" (Paolucci, Hall, and Axinn, 1977, p. 18).

Structural Modification is "changing the physical structure of the house, or some part there of, to conserve energy" (Williams, Lauener and Braun, 1979, p. 91).

CHAPTER II

REVIEW OF LITERATURE

The review of literature for this study includes the following topics: Energy as a National Concern, Energy as a Concern of Oklahoma Families, Private Households as Energy Users, Management of Energy Resources, and Adoption or Non-adoption of Energy Conservation Practices. A summary of the literature cited concludes the chapter.

Energy as a National Concern

In late 1973 and early 1974, the United States felt the first shock of the energy crisis. The Arab oil embargo ended the era of secure and cheap oil (Stobaugh and Yergin, 1979, p. 3). Aliber (1975, p. 82) refers to the embargo as "the biggest shock to the international economic system since World War II". For the first time, the Organization of Petroleum Exporting Countries (OPEC) quit negotiating a price for their oil. Instead, they "unilaterally set the price on a take-it-or-leave-it basis" (Stobaugh and Yergin, 1979, p. 4). In less than six months, the price of foreign oil had increased by more than 400 percent (Cicchetti, 1977, p. 7). The second energy crisis shock came with home heating oil shortages during the winter of 1977-78 (Stobaugh and Yergin,

1979, p. 4).

"Prices for residential fuels and gasoline have increased sharply" (Smith, 1977, p. 11). The largest increase has been heating oil; the price has increased 65 percent since 1970. Natural gas for home space-heating has increased 37 percent and the bill for electric space-heating has increased 25 percent since 1970 (Peterson, 1979, p. 5). Personal income increased by an average of only thirteen percent in 1979. Families are borrowing money and buying on credit before prices rise any further. The cost of living is rising out of sight and the votile price of energy is one of the reasons (Anderson et al., 1980, pp. 54-59).

Esther Peterson (1980, p. vi), Drirector of the U.S. Office of Consumer Affairs, notes that each year American families pay more and more of their income for the basic necessities. The reason is that ". . .spiraling inflation hits hardest at food, housing, energy and health care". She goes on to say that these necessities rose collectively 18.2 percent in 1979 and that non-essentials rose by 7.0 percent .

Sixty percent of the Michigan State Family Energy Project respondents "reported that increased prices of gasoline, heating fuel, and electricity were a 'great problem'" (Morrison et al., 1978, p. 19). Morgan reports that inflation has created stress on the American family (Bernard, Morgan, Skolnick, Reasoner, St. Marie and Newkirk, 1976, p. 7). According to a recent article by Cornille, Oransky and Pestle (1979, p. 36), families find it hard to believe that

they are unprepared to cope with the excellerating energy cost. They find customary behavior patterns are inadequate. Personal and household standards may have to change.

Energy Concerns of Oklahoma Families

Providing research-based, educational programs to improve the standard of living of families has historically been the mission of the Cooperative Extention Service (Roberts, 1970, p. 124). In order to provide these educational programs, Extension Home Economists need to be familiar with the area they serve. Hall and Paolucci (1970, p. 41) state that the recognition of the prevailing practices will help determine what should be taught in specific subject matter areas of home economic. They also state that:

> A keener understanding of those community forces that impinge upon individuals and their families will increase your ability to put over your subject matter in such a manner that it will 'take' (p. 41).

Hall and Paolucci (1970, p. 145) further state that "an advisory committee will be helpful in planning any type of home economics programs".

The grassroots advisory organization of the Oklahoma Cooperative Extension Service is the Program Planning and Advisory Committee (P.P.A.C.). Each county has a P.P.A.C. for Agriculture, Home Economics, 4-H and Other Youth and Rural Development. The county P.P.A.C.'s are made up of fifteen lay leaders that represent a cross-section of the

county's population. The committees are made up of men and women from different geographic areas, ages, races, and socioecomonic groups. The county P.P.A.C. meets with the professional county Cooperative Extension staff to identify needs, set goals, and list priorities for programming. They also review and evaluate the past years program. During the year, the P.P.A.C. assists with and lends support to the Extension educational programs (Figure 2).

County representatives from Agriculture, Home Economics, 4-H and Other Youth and Rural Development then meet by districts. These representatives discuss their counties concerns and are then listed and prioritized.

The 1974 District Home Economics P.P.A.C. report did not list energy as a concern of Oklahoma families, but eluded to it in listing "learning more about microwave ovens" as a concern (District Home Economics P.P.A.C. Report, 1974). In 1975, one of the five districts listed energy conservation as a concern under the topic of management. Energy conservation was listed as high priority by two counties, as a medium priority by two counties and as a high priority by one district in 1975 (Home Economics District P.P.A.C. Report, 1975).

In February of 1976 when the Districts Home Economics P.P.A.C.'s met, two districts had concerns about energy. The Central District listed "good management of time, energy, money and resources". The Northwest District listed "conserve energy" as a priority (Home Economics District P.P.A.C. Report, 1976).

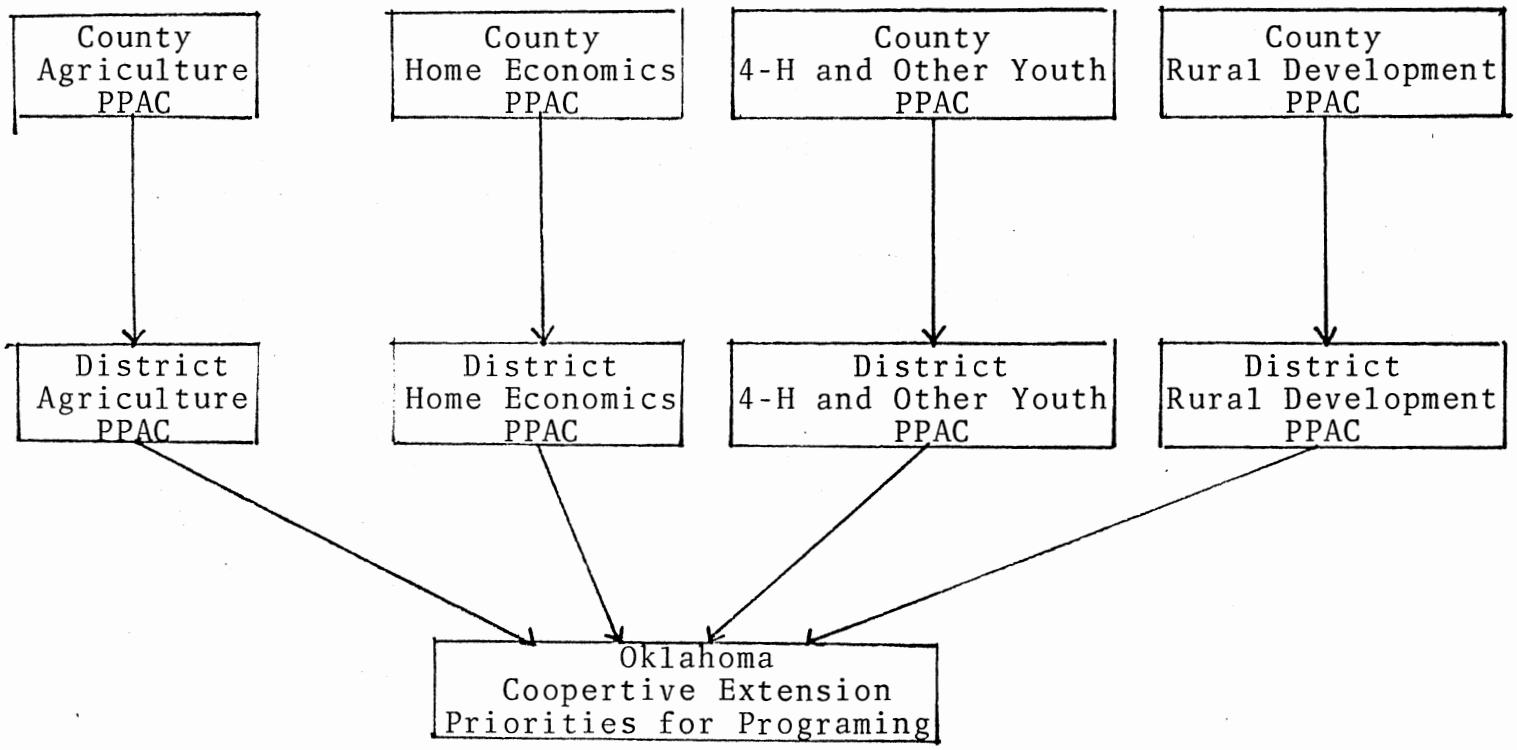

Figure 2. Program Planning and Advisory Committee (P.P.A.C.) Model

When the District Home Economics P.P.A.C.'s met in 1977, each of the five districts felt energy conservation was a high priority (Home Economics District P.P.A.C. Report, 1977). The 1978 District Home Economics P.P.A.C. report from each district listed energy conservation and managing energy as a high priority (Home Economics District P.P.A.C. Report, 1978). Oklahoma families were becoming very aware of the rising energy costs.

The 1979 District Home Economics P.P.A.C. report lists several related concerns in addition to energy conservation. "Selecting a reputable business for insulation", "solar energy", "changing life styles", and "up grading homes" were some of the sub-headings listed under energy conservation. Each of the five districts felt energy conservation was a priority (Home Economics District P.P.A.C. Report, 1979).

Again, in 1980, the District Home Economics P.P.A.C.'s reported energy conservation as a prime concern. Other related priorities that were listed include "coping with inflation", "inflation fighting", "alternatives for home heating", and "replenishing and planting trees for firewood" (Home Economics District P.P.A.C. Report, 1980).

County and district priorities direct programming for the counties, districts, and state annual plans of work. The P.P.A.C. not only accesses needs and lists priorities, but also monitors progress, assists with educational programs, and participates in program evaluation throughout the year. The process of planning, implementing, and evaluating is re-

peated continually.

Oklahoma families have felt the effects of inflation and the rising energy costs. These effects are demonstrated by the Home Economics Program Planning and Advisory Committee reports that represent the five Coperative Extension districts and each of the seventy-seven counties in Oklahoma.

Private Households as Energy Users

"Most familes spend at least several hundred dollars each year for household energy" (Ruffin and Weinstein, 1979, p.2). All families have the problem of rising energy costs. The poor families, however, have been affected more than others. Poor families spend as much as 15 to 25 percent of their budget on energy (Peterson, 1979, p. III-16; Energy Policy Project of the Ford Foundation, 1976, p. 118).

Families experience the problem of rising energy costs as direct energy use through space heating, water heating, air conditioning and such. Futher, rising energy costs affect households indirectly through manufacturing and distributing products.

An average or typical family or household is difficult to define. The families size, values, and life styles, different climates, house constructions, equipment and appliances determine energy usage (Gorman, Matern, Williams, Lauener, Siddens, and Williams, 1980, p. 17).

Dole (1975, p.vi) gives a break down of household energy use as:

Energy Use Categories	Percent of Total Household Energy Use
Space Heating	55.5
Water Heating	14.5
Refrigeration and Freezing	7.7
Lighting	5.7
Cooking	5.1
Air Conditioning	4.6
Drying	1.7
Other	5.7

Milstein (1976, p. 315), of the Federal Energy Administration, gives a breakdown of household energy use, very similar to Dole's, as:

Energy Use Categories	Percent of Total Household Energy Use
Space Heating	53
Water Heating	15
Refrigeration and Freezing	7
Cooking	5
Air Conditioning	6
Lighting, Drying and Other	11

The total direct household energy use ". . . accounts for about 20 percent of the national energy consumption" (Ruffin and Weinstein, 1979, p. 2).

"Our high consuption society is dependent on large amounts of energy for production of goods and for delivery of services" (Hogan, 1977, p. 7). Energy is required to manufacture such things as microwave ovens, trash compactors and stereos. These appliances do not require large amounts of energy to operate, they do however, require a great deal of energy to manufacture (Hogan, 1978, p. 20, Hungerford, 1978, p. 3). Convenience items such as easy-care fabrics, styrofoam cups and disposable diapers have decreased the con-

sumers' human energy use, but increased the consumers' indirect energy use (Hogan, 1978, p. 20). Indirect energy accounts for over half of the energy the average family consumes (Hogan, 1977, p. 7).

Hungerford (1978, p. 73) suggests that as much as 70 percent of the energy consumed in the United States is used directly or indirectly by households. Hogan and Paolucci (1979, p. 211) state "The combined direct and indirect energy consumption data reveal that the major portion of energy is ultimately consumed by the family unit".

Management of Energy Resources

People are becoming increasingly aware that they are interdependent creatures. They are interdependent not only on each other and on other living species, but also on the total environment (Bubolz, Eicner and Sontag, 1979, p. 28). Managing this interdependent system, or ecosystem, of the family is essential because the family determines the value placed upon resources (Paolucci, 1978, p.22). The growing number of families is increasing the amount of the energy resources that are consumed. This increased use has created a need to conserve (Gorman et al., 1980, p. 17).

More and more families are attempting to conserve energy by some type of conservation. In 1976, three-forths of the households studied by USDA's Economic Research Service indicated some type of energy conservation in their households (Smith, 1977, p. 11).

Energy conservation can be thought of as an alternate energy source. Conservation can do more to help deal with energy problems than any conventional source of energy (Yergin, 1979, p. 136). Conservation is an attractive option because it has the least impact on the natural world (Sachs, 1975, p. 6). Families need to adopt the conservation ethic so that a balance between people and resources can be achieved (Paolucci, 1978, p. 23).

Studies have shown that the type of energy use patterns tend to point to certain demographic groups. Morrison and Gladhart (1976, pp. 16-17) found that "family income . . . was the best indirect predictor of residential energy consumption: the richer families use more energy than poorer families". Hungerford's (1978, p. 148) study, however, shows that affluent families did make reductions in residential energy use and that their reductions can be of a large magnitude. Middle income families reduced energy use the most (Morrison et al., 1978, p. 30). Murray, Minor, Brandburn, Cotterman, Frankel and Pisarski (1974, p. 262) state that in the respondents that reported a reduction in household temperature, that the "temperature varies positively with the income".

Morrison (1975, p. 143) states that household size is an important predictor of energy consumption. Larger families use more energy than small families and families in the child-rearing stage use more energy than families without children (Morrison and Gladhard, 1976, p. 17). Eichenberger

found in 1975 that employed homemakers use less household energy than a non-employed homemaker. Morrison and Gladhart (1976, p. 17) found that homemakers employed full time used eight percent less residential energy than non-employed homemakers and part-time employed homemakers used six percent less residential energy than non-employed homemakers.

Single family dwellings use more energy than multi-family dwellings (Morrison and Gladhart, 1976, p. 17). However, among low income families, apartments and attached dwellings may have proportionately large heating bills due ". . . to the condition of their homes, particularly the absence of insulation and storm windows" (Hungerford, 1977, p. 5). Energy consumption increases as the number of rooms, windows, exterior doors and major appliances increase (Morrison and Gladhart, 1976, p. 17).

Hogan and Paolucci (1979, p. 217) studied the demographic characteristics of education, occupation, age, employment status, family income, family size, stage of family life cycle and urban-rural residency. They found that higher levels of education were associated with higher commitment to energy resource savings. Other significant characteristics were age, employment, income and family size.

The stage of the family life cycle, income, education, and life style influence the way families conserve energy. Energy can be saved through structural modification or home improvements by focusing on insulation, storm windows and other aspects of the building shell to form a "thermal envel-

ope", as well as the heating and cooling equipment and major appliances. This could result in a 30 to 60 percent total energy savings and a large dollar savings over the life of the home (Peterson, 1979, p. II-13).

Behavioral modification or the life styles, attitudes, values and choices can greatly influence energy use. The thermostat setting, use of hot water, opening or closing shades and curtains or the way the home is used makes a substantial difference in how much energy is used (Peterson, 1979, p. III-13; Gladhart, 1977, pp. 266-267). One of two houses built by the same contractor, which are expected to have identical thermal characteristics, can use 2.2 times as much heat and 75 percent more energy than the other. The families' habits and life styles make the difference (Peterson, 1979, p. III-13). Keith (1979, p. 96) found that increased intensity of conservation behavior was significant in the reduction of energy. Anderson and Lipsey (1978, p. 28) found that most respondents preferred a behavioral response to energy conservation. The Federal Energy Administration found that over half of their respondents turned out light when leaving the room, made thermostat adjustments, and waited to use the dishwasher and clothes dryer until full (Milstien, 1976, p. 316).

The combination of behavioral and structural modification is also important (Morrison et al., 1978, p. 20). In 1979, Burda found that the most acceptable energy conservation policies would be mandatory insulation and temperature

limitations, which is a combination of behavioral and structural modifications.

Studies have shown that younger families, and families with higher incomes and education tend to do more structural modification. Lower income families and senior citizens tend to adopt behavioral modifications to conserve energy. This may be due to the lack of money for structural modifications (Murray, Braun, Williams, 1978; Braun, Murray, and Williams, 1979; Williams, Lauener and Braun, 1979; Morrison et al., 1978).

Energy conserving families may choose structural or behavioral modification or a combination of structrual and behavioral modifications. All three types of modification to conserve energy are effective.

Adoption or Non-adoption of Conservation Practices

Money is the most effective reason for families to conserve energy (Kahienberg, Phillips, and Proctor, 1976; Fox and Hake, 1977; Hayes and Cone, 1977; Palmer, Lloyd, and Lloyd, 1977; McCormack, 1975; Laube, 1975; Hirst and Carney, 1978; Morrison and Gladhart, 1976; Morrison et al., 1978; Rudd, 1978; Rowley, 1978; Milstein, 1976; Bittle, Valesano and Thaler, 1979; Rudd and Longstreth, 1977; and Peterson, 1979). The increasing price of energy has encouraged families to conserve energy (Hirst and Carney, 1978; Gladhart, 1977; and Rudd and Longstreth, 1977). Income tax breaks for

weatherizing homes are also reasons for conserving (Rudd and Longstreth, 1977; Peterson, 1979; McCormack, 1973; and Milstein, 1976). Laube (1975) states that in apartments that the owner paid the electric bill, each apartment used 67.7 percent more electricity than where the tenant paid his own bills. The tenant had an incentive to save if he was paying the utility bills. The feedback system has been suggested by many as an affective conservation technique (Kahlenberg et al., 1976; Hayes and Cone, 1977; Palmer et al., 1977; Seaver and Patterson, 1976; Gladhart, 1977; Milstein, 1979; and Bittle et al., 1979). Feedback systems tells the consumer how much energy is being used as it is used. Feedback is especially effective when used with a cash reward for not exceeding certain quotas (Fox and Hake, 1977). Seaver and Patterson (1976) found that a reward of an energy reduction decal displayed on the home was a incentive to conserve energy.

Gladhart (1977) states that patrotic convictions of families were reasons to conserve energy. Milstein found in an April 1976 survey that 80 percent of the respondents felt that the government should point out that it was a patriotic duty to cut down usage of gas, oil and electricity. In February 1975, Milstein (1976) found, that of the 95 percent of the respondents that were making an effort to save energy, seventeen percent cited "shortages of energy" and "the Nation's running out of resources", eleven percent cited 'their responsibilities as citizens" and six percent said 'it

would help the economy" as reasons for conserving. Braun, Murry and Williams (1979) found that 65 percent of the respondents listed confort as the reason for weatherizing their home.

Peterson (1979) states that there is a wide variety of reason for consumers' failure to conserve energy. He lists these as:

> 1) lack of social pressure or reinforcement for conserving behavior; 2) disparity in effects of the energy problem, as well as inopportunities to conserve, among different income groups; 3) conflicts between conservation objectives and other goal such a comfort, convenience, and 'fairness'; 4) distrust of information providers and disbelief that shortages are 'real'; 5) lack of practical knowledge about how to conserve; 6) complacency caused by faith in a technical solution to future energy supply problems (p. III-16).

Milstein (1976) suggest that Americans have cultural norms that work against reducing energy.

> Americans place a high value on indulging their comforts and conveniences, living for today rather than for the future, materialism, and success defined in terms of conspicuous consumption (p. 317).

Braun, Murray and Williams (1979) asked why non-adopters did not weatherize, 53 percent said lack of money was the reason. Other responses for not weatherizing were, eighteen percent due to the weather, eleven percent because they were renting, and four percent because the home was already weatherized.

Accurate educational information on how to conserve is an influence on families (Seaver and Patterson, 1976; Morrison and Gladhart, 1976; Hogan, 1978; Gladhart, 1977; Rudd, 1978; Rudd and Longstreth, 1977; and Peterson, 1979).

A recent survey showed that news broadcasts, newspapers, television specials, books, magazines articles and commercials influenced families energy habits. Families with higher educational attainment, larger family income and higher occupational status gained information on energy related issues from books and magazines. Lower income and less educated families paid more attention to commercials, television specials and utility companies concerning energy information (Morrison et al., 1978). Milstein (1976) states that 42 percent of the public obtain their information about energy from television and 45 percent obtain their information from newspapers. They believe the information if it is given by someone without a vested economic or political interest in energy. In the study by Braun, Murray, and Williams (1979), families were asked if any person influenced their decision to weatherize their home; 79 percent answered yes. When asked who influenced their decision, 68 percent said the project aid that had demonstrated and explained weatherizing influenced them, 30 percent said their friends influenced them, and two percent said the landlady influenced them.

Families have many reasons, including money, comfort and patriotism for conserving energy. Unwillingness to give up comforts and conviences and lack of social pressures, practical knowledge and money are reasons given for non-adoption. Television, newspapers, magazines, friends and other people influence consumers to save energy.

Summary

Energy shortages and rising energy prices coupled with inflation have affected how American families spend their money. Oklahoma families have also been affected by the energy crisis and inflation. Oklahoma families have voiced their concerns about energy through the Home Economics Program Planning and Advisory Committee of the Oklahoma Coooperative Extension Service.

Families use energy directly through space heating and cooling, and water heating. Indirect energy is used to manufactor goods and deliver services to the family. As much as 70 percent of the energy used in the United states is used directly or indirectly by households.

Energy-saving families can conserve energy by structural modification or behavioral modification or by a combination of the two. All three types are effective. Families have different reason for conserving energy. Money is the primary reason. Other reasons include comfort, patriotism and the scarity of the energy supply. Reasons for families not conserving are their unwillingness to give up comforts and conveniences and the lack of social pressure. Television, newspapers, magazines, friends and other people influence families to conserve.

CHAPTER III

RESEARCH DESIGN

The research design chapter includes five sections. They are: Type of Research, The Sample, The Sampling Techniques, The Instrumentation, and The Statistical Analysis.

Type Of Research

This study was designed to obtain descriptive data concerning household energy conservation practices. Best (1977, p. 116) states that a "descriptive study describes and interprets what is". Best (1977, p. 116) goes on to state that a descriptive study is concerned with "processes that are going on, effects that are evident or trends that are developing".

The Sample

To draw a representative sample from the State of Oklahoma, a method of simple random sampling was used. The U.S. Bureau of the Census (pp. 38-16 through 38-17) was used to determine urban areas. According to the 1970 Census . . .

> . . . the urban population comprises all persons living in urbanized areas and in places of 2,500 inhabitants or more outside urbanized areas (U.S. Bureau of the Census, pp. App. 1-2).

Two urban areas of Oklahoma were selected. These two urban areas were Tulsa and Bartlesville (Figure 3).

The Sampling Techniques

The sample which served as a data base for this study was obtained during the fall of 1978. A simple random selection technique was used to draw a sample of 1,200 families from the cities. Telephone directories from Bartlesville and Tulsa were used as the sample source. Several steps were involved in the actual selection.

The first step was to determine which urban areas would be used in the sample. The second step in the sampling procedure involved contacting the telephone companies to secure the appropriate telephone directories. The third step of the sampling procedure was the preparation of a computerized table of random numbers. In order to generate the table of random numbers, specific information was needed from each telephone directory such as:

1. the first valid page of the directory;
2. the last valid page of the directory;
3. the number of columns per page;
4. the number of lines per column; and
5. the estimated number of random selections needed to acquire the desired sample size.

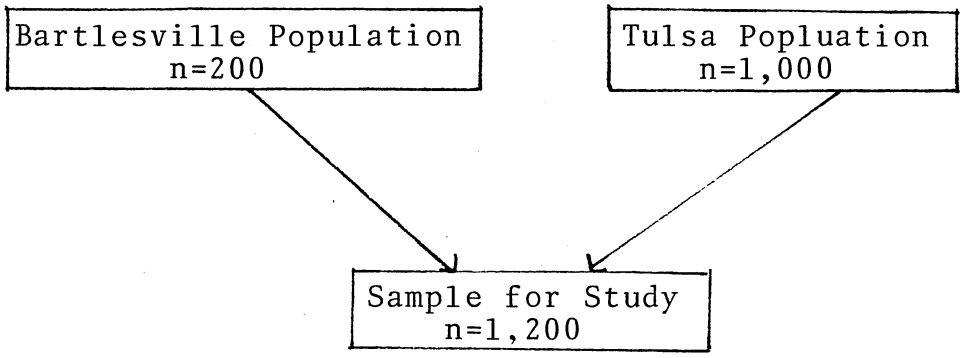

Figure 3. Stratification Model

Upon completion of the first three steps, the actual sample selection was done using the computerized table of random numbers. The following procedure was used in selecting a valid sample.

The first step was to interpret the computerized table of random numbers. The computer output (table of random numbers) first identified the page, the column and the specific number down the column where each potiental respondent would be found. Only urban residential addresses were used. All non-residence addresses, such as commercial businesses, community services, and governmental offices were not used, as well as, dormitory, military or institutional residences. If one of these addresses were drawn, it was rejected and the next randomly selected address was drawn into the sample. This procedure was used to draw a total of 1200 valid respondents.

During November and December 1978, the questionnaires were mailed to the 1200 randomly drawn names and addresses. Three attempts were made to gain a response from the sample. A total of 476 (40 percent) valid questionnaires were returned.

The Instrumentation

The questionnaire, Energy and You was designed by Williams, Lauener and Braun (1979). The questionnaire was reviewed by faculty members of the Division of Home Economics

at Oklahoma State University and other experts in the field. It was pretested and revised to consist of 35 items designed to obtain the required data. The preferred respondent was the female or male household head. The questionnaire took an average of ten minutes to complete. After the questionnaires were returned, 476 questionnaires provided the basis for this analysis. The information from the questionnaires was edited, coded and prepared for computer analysis on IBM cards.

The Statistical Analysis

Data was analyzed by frequency distribution, factor analysis, chi-square and Cramers V. Frequency distribution is a type of descriptive statistics to measure or count some characteristic and group or divide into classes showing the number of observations in each class. "Basically the frequency distribution is a table to show how many times a given score or group of scores occur" (Bartz, 1976, p. 22).

For example, four types of residences were listed on the questionnaire. They were: 1) single family, 2) duplex, 3) apartment, and 4) mobile home. The number of respondents that indicated they lived in a single family residence were totaled and the percentage determined. Frequency distribution was used to describe the characteristics of the sample.

"Factor analysis is a method for determining the number and nature of the underlying variables among large numbers of

measures. More succinctly, it is a method for determing underlying variables (factors) from n sets of measures, k being less than n" (Kerlinger, 1973, p. 659). Factor analysis was used to group the independent variables into behavioral and structural groups. For example, respondents were asked to reply to items concerning household energy conservation. Some of these items were:

-installed storm doors

-weatherstripped windows

-turned thermostat down to 68^{o} in winter

-turned thermostat up to 78^{o} in summer

Factor analysis grouped the first two items into the structural modification group and the last two items into the behavior modification group. The structural modification group was made up of seventeen variables and the behavioral group was made up of twelve variables.

Chi-square (X^2) is a statistical measure of the deviation of the observed responses from the expected or theoretical responses in two or more categories (Bartz, 1976, p. 294). A significant chi-square value would indicate that variables are not independent and the relationship was not the result of chance.

Best (1977, p. 277) suggests that a 0.05 level of significance be used as a standard for rejection in educational and psychological circles. Therefore the 0.05 level of significance was chosen to reject or accept the null hypotheses of this study .

For example, if saving money and behavioral modification were analyzed with a chi-square test, a chi-square level of significance was $p > = 0.05$, it would indicate a relationship between saving money and behavioral modification. In other words, the relationship was not a result of chance.

Chi-square analysis was used to test both null hypotheses. Hypothesis one determined if there was any statistically significant difference between the perceived reasons for adopting household energy conservation practices of the structural modification group and the behavioral modification group. Hypothesis two determined if there was any statistically significant difference between the perceived influences for adopting household energy conservation practices of the structural modification group and the behavioral modification group.

Cramer's V measure of association measures the strength of the relationships compared in each chi-square test. Cramer's V scale ranges from zero, which is a very low score, to a perfect 1.0 score, which is a very strong association. The Cramer's V score was used to determine the strength of the relationships in each chi-square test (Loether and McTavish, 1974, p. 197). The strength of the Cramer's V score is determined through the following classifications (Vines,1978, p. 18):

Value of Cramer's V	Appropriate Phrase
±0.70 or higher	a very strong association
±0.50 to 0.69	a substantial association
±0.30 to 0.49	a moderate association
±0.10 to 0.29	a low association
±0.01 to 0.09	a negligible association
0.00	no association

CHAPTER IV

FINDINGS

Characteristics of the Sample

The majority of the families in this study lived in a single family residence (88 percent). This compares with one and one half percent living in duplexes, nine percent living in apartments and one and one half percent living in mobile homes (Table I).

A very large portion, 86 percent, owned their residence, while fourteen percent rented. Over 27 percent of the residences were over 25 years old. Over 30 percent of the residences were ten to twenty years old and twelve percent were less than five years old. Approximately 46 percent of the families had lived in their homes 5 years or less. Nearly ten percent had lived in their homes over 25 years (Table I).

A fairly well distributed percentage of square feet of living space was reported from 901 square feet to over 2000 square feet. However, the largest reporting of square footage fell in the 1101 to 1400 square feet range with nearly 21 percent. The number of rooms in the residence ranged from one to more than seven. Fifty-eight percent of the households responding reported having five to six rooms (Table I).

The male head of household with female present was the

TABLE I

HOUSING CHARACTERISTICS OF THE SAMPLE

Housing Characteristics		Frequency n	Percent (%)
Type of residence			
Single family		417	87.975
Duplex		8	1.688
Apartment		42	8.861
Moble home		7	1.477
	Total	474	100.000
Tenure			
Rent		65	13.889
Own		403	86.111
	Total	468	100.000
Age of residence			
Less than one year		13	2.838
1 to 5 years		47	10.262
5 to 10 years		59	12.882
10 to 15 years		67	14.629
15 to 20 years		73	15.939
20 to 25 years		73	15.939
Over 25 years		126	27.511
	Total	458	100.000
Length of residence			
Less than one year		57	11.975
1 to 5 years		165	35.084
5 to 10 years		75	15.756
10 to 15 years		60	12.605
15 to 20 years		45	9.454
20 to 25 years		28	5.882
Over 25 years		44	9.244
	Total	476	100.000
Total square feet in residence			
Under 900 square feet		39	9.286
901 to 1100 square feet		67	15.952
1101 to 1400 square feet		88	20.952
1401 to 1600 square feet		58	13.810
1601 to 2000 square feet		86	20.476
Over 2000 square feet		82	19.524
	Total	420	100.000

TABLE I (Continued)

Housing Characteristics	Frequency n	Percent (%)
Number of rooms in residence		
1 to 2 rooms	8	1.681
3 to 4 rooms	66	13.866
5 to 6 rooms	275	57.773
Over 7 rooms	127	26.681
Total	476	100.000

most commonly reported household with 76 percent. Female head of household with no male present accounted for sixteen percent of the reported households. The most common age for the head of household was 50 to 61 years. Close to twenty percent of the household heads were in each of three catagories of 30 to 39 years, 40 to 49 years and 62 to 75 years. Fifteen percent of the household heads were 29 years old or less. Fourty-four percent of the household heads reported being college graduates. Approximately 29 percent of the household heads had some college education. Over ten percent of the household heads had not completed high school (Table II).

For this sample, family size ranged from one person to over ten persons. Nearly 40 percent of the households were two person families. Over 36 percent of the sample was three or four person families and ten percent were five persons and over families (Table II).

The income level reported most frequently for this sample was over $24,001 (35 percent). Over half of the households had incomes between $6,001 and $24,000 and ten percent had incomes of less than $6,000 (Table II).

Structural and Behavioral Modifications

Each of the 29 items were coded. When respondents indicated no modification had been made, the item was coded zero. When the respondent indicated that the modification had been made, the item was coded one. A total score for each respon-

TABLE II

FAMILY CHARACTERISTICS OF THE SAMPLE

Family Characteristics	Frequency n	Percent (%)
Sex of the household head		
Male head, female present	351	76.471
Male head, no female present	24	5.229
Female head, male present	12	2.614
Female head, no male present	72	15.686
Total	459	100.000
Age of the household head		
18 to 29 years	71	14.916
30 to 39 years	93	19.538
40 to 49 years	87	18.277
50 to 61 years	117	24.580
62 to 75 years	88	18.487
76 to 91 years	20	4.202
Total	476	100.000
Education level of household head		
8 years or less	15	3.158
Some high school	41	8.632
High school graduate	75	15.789
High school plus some college	136	28.632
College graduate	208	43.789
Total	475	100.000
Number of persons in residence		
One person	72	15.126
2 persons	186	39.076
3 persons	88	18.487
4 persons	83	17.437
5 persons	31	6.513
6 persons	11	2.311
7 to 9 persons	4	0.840
Over 10 persons	1	0.210
Total	476	100.000
Gross family income		
less than $6,000	45	9.978
$6,000 to $12,000	77	17.073
$12,001 to $18,000	89	19.734
$18,001 to $24,000	84	18.625
Over $24,001	156	34.590
Total	451	100.000

dent was obtained by adding the coded scores. The score for structural modification ranged from zero to twelve with the mean score of 2.07143 (Table III). The behavioral modification score ranged from zero to seventeen with the mean score of 8.70378 (Table IV). These scores were divided into high, medium and low groups with approximately 33 percent in each group for chi-square analysis.

Question number 9, 11, 13, and 15 in the Energy and You questionnaire dealt with structural modifications during the last two years. Each question asked several items relating to household energy conservation, from these four questions, twelve items were identified as indicators of structural modifications (Table V).

Over 37 percent or 177 respondents had caulked the openings in their residence during the last two years. Just over 36 percent reported weatherstripping doors or windows and 67 percent had installed storm doors or windows in the last two years (Table V).

Adding insulation to the home was reported by 191 respondents. Over 27 percent of the respondents indicated that they had insulated the attic or added to their attic insulation. Nine percent insulated their wood frame walls and nearly four percent insulated the floors (Table V).

Heating and cooling energy-saving home improvements in residence were reported by 108 respondents. Over fifteen percent reported that they had installed heating and cooling equipment with a high energy efficiency rating. One re-

TABLE III

NUMBERS OF STRUCTURAL MODIFICATIONS MADE

Number of Structural Modification Made	Frequency n	Percent of Households (%)
0	138	28.992
1	89	18.697
2	93	19.538
3	52	10.924
4	46	9.664
5	25	5.252
6	9	1.891
7	9	1.891
8	10	2.101
9	3	0.630
10	0	0.000
11	2	0.420
12	0	0.000
	476	100.000

Mean = 2.07143, Standard Mean = 0.0972322

TABLE IV

NUMBERS OF BEHAVIORAL MODIFICATIONS MADE

Number of Behavioral Modification Made	Frequency n	Percent of Households (%)
0	6	1.261
1	6	1.261
2	8	1.681
3	17	3.571
4	22	4.622
5	25	5.252
6	46	9.664
7	43	9,034
8	62	13.025
9	41	8.613
10	50	10.504
11	40	8.403
12	35	7.353
13	31	6.513
14	19	3.992
15	15	3.151
16	9	1.891
17	1	0.210
	476	100.000

Mean = 8.70378, Standard Mean = 0.162511

TABLE V

STRUCTURE MODIFICATIONS FOR ENERGY SAVINGS

Structure Modifications	Frequency n	Percent (%)
Caulked the opening in your residence	177	37.185
Weatherstripped your windows	68	14.286
Weatherstripped your doors	105	22.059
Installed storm windows	145	30.462
Installed storm doors	174	36.555
Insulated your attic or added insulation to attic	130	27.311
Insulated your wood frame walls	43	9.034
Insulated your floor(s)	18	3.782
Installed heating and air conditioning equipment with a high energy efficient rating	74	15.546
Installed solar heating system	1	0.210
Installed a whole-house ventilating fan	33	6.933
Insulated your hot water storage tank and piping	18	3.782

spondent installed a solar heating system. Nearly seven percent installed a whole-house ventilating fan (Table V).

Eighteen respondents reported hot water energy-saving home improvements during the last two years. Almost four percent insulated their hot water storage tank and piping (Table V).

Question number 10, 14, 16, and 18 of the Energy and You questionnaire dealt with behavioral modifications. Each question asked several items relating to household energy conservation. From those four questions, seventeen items were identified as indicators of behavioral modification during the last two years (Table VI).

Window and door energy-savings practices used in residence had very high frequencies. A total of 413 (87 percent) reported that they kept doors and windows firmly shut. Nearly 62 percent had checked window and door latches for a tight fit. Over 45 percent used heavy or insulated draperies. Almost 78 percent (371 respondents) kept their draperies shut at night and open on sunny days in winter. Of those reporting, 62 percent (294 respondents) kept out day time sun and used low light level in summer (Table VI).

Over 50 percent reported heating and cooling energy saving practices used in residence during last two years. Almost 60 percent reported that they had turned their thermostat down to 68^{o} in the winter and over 50 percent had turned their thermostat up to 78^{o} in summer.

Doing household cleaning with cold water whenever pos-

TABLE VI

BEHAVIORAL MODIFICATIONS FOR ENERGY-SAVINGS

Behavior Modifications	Frequency n	Percent (%)
Kept doors and windows firmly shut	413	86.765
Checked window and door latches for tight fit	294	61.765
Used heavy or insulated draperies	218	45.798
Kept draperies shut at night and open on sunny days in winter	371	77.941
Kept out daytime sun and used low light in summer	294	61.765
Turned thermostat down to 68° in winter	282	59.244
Turned thermostat up to 78° in summer	241	50.630
Repaired leaky faucets promptly	241	50.630
Did household cleaning with cold water whenever possible	293	61.555
Lowered the temperature on your hot water heater	162	34.034
Don't allow sediments to build in the bottom of your hot water tank	85	17.857
Used kitchen, bath and other ventilating fans sparingly	220	46.218
Made sure your refrigerator door seals were air-tight	280	58.824
Turned dishwasher off after final rinse and let dishes air dry	111	23.319
Used small single purpose appliances like toasterovens, instead of range	288	60.504
Washed clothes in warm or cold water, rinsed in cold	281	59.034
Line dried clothes	142	29.832

sible was reported by more (293) respondents (61.5 percent) than anyother hot water heating energy-saving practice. A total of 162 respondents (34 percent) lowered the temperature on their hot water heater and 85 respondents (18 percent) reported that they did not allow sediments to build in bottom of their hot water tank (Table VI).

Many kitchen, laundry room and bathroom energy-saving practices were reported. Nearly 59 percent made sure the refrigerator door seals were tight. Of those reporting, 46 percent used the kitchen, bath and other ventilating fans sparingly. Over 23 percent turned their dishwasher off after the final rinse and let dishes air dry. The use of small single purpose appliances like toaster ovens, instead of a range was reported by 288 respondents (60.5 percent). A total of 281 respondents (59 percent) reported that they washed clothes in warm or cold water, rinsed in cold water and 142 respondents (30 percent) line dried clothes (Table VI).

Perceived Reasons For Adopting Household Energy Conservation Practices

Question 25 of the Energy and You questionnaire dealt with reasons for household conservation practices. Four reasons were listed on the questionnaire. They were: 1) have not adopted any conservation practices, 2) to save money, 3) because the supply of energy is scarce, and 4) so future generations will have a supply of energy. A space

also was provided for respondents to write in other reasons.

In the structural modification group, saving money was one of the reasons that chi-square analysis was statistically significant at a $p >= 0.0001$ level. The Cramer's V score was 0.201 which indicates a low association between saving money and making structural modifications. This tends to indicate that the structural modification group perceived that saving money was a reason for energy-saving home improvements.

In the structural modification group, saving energy for future generations was the other reason that showed statistically significant by approaching a $p >= 0.01$ level. The Cramer's V score was 0.152 which shows a low association between saving energy for future generations and making structural modifications. In other words, the structural modification group perceived that saving energy for future generations was a reason for energy saving home improvements (Table VII).

No significant association was found between the scarcity of energy and the structural modification group. This lack of association indicates that there are no differences between this reason for adopting household energy conservation practices and the structural modification group. For example, saving energy because the supply is scarce is not significantly associated as a reason for energy conservation among the structural modification group (Table VII).

In the behavioral modification group, again saving money showed statistically significant at a $p >= 0.0001$ level.

TABLE VII

REASONS FOR STRUCTURAL MODIFICATIONS

Reasons	X^2	p	Cramer's V
To save money	19.221	0.0001	0.201**
Because the supply of energy is scarce	3.211	NS	0.082***
So future generations will have a supply of energy	11.026	0.01*	0.152**

n=476, df=2
NS=not statistically significiant
*=approching
**=low association
***=negligible association

TABLE VIII

REASONS FOR BEHAVIORAL MODIFICATIONS

Reasons	X^2	p	Cramer's V
To save money	25.358	0.0001	0.231**
Because the supply of energy is scarce	16.578	0.001*	0.187**
So future generations will have a supply of energy	18.926	0.0001	0.199**

n=476, df=2
*=approaching
**=low association

The Cramer's V score was 0.231 which indicates a low association between saving money and adopting energy conservation practices. This tends to indicate that the behavioral modification group perceived that saving money was a reason for adopting energy conservation practices (Table VIII).

Chi-square analysis also showed saving energy for future generations to be statistically significant at a $p >= 0.0001$ level. The Cramer's V score of 0.199 indicates a low association between saving energy for future generations and the behavioral modification group adopting energy conservation practices. This tends to point to the fact that the behavioral modification group perceived that saving energy for future generations was a reason for adopting enegy conservation practices (Table VIII).

In the behavioral modification group, the scarcity of energy showed statistically significant at a $p >= 0.001$ level. The Cramer's V score was 0.187 which indicates a low association between saving energy because the supply is scarce and adopting energy conservation practices. This tends to indicate that the behavioral modification group perceived that saving energy because the supply is scarce was a reason for adopting energy conservation practices (Table VIII).

Analysis indicated two statistically significant reasons for the structural modification group to adopt household energy conservation practices. The two reason were 1) to save money and 2) so that future generations will have a

supply of energy. Conserving household energy because the supply of energy is scarce did not show statistically significant for the behavioral modification group. Three reasons to adopt household energy conservation practices were statistically significant for the behavioral modification group. These three reasons were 1) to save money, 2) because the supply of energy is scarce and 3) so future generation will have a supply of energy. Thus null hpothesis one, there is no significant difference between the perceived reasons for adopting household energy conservation practices of the structural modification group and the behavioral modification group, was to a certain degree rejected.

Perceived Influences For Adopting Household Energy Conservation Practices

Question 26 of the Energy and You questionnaire dealt with influences on household energy conservation practices. Five influences were listed on the questionnaire. They were: 1) mass media, 2) educational programs, 3) income tax benefits, 4) friends or family members, and 5) no one influenced the decision. Also, a space was provided for the respondents to write in other reasons.

In the structural modification group, income tax benefits showed statistically significant at a $p >= 0.05$ level. The Cramer's V score was 0.120 which indicates a low association between income tax benefits and making energy saving

home improvements. In other words, the structural modification group perceived that income tax benefits were an influence in making energy saving home improvements (Table IX).

Chi-square analysis did not exhibit a significant relationship between the other three influences and the structural modification group. This lack of association indicates that there are no differences between the other influences for making energy saving home improvements and the structural modification group. For example, family members or friends were not a significant influence for the structural modification group to make energy-saving home improvements (Table IX).

Educational programs showed statistically significant at a $p >= 0.01$ level for the behavior modification group. The Cramer's V score, was 0.160 which indicates a low association between educational programs and adopting energy conservation practices. In other words, the behavioral modification group perceived that educational programs were an influence in adopting household energy conservation practices. Chi-square analysis did not show a significant relationship between the other three influences and the behavior modification group. This lack of association indicates that there are no differences between the other influences for adopting energy-saving practices and the behavior modification group. For example, mass media was not a significant influence for the behavioral modification group to adopt energy-saving practices (Table X).

TABLE IX

INFLUENCES FOR STRUCTURAL MODIFICATIONS

Influences	X^2	p	Cramer's V
Mass media	0.470	NS	0.031***
Educational programs	3.871	NS	0.090***
Income tax benefits	6.896	0.05*	0.120**
Friends or family members	3.077	NS	0.080***

n=476, df=2
NS=not statistically significant
*=approaching
**=low association
***=Negligible association

TABLE X

INFLUENCES FOR BEHAVIORAL MODIFICATIONS

Influences	X^2	p	Cramer's V
Mass media	1.642	NS	0.059***
Educational programs	12.227	0.01*	0.160**
Income tax benefits	3.044	NS	0.080***
Friends or family members	0.444	NS	0.031***

n=476, df=2
NS=not statistically significant
*=approaching
**=low association
***=negligible association

Analysis indicated one statistically significant influence for adopting energy conservation practices of the structural modification group. The one influence was income tax benefits. Of the behavioral modification group a different influence for adopting household energy conservation practices was statistically significant. This influence was educational programs. Thus null hypothesis two, there is no significant difference between the perceived influences for adopting household energy conservation practices of the structural modification group and the behavioral modificatin group, was partically rejected.

CHAPTER V

SUMMARY

This study investigated household energy conservation practices of two groups of consumers. The two groups were 1) families who did structural modifictions to their residence to save energy and 2) families who did behavioral modifications by adoptiong energy-saving practices.

The purpose of this study was to determine two aspects of household energy conservation. They were 1) the perceived reasons for adopting household energy conservation practices of the structural modification group and the behavioral modification group and 2) the perceived influences for adopting household energy conservation practices of the structural modification group and the behavioral modification group.

The data was obtained through the Energy and You questionnaire which was mailed to 1200 families in the Bartlesville and Tulsa, Oklahoma, areas. After the questionnaires were returned, 476 questionnaires provided the basis for the analysis.

The questionnaire was designed to collect specific information. This information was 1) family and housing characteristics 2) energy-saving home improvements and energy-

saving practices, and 3) reasons and influences for this change.

The data were first analyzed by frequency distribution. This information was used to examine characteristics of the sample. Factor analysis was then used to group the energy savings into structural modification and behavioral modification groups. Chi-square (X^2) analysis tested the relationship of the structural and behavioral modification groups and perceived reasons and influences for conserving household energy. A 0.05 level of significance was used to reject the null hypothesis. Cramer's V score measured the strength of the relationships in each chi-square test.

Major Findings

Hypothesis one examined the perceived reasons for adopting household energy conservation practices of the structural modification group and the behavioral modification group. Saving money was the most significant reason for energy-saving structural modifications and behavioral modifications.

The other significant reason for energy-saving structural modification was so future generation would have a supply of energy. The two other significant reasons for energy-saving behavioral modifications were saving energy for future generations and the scarcity of energy. The null hypothesis was, to certain degree, rejected.

Hypothesis two examined the perceived influences for adoptiong household energy conservation practices of the

structural modification group and the behavioral modification group. Income tax benefits were the significant influence of the structural modification group. Educational programs were the significant influence of the behavioral modification group. The null hypothesis was partically rejected.

Saving money was written-in by 39 out of 80 respondents as an influence which indicates added economic concern. Common sense was also written-in by 10 of the 80 respondents as an influence to conserve energy.

Conclusions

Conclusions drawn from the analysis of this study are limited to the families in the sample of the study at a specific point in time. The fact that Oklahoma is an oil producing state and that the two cities in the sample have large oil and energy-related industries restricts the conclusions of this study.

Saving money was an important reason for both the structural and behavioral modification groups. Saving money was written-in by 39 out of 80 respondents as an influence of household energy conservation practices. This is consistant with many previous studies (Kahienberg, Phillips, and Proctor, 1976; Fox and Hake, 1977; Hayes and Cone, 1977; Palmer, Lloyd, and Lloyd, 1977; McCormack, 1975; Laube, 1975; Hirst and Carney, 1978; Morrison and Gladhart, 1976; Morrison et al., 1978; Rudd, 1978; Rowley, 1978; Milstein,

1976; Bittle, Valesano and Thaler, 1979; Rudd and Longstreth, 1977; and Peterson, 1979).

Saving energy for future generations was a reason for both the structural modification and the behavioral modification group to adopt energy conservation practices. This is possibly due to the age of the families in this study. Over 47 percent of the household heads were 50 years old or older.

The behavioral group felt that the scarity of the energy supply was a reason to save energy. This concurs with Milstein's (1976) findings that "shortages of energy" and "the Nation's running out of resources" were reasons for efforts to save energy.

Income tax benefits were an influence for adopting energy conservation practices of the structural modification group. This is consistent with studies by Longstreth (1977), Peterson(1979), McCormack (1973), and Milstein (1979) which found that income tax breaks for weatherizing homes were reasons for conserving energy.

The behavioral modification group felt that educational programs were influences for conserving household energy. Several other studies (Seaver and Patterson, 1976; Morrison and Gladhart, 1976; Hogan, 1978; Gladhart, 1977; Rudd, 1978; Rudd and Longstreth, 1977; and Peterson, 1979) have also found accurate educational information on how to conserve energy was an influence.

Mass media was not indicated as a statistically significant influence for energy conservation for either the

structural or behavioral modification groups. This is not consistant with studies by Morrison (1978) or Milstein (1979). Morrison found that families with higher education and family income relied on books and magazines for energy conservation information. Lower income and less educated families relied on television a great deal for energy information (Morrison et al., 1978). Milstein (1976) found that 42 percent of the public obtain their information about energy from television and 45 percent obtain their information from newspapers.

Program Implications

A primary reason for this study was to contribute to the development and dissemination of energy education programs through Cooperative Extension Service. These program implications are added in order to futher clarify the impact of the research finding on program development. Thoughtful consideration of the <u>way</u> conservation programming is presented has direct relation to the <u>success</u> of programming.

"Energy conservation is an idea that must be 'sold' to the public" (Gilly and Gelb, 1978, p. 31). The same marketing techniques that have been successful in selling soap or beer can be applied to energy conservation. One technique is market segmentation (Gilly and Gelb, 1978, p. 31).

"Market segmentation is considered to be the essence of marketing" (Sheth, 1968, p. 453). "Market segmentation as a strategy can be defined as tailoring the market mix compo-

nents to needs and wants of a selected sub-group within the overall market" (Arndt, 1968, p. 67). The buyers can be classified by socioeconomic variables such as income, education and occupation or demographic variables such as age, marital status and life cycle (Sheth, 1968, p. 452). Other variables that can be used to classify buyers are psychological and social variables such as attitudes, personality, mobility and social class (Arndt, 1968, p. 68) or the buyers' state of mind, state of being, usage, and benefit (Gilly and Gelb, 1978, p. 33). Delivery systems, as well as, curriculum can be presented in new, innovative ways (Rowley, 1978, p. 29).

This study delt with relatively high income, well educated, older families with a male head of household and a female present. This sample was segmented into consumers that tend toward structural modification and consumers that tend toward behavioral modification to save household energy. Energy conservation programs directed toward saving money and saving energy for future generations would appeal to both groups in this segment. However, the behavior modification group would also respond to programs on scarcity of the supply of energy.

The first step of energy conservation is awareness of the need to conserve household energy. Arndt (1968) found that mass media is a good delivery system for developing awareness. Cooperative Extension use mass media for energy conservation education.

In this study, income tax benefits influenced the consumers that tend toward structural modification. Educational programs influenced the group that tend toward behavioral modification.

After awareness, Lionberger (1979, pp. 765-768) sees the next step as getting the consumer interested and then they will seek more detailed information. Detailed energy conservation information is available through county OSU Extension Centers. After the energy conservation knowledge is accumulated, a family will make a decision. The family has to decide or evaluate if what they have learned is good or not, and whether it is likely to be good for them. If the decisions are affirmative, the next step is to try it out. If it goes well, the consumer may accept the idea.

The group of consumers in this study are beginning to conserve energy. They need to have their decision to conserve energy reinfored before they will develop into long term adopters of energy-saving practices. An individual learns quickly at the teachable moment (Copeland and Kaiser, 1971). Duvall (1970) states that the teachable moment is when an individual is truly ready for the next step in his development. The teachable moment, according to Copeland and Kaiser (1971, p. 54), "is the time when the learner is intensely anxious to engage in a learning experience so he can acquire a skill. The teachable moment emerges from three dimensions--the physical organism, the social pressures and the personal values of the individual (Duvall, 1971). Stout

(1980, p. 3) states that the teachable moment for energy education is here. Possibly the combination of the realization that the energy crisis is not a fabrication and the rising energy costs has created the teachable moment. Cooperative Extension should take note of this "teachable moment" and futher develop energy educational programming.

In this study, the behavioral modification group perceived that educational programs were an influence to conserve energy. Perhaps educational programs could influence this group to adopt energy-saving structural modifications.

Verner (1964, p. 29) states that "adulthood is the stage of life when an individual has assumed responsibility for himself and usually for others." Adults have different experiences and a broader background of experiences as he moves from young adulthood, to middle age, and then onto old age.

The group in this sample was generally a mature adult group. Almost half of the respondents were 50 years of age or older.

Influences of technological change and other societal forces have resulted in making life long learning a must (Copeland and Daiser, 1971). Havinghurst (1952) states that the learning process is necessary throughout life, not only in the early stages of life, but through out the life cycle. Peterson (1974) states that through this learning process, that change can result to improve the quality of life. Wilhelms (1974, p. 2) states that due to the energy crisis, that improving the quality of life, or learning how to live

well is very important.

Learning ability peaks between 20 and 25 years and declines with age (Verner, 1964). Authorities disagree on the rate of this decline. Verner (1964, p. 21) states that "any adult can learn almost anything he wants to learn at any age about as well as he could have learned it at his peak of learning abilities". All ages can learn to conserve energy, so Cooperative Extension should direct energy programming to all age groups.

High energy prices and energy shortages have made almost every group of consumers aware of the need to conserve energy. Gladhart (1977, p. 269) states that, "if consumers are to choose rationally, they need information about the range of options available in the market and technical information about efficiency of different options". Cooperative Extension educators can provide this information to the different groups of consumers to help them learn how to conserve energy.

Learning to conserve energy can be made more desirable through motivational stratagies and incentatives. Milstein (1976, p. 318) states that the "most effective means of modifying energy-using behavior is financial reward". He goes on to state, however, that many studies using financial rewards to conserve energy have been economically unrealistic (paying people to save energy). But these studies do validate the importance of using the desire to save money to induce people to save energy (Milstein, 1976, p. 318).

For the respondents in this sample, saving money was a primary reason for both the structural modification group and the behavioral modification group to conserve energy. Cooperative Extension should build energy conservation programs on this information.

Rudd and Longstreth (1977, pp. 2-9) state that education is essential in energy conservation programs. Energy conservation can be encouraged by educating users "on the why's and how's of energy conservation". They go on to state consumer education programs in secondary schools, mass media and local meetings with specific suggestions can encourage conservation. Easy to understand information should be readily available through Cooperative Extension, Welfare and social agencies. Rowley (1978, p. 29) states that the best way of reaching groups is to adopt curriculum to suit needs and the curriculum should be based on research. Home Economists have a tremendous advantage by virtue of their direct contacts with families through Extension, secondary and adult education to help families learn to conserve energy(Rudd, 1978, p. 26).

Oklahoma families have asked for energy conservation information through the Cooperative Extension Program Planning and Advisory Committee. Cooperative Extension must develop effective energy education programs. This research suggests that energy conservation programs emphasising saving money, saving energy for future generations and saving energy because the supply is scarce should be affective for

well educated, higher income, older familes that are living in single family dwellings.

Recommendations

The following are recommendations in the area of household energy conservation. They are:

1. That this study be replicated in the future and include urban and rural residences across Oklahoma.

2. That other studies be designed to explore how household energy conservation changes affect families life style.

3. That other studies be designed to evaluate the effectiveness of Oklahoma's Cooperative Extension Service energy conservation programs.

4. That other studies be designed to evaluate the effectiveness of mass media educational programs.

5. That educational programs on household energy conservation be developed by Oklahoma Home Economics Cooperative Extention Service.

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APPENDIX A

ENERGY AND YOU QUESTIONNAIRE

ENERGY AND YOU

DO NOT WRITE IN THIS COLUMN

RESPONDENT ____ ____ ____ ____ 1-4

CITY ____ 5

CARD NO. 1 6

DIRECTIONS: We are conducting a survey to assess the energy conservation progress being made by individuals and families in Oklahoma. Please place a check mark (✓) in the blank space or spaces that is most descriptive for you.

1. In which type of residence do you reside? ____ 7

_____ A. Single family
_____ B. Duplex
_____ C. Apartment
_____ D. Mobile home
_____ E. Other (please specify)_____

2. Do you rent or own your residence? ____ 8

_____ A. Rent
_____ B. Own
_____ C. Other (please specify)_____

3. Which of the following describes the material of which your residence is built? ____ 9

_____ A. Solid masonry, brick, stone or concrete block
_____ B. Wood frame with wood siding or masonry veneer
_____ C. Mobile home
_____ D. Other (please specify)_____

4. Approximately what is the age of your residence?
(number of years to the nearest whole year) ____ 10

_____ A. Less than one year
_____ B. 1 to 5 years
_____ C. 5 to 10 years
_____ D. 10 to 15 years
_____ E. 15 to 20 years
_____ F. 20 to 25 years
_____ G. Over 25 years
_____ H. Do not know

5. How many years have you lived in your present residence?
(number of years to the nearest whole year) ____ 11

_____ A. Less than one year
_____ B. 1 to 5 years
_____ C. 5 to 10 years
_____ D. 10 to 15 years
_____ E. 15 to 20 years
_____ F. 20 to 25 years
_____ G. Over 25 years

6. How many square feet are in your residence (not counting porches or garages)? ____ 12

_____ A. Under 900 square feet
_____ B. 901 to 1100 square feet
_____ C. 1101 to 1400 square feet
_____ D. 1401 to 1600 square feet
_____ E. 1601 to 2000 square feet
_____ F. Over 2000 square feet
_____ G. Do not know

7. How many rooms are in your residence (do not count bathrooms, open porches, utility room, garage, unfinished basement)?

_____ A. 1 to 2 rooms
_____ B. 3 to 4 rooms
_____ C. 5 to 6 rooms
_____ D. Over 7 rooms

13

8. Are any of the following conditions present in your residence? If yes, check major or minor.

NO	Minor	Major		
_____	_____	_____	A. Leak(s) in the roof	14
_____	_____	_____	B. Leak(s) in the basement	15
_____	_____	_____	C. Crack(s) (other than hairline) in walls or ceilings	16
_____	_____	_____	D. Sag(s) or bulge(s) in walls or ceiling	17
_____	_____	_____	E. Peeling paint on inside walls	18
_____	_____	_____	F. Peeling paint on outside walls	19
_____	_____	_____	G. Decay of door and/or window frames	20
_____	_____	_____	H. Decay of porch and/or outside steps	21
_____	_____	_____	I. Uneven floors	22
_____	_____	_____	J. Holes or badly worn places in floor coverings	23
_____	_____	_____	K. Broken or missing window panes	24
_____	_____	_____	L. Broken or missing materials on exterior walls or foundation	25
_____	_____	_____	M. Cold drafts in house	26

9. Check any of the window and door energy-saving home improvements made in your residence anytime during the last two years. (January, 1976 to present date)

_____ A. Caulked the openings in your residence 27
_____ B. Weatherstripped your windows 28
_____ C. Weatherstripped your doors 29
_____ D. Installed storm windows 30
_____ E. Installed storm doors 31
_____ F. Have not done any of the above 32
_____ G. Other (please specify)_____ 33

10. Check any of the window and door energy-saving practices used in your residence anytime during the last two years.

_____ A. Kept doors and windows firmly shut 34
_____ B. Checked window and door latches for tight fit 35
_____ C. Used heavy or insulated draperies 36
_____ D. Kept draperies shut at night and open on sunny days in winter 37
_____ E. Kept out daytime sun and used low light level in summer 38
_____ F. Have not done any of the above 39
_____ G. Other (please specify)_____ 40

11. Check any of the insulation energy-saving home improvements made in your residence anytime during the last two years.

_____ A. Insulated your attic or added insulation to attic 41
_____ B. Insulated your wood frame walls 42
_____ C. Insulated your floor(s) 43
_____ D. Have not done any of the above 44
_____ E. Other (please specify)_____ 45

12. Check any of the insulation energy-saving practices used in your residence anytime during the last two years.

_____ A. Kept fireplace damper closed unless a fire was going 46
_____ B. Used a glass door on open masonry fireplace 47
_____ C. Do not have a fireplace 48
_____ D. Checked to see if residence is adequately insulated 49
_____ E. Have not done any of the above 50
_____ F. Other (please specify)_____ 51

13. Check any of the heating and cooling energy-saving home improvements made in your residence anytime during the last two years.

_____ A.	Installed heating and air conditioning equipment with a high energy efficient rating	52
_____ B.	Installed solar heating system	53
_____ C.	Incorporated new landscaping for energy conservation purposes	54
_____ D.	Installed a whole-house ventilating fan	55
_____ E.	Have not done any of the above	56
_____ F.	Other (please specify)_____	57

14. Check any of the heating and cooling energy-saving practices used in your residence anytime during the last two years.

_____ A.	Turned thermostat down to 68° in winter	58
_____ B.	Turned thermostat up to 78° in summer	59
_____ C.	Closed off unoccupied rooms and shut off vents; or turned off room air conditioner	60
_____ D.	Cleaned or replaced the filter in your forced-air system once a month	61
_____ E.	Had your furnace serviced once a month	62
_____ F.	Reduced thermostat setting at night consistently	63
_____ G.	Turned gas pilot light off in summer	64
_____ H.	Opened windows instead of using air conditioner or electric fan	65
_____ I.	Used attic fan when possible	66
_____ J.	Have not done any of the above	67
_____ K.	Other (please specify)_____	68

15. Check any of the hot water heating energy-saving home improvements made in your residence anytime during the last two years.

_____ A.	Insulated your hot water storage tank and piping	69
_____ B.	Installed a hot water heater with thick insulation on the shell	70
_____ C.	Installed solar hot water system	71
_____ D.	Have not done any of the above	72
_____ E.	Other (please specify)_____	73

16. Check any of the hot water heating energy-saving practices used in your residence anytime during the last two years.

_____ A.	Repaired leaky faucets promptly	74
_____ B.	Did household cleaning with cold water whenever possible	75
_____ C.	Lowered the temperature on your hot water heater	76
_____ D.	Don't allow sediments to build in the bottom of your hot water tank	77
_____ E.	Have not done any of the above	78
_____ F.	Other (please specify)_____	79

17. Check any of the kitchen, laundry room and bathroom energy-saving home improvements made in your residence anytime during the last two years.

_____ A.	Bought refrigerator with a power-saver switch and manual defrost	80
_____ B.	Installed flow restrictors on showers	81
_____ C.	Have not done any of the above	82
_____ D.	Other (please specify)_____	83

18. Check any of the kitchen, laundry room and bathroom energy-saving practices used in your residence anytime during the last two years.

CARD NO. 2 6

_____ A.	Used kitchen, bath and other ventilating fans sparingly	7
_____ B.	Made sure your refrigerator door seals were airtight	8
_____ C.	Turned dishwasher off after final rinse and let dishes air dry	9
_____ D.	Used small single purpose appliances like toaster ovens, etc. instead of range	10
_____ E.	Washed clothes in warm or cold water, rinsed in cold	11
_____ F.	Line dried clothes	12
_____ G.	Have not done any of the above	13
_____ H.	Other (please specify)_____	14

19. Check any of the following household appliances used in your residence.

_____ A.	Electric stove	15
_____ B.	Gas stove	16
_____ C.	Electric refrigerator	17
_____ D.	Gas refrigerator	18
_____ E.	Separate food freezer	19
_____ F.	Automatic dishwasher	20
_____ G.	Automatic washing machine	21
_____ H.	Electric clothes dryer	22
_____ I.	Gas clothes dryer	23
_____ J.	Black and white TV	24
_____ K.	Color TV	25

20. What fuel do you most often use for heating your residence?

_____ A.	Natural gas	26
_____ B.	Bottled gas	
_____ C.	Fuel oil, kerosene	
_____ D.	Electricity	
_____ E.	Coal or coke	
_____ F.	Wood	
_____ G.	Other (please specify)_____	

21. What type of heating system do you have in your residence?

_____ A.	Central heating system	27
_____ B.	Wall furnace	
_____ C.	Electric heat pump	
_____ D.	Floor furnace	
_____ E.	Baseboard	
_____ F.	Other (please specify)_____	

22. During the last two years (January, 1976 to present date) what has your highest heating bill been?

_____ A.	Cost of heating bill	_____
_____ B.	Don't know	28-30

23. What type of cooling system do you have in your residence?

_____ A.	Central air conditioning	31
_____ B.	Window air conditioning	
_____ C.	Evaporative cooler	
_____ D.	No cooling equipment	
_____ E.	Other (please specify)_____	

24. During the last two years (January, 1976 to present date) what has your highest cooling bill been?

_____ A.	Cost of cooling bill	_____
_____ B.	Don't know	32-34

25. What was the main reason for adopting energy conservation practices, if you have done so?

_____ A.	Have not adopted any energy conservation practices	35
_____ B.	To save money	36
_____ C.	Because the supply of energy is scarce	37
_____ D.	So future generations will have a supply of energy	38
_____ E.	Other (please specify)_____	39

26. Who or what influences you the most to make energy-saving improvements in your residence? (check all that apply)

_____ A.	Mass media (television, radio, newspaper, magazines, etc.)	40
_____ B.	Educational programs (extension programs, utility companies, governmental programs, etc.)	41
_____ C.	Income tax benefits	42
_____ D.	Friends or family members	43
_____ E.	No one influenced the decision	44
_____ F.	Other (please specify)_____	45

27. What is the sex of the household head?

_____ A. Male head, female present
_____ B. Female head, male present
_____ C. Male head, no female present
_____ D. Female head, no male present

46

28. What is the age of the household head?

_____ A. 18 to 29 years
_____ B. 30 to 39 years
_____ C. 40 to 49 years
_____ D. 50 to 61 years
_____ E. 62 to 75 years
_____ F. 76 to 91 years

47

29. What is the education level of the household head?

_____ A. 8 years or less
_____ B. Some high school
_____ C. High school graduate
_____ D. High school plus some college
_____ E. College graduate

48

30. How many people are living in this residence?

_____ A. One person
_____ B. 2 persons
_____ C. 3 persons
_____ D. 4 persons
_____ E. 5 persons
_____ F. 6 persons
_____ G. 7 to 9 persons
_____ H. Over 10 persons

49

31. What is your yearly gross family income?

_____ A. Less than $6,000
_____ B. $6,000 - $12,000
_____ C. $12,001 - $18,000
_____ D. $18,001 - $24,000
_____ E. Over $24,001

50

32. Who contributes to the yearly gross family income?

_____ A. Male head
_____ B. Female head
_____ C. Male and female heads
_____ D. Other (please specify)_____

51

APPENDIX B

TABLES

TABLE XI

REASONS FOR ADOPTING ENERGY CONSERVATION PRACTICES

Reasons	Frequency n	Percent (%)
Have not adopted an energy conservation practices	58	12.185
To save money	374	78.571
Because the supply of energy is scarce	181	38.025
So future generations will have a supply of energy	101	21.218
Other	26	5.462

TABLE XII

INFLUENCES FOR ADOPTING ENERGY CONSERVATION PRACTICES

Influences	Frequency n	Percent (%)
Mass media	192	40.336
Educational programs	121	25.420
Income tax benefits	36	7.536
Friends or family members	43	9.034
No one influences the decision	172	36.134
Other	80	16.807

TABLE XIII

LEVEL OF ADOPTION OF ENERGY CONSERVATION PRACTICES OF THE STRUCTURAL MODIFICATION GROUP

Level of adoption	Frequency n	Percent (%)
Low adoption	138	28.992
Moderate adoption	182	38.235
High adoption	156	32.773
Total	476	100.000

TABLE XIV

LEVEL OF ADOPTION OF ENERGY CONSERVATION PRACTICES OF THE BEHAVIORAL MODIFICATION GROUP

Level of adoption	Frequency n	Percent (%)
Low adoption	173	36.345
Moderate adoption	153	32.143
High adoption	150	31.513
Total	476	100.000

TABLE XV

FACTOR ANALYSIS OF STRUCTURAL MODIFICATIONS

Energy Saving Home Improvement	Factor Loading
Calked openings in residence	0.53738
Weatherstripped windows	0.78351
Weatherstriped doors	0.75606
Installed storm windows	0.74651
Installed storm doors	0.76002
Insulated attic or added insulation to attic	0.51247
Insulated wood frame walls	0.49017
Insulated floor(s)	0.49282
Instaled high efficiency heating and air conditioning equipment	-0.47260
Installed solar heating system	0.65766
Installed whole-house ventilating fan	-0.52370
Insulated hot water storage tank and piping	-0.58976

TABLE XVI

FACTOR ANALYSIS OF BEHAVIORAL MODIFICATION

Energy Saving Practices	Factor Loading
Kept doors and windows firmly shut	-0.57242
Checked windows and door latches for tight fit	-0.45524
Used heavy or insulated draperies	-0.62173
Kept draperies shut at night and open on sunny winter days	-0.69761
Kept out daytime sun and used low light level in summer	-0.70446
Turned thermostat down to 68^{o} in winter	-0.76108
Turned thermostat up to 78^{o} in summer	-0.73833
Did household cleaning with cold water whenever possible	0.56073
Lowered temperature on hot water heater	0.69033
Don't allow sediments ot build up in bottom of hot water tank	0.42231
Used kitchen, bath and other ventilating fans sparingly	0.43675
Made sure refrigerator door seals were air tight	0.56635
Turned off dishwasher after final rinse and let dishes air dry	0.45133
Used small single purpose appliances like toaster ovens, etc. instead of range	0.41054
Washed clothes in warm or cold water, rinsed in cold	0.60411
Line dried clothes	0.35582

TABLE XVII

STRUCTURAL MODIFICATION BAR GRAPH

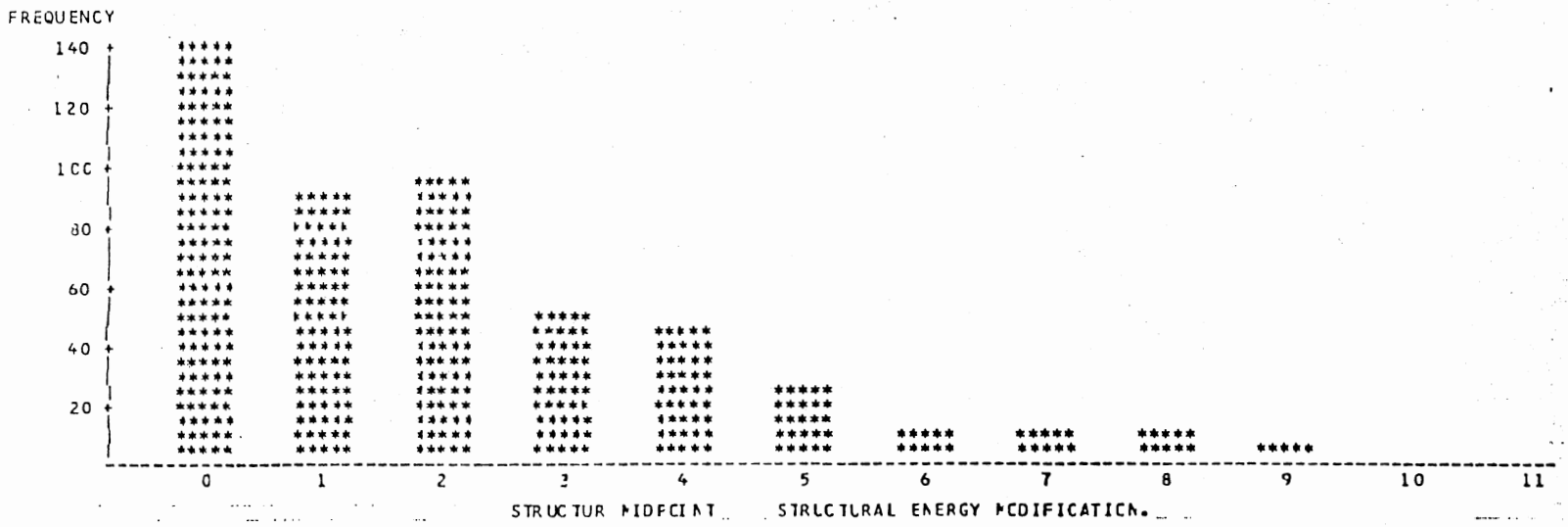
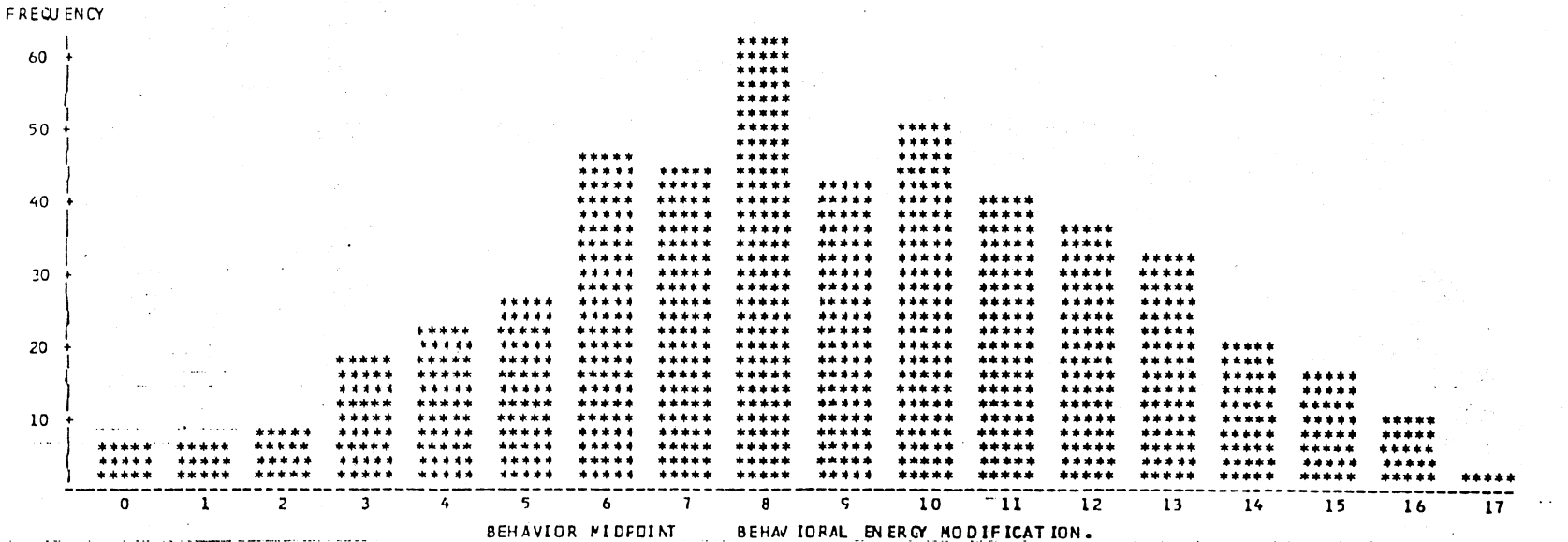


TABLE XVIII

BEHAVIOR MODIFICATION BAR GRAPH



VITA

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