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ON THE CONCEPTUALIZATION AND MEASUREMENT OF ENERGY-RELATED ATTITUDES

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Abstract

This paper is directed toward a concern with the conceptualization and measurement of energy-related attitudes. Four such dimensions were conceptually and operationally defined. This paper reports on the analysis of these measures.

The United States is rapidly entering a transition toward a post-industrial society. There may be no better example of this social change than the growth of controversy over an "energy crisis," both within government and among the general public. One major focus of concern has been the assessment of individual attitudes and beliefs toward energy, its consumption, and the need for less energy-demanding life styles. Although the aggregate demand for energy is heavily influenced by corporate decisions, it is the private decisions of individuals and family households that manifests a collective, energy-demanding life style within society. (11)

The 1974 oil embargo and subsequent public concern and debate over the "energy crisis" quickly generated a research literature on energy-related attitudes. Part of this research focused on the relationships between attitudes toward energy and actual consumption behavior. (6, 7, 11, 16, 17) Donnermeyer, for example, surveyed patterns of attitudes and behavior in parts of Kentucky, while Morrison and his associates reported on similar research among Michigan residents.

The remaining work in this area has largely concentrated on the measurement of attitudes toward energy issues. (1, 2, 3, 4, 7, 8, 9, 10, 12, 14, 15) Bartell, for example, from his survey of Los Angeles County, reported that "... people who had relatively little trust in political practices were less

* Now at the University of Guam.

likely to believe in the severity of the energy crisis and were no more or less likely to change their life style to conserve energy. Concern about whether the energy crisis would affect one's job was the only factor affecting the possibility of changing life style." (2:430) Similarly, other researchers have studied attitudinal coping mechanisms (4), relative preferences for rationing versus higher prices (3), the relationships between attitudes toward conservation and technology (1), the affect of fear appeals on energy consumption (9), and the comparative attitudes of such differing populations as petroleum company executives (12), business press executives (10), and college students. The work of Rappeport and Labaw (14) and Gottlieb (7, 8) were also along these general lines.

Taken as a whole, the results of these initial studies are confusing and inconclusive. Donnermeyer, for example, documented inconsistencies between attitudes and behavior. (5) Others, such as Bartell, found only a few weak relationships among his attitudinal variables. (2) In general, then, previous research in this area has not been successful in establishing firm, strong associations between attitudes or between attitudes and behaviors. Because it seems highly unlikely that energy-related attitudes are essentially random phenomena, we believe that one serious limitation of much previous research in the area may stem from inadequate conceptualization and measurement of energy-related attitudes. Most studies, for

example, have used one or more items for tapping energy attitudes. But they have not been characterized by a concerted focus of attention on the definitions of the dimensions that underlie the energy attitude domain. Moreover, little attention has been given to the problems of reliability and validity of the measurement of attitudes in the energy field.

With the above in mind, the present paper is directed toward a concern with both the conceptualization and measurement of energy-related attitudes. We now turn to these two purposes.

CONCEPTUALIZATION

Discussion of the dimensions of important energy-related attitudes was carried on among members of the Center for Research on Social Behavior at Bowling Green State University over a period of years. These seminars have been interdisciplinary in composition, including biologists, psychologists, historians, sociologists, and members of the Center for Environmental Studies.*

From these discussions, several components of energy-related attitudes were conceptualized, and items were constructed as potential empirical referents for those respective concepts. The variables identified were initially viewed as having a bearing on receptiveness to knowledge about energy problems or on a willingness to voluntarily reduce one's own use of energy for conservation purposes, or on a readiness to support or oppose public policies constraining energy use. In this report, four of these variables will be emphasized in terms of their measurement properties. These include the following:

- (1) Social Responsibility: the extent to which an individual is willing to modify his or her own behavior in order to conserve energy resources for the use of future generations.

* In addition to the authors, the major participants included John Paul Scott, James Q. Graham, Stephen Vessey, John Schuck, Nancy Miller, and William Jackson.

- (2) Materialistic Life Styles: the emphasis upon life plans which require a relatively heavy use of energy resources, such as air conditioning of one's own home or apartment, owning a large and comfortable car, taking vacations which involve a great deal of travel, ownership of a private dwelling, etc.
 - (3) Distrust of Business and Government: the degree to which emphasis upon an energy crisis is believed to have been engendered by sectors of business and government as a means of increasing prices and profit levels.
 - (4) Responsibility of Government: the degree to which government programs and policies are viewed as necessary for solving energy problems.
- Fifty four items designed to measure these four dimensions of energy-related attitudes were constructed. Each item was designed to measure its respective energy-related attitudinal concept.

MEASUREMENT

The present research was based upon a sample of 666 undergraduate students at Bowling Green State University who returned questionnaires during the Spring of 1976 and 1977. This sample represented a 54 per cent response rate from the 1226 students who were randomly sampled from the student body. Comparisons between students who responded in each year with the general undergraduate population revealed no substantial differences in sex composition, grade point average, parental education, or occupational status.

The 54 items with response categories ranging from strongly agree to strongly disagree were administered to the sample. These items, designed to measure the four dimensions of energy-related attitudes, were then factor analyzed using the principal components procedure. (13:468-514) Items with ambiguous definitions and items with low communalities were removed from the analysis. The remaining 28 items were refactored. The results of this analysis are shown in Table 1, where factor loadings of .3 and greater have been underlined. The contents of these items are listed in Table 2 with the items designed negatively to assess their respective dimensions denoted by an asterisk.

TABLE 1. FACTOR ANALYSIS OF ENERGY-RELATED ATTITUDE ITEMS

		Factor			
		1	2	3	4
1	Social Responsibility	<u>-.473</u>	-.049	.016	-.083
2	Social Responsibility	<u>-.389</u>	-.154	-.163	.003
3	Social Responsibility	<u>.574</u>	.045	.064	.037
4	Social Responsibility	<u>.518</u>	.091	.064	.027
5	Social Responsibility	<u>.365</u>	.148	-.007	.007
6	Social Responsibility	<u>-.643</u>	.037	.002	-.041
7	Social Responsibility	<u>.579</u>	.161	-.014	.144
8	Social Responsibility	<u>-.643</u>	-.021	-.010	-.053
9	Social Responsibility	<u>.447</u>	.131	.056	.063
10	Social Responsibility	<u>.712</u>	.097	-.005	.025
11	Social Responsibility	<u>.413</u>	.096	.106	.042
12	Social Responsibility	<u>-.361</u>	-.104	-.223	.056
13	Social Responsibility	<u>.596</u>	.087	.074	.033
1	Life Style	-.115	<u>-.421</u>	-.058	-.035
2	Life Style	.211	<u>.645</u>	.060	.034
3	Life Style	.211	<u>.676</u>	.076	.001
4	Life Style	-.092	<u>-.390</u>	.078	.177
5	Life Style	-.062	<u>-.550</u>	-.018	.065
1	Distrust of Bus./Gov't	.161	.152	<u>.531</u>	.255
2	Distrust of Bus./Gov't	.113	.033	<u>.752</u>	.258
3	Distrust of Bus./Gov't	.075	-.044	<u>.801</u>	.224
1	Responsibility of Gov't	.130	.019	.139	<u>.615</u>
2	Responsibility of Gov't	.176	-.080	.111	<u>.552</u>
3	Responsibility of Gov't	-.078	.011	.101	<u>.380</u>
4	Responsibility of Gov't	-.057	.114	-.050	<u>-.514</u>
5	Responsibility of Gov't	-.006	.030	-.015	<u>-.539</u>
6	Responsibility of Gov't	.110	-.040	.191	<u>.679</u>
7	Responsibility of Gov't	.047	.068	.032	<u>.661</u>

An examination of Table 1 reveals that the sets of items designed to measure their respective energy-related attitudes are distinct from one another and each set clearly defines its own factor. Moreover, a comparison between Tables 1 and 2 shows that within each set of items, negatively phrased items have an algebraic sign opposite of the positively phrased items. This evidence is consistent with the assertion that these energy-related dimensions are separate and distinct from one another. It does not, however, show that they are equally useful or interesting in providing us with an understanding of energy-related attitudes. For that problem, we turn to the relationships between these dimensions and various social variables.

In order to relate the energy-related attitudes to various social variables, scales were constructed. Each scale represented the sum of the items defining its respective factor such that the higher the score, the more the respondent answered positively to the respective attitudinal dimension. For example, the Social Responsibility scale was created by

summing social responsibility items 1, 2, 6, 8, and 12 and subtracting the remaining items from that sum. As a result, respondents with higher scores were deemed to have a more socially responsible attitude concerning energy conservation than those with lower scores. Similarly, the Life Style scale was constructed so that those who planned a life style of high energy consumption had higher scores on the scale than those who planned low energy consumption life styles. The Distrust of Business and Government scale was also constructed so that those who distrusted business and government had higher scores than those who trusted those organizations. Finally, the Responsibility of Government scale was constructed so that those who believed government to be responsible for the solution to energy problems had higher scores than those who did not hold the government responsible.

Cronbach alpha reliability coefficients were computed for each of these scales as follows:

TABLE 2. IDENTIFICATION OF ENERGY-RELATED ATTITUDE ITEMS

Social Responsibility Items

1. We have a moral responsibility to conserve energy resources for the benefit of future generations.
2. We must do everything we can to reduce pollution, even if it means paying higher prices for energy.
- * 3. If a person can afford to keep his house at 72 degrees, he should be allowed to do so.
- * 4. If a person can afford the gasoline to take a long vacation trip, he should go.
- * 5. All possible attempts must be made to develop our energy sources, even if it means damaging the environment.
6. It is the responsibility of each citizen to reduce his or her consumption of energy.
- * 7. Other people are not trying to save energy so neither will I.
8. I am willing to cut back on my personal use of energy regardless of what others are doing.
- * 9. I am willing to conserve energy only if others also conserve energy.
- * 10. There is no obligation to conserve energy as long as one can afford to pay for it.
- * 11. Large companies are the only ones that can conserve enough energy to make it worthwhile.
12. I would be willing to pay higher prices in return for more effective energy conservation.
- * 13. I am willing to conserve energy only if it does not inconvenience me.

Life Style Items

- * 1. There are more important things in life than having financial security.
2. One of the major goals of a young person today should be to make as much money in his lifetime as possible.
3. Every young person should dream of becoming rich.
- * 4. People who strive to get ahead in business often miss the most important things in life.
- * 5. Making money should never be a person's major goal in life.

Distrust of Business and Government Items

1. The government purposely plays up the energy crisis so that people will accept higher energy costs.
2. Electric utility companies contrived "an energy crisis" so they could raise their prices.
3. Utility companies try to scare people into thinking there is an energy crisis in order to increase their own profits.

Responsibility of Government Items

- * 1. Congressmen do not pay very much attention to the people who elect them when they decide what to do in Congress.
- * 2. Elections are not much help in making the government pay attention to what the people want.
- * 3. People in government waste a lot of our tax money.
4. Over the years, the government usually pays a great deal of attention to what people want when it decides what to do.
5. Almost all of the people running the government are smart people who usually know what they are doing.
- * 6. Government is pretty much run by a few big interests looking out for themselves.
- * 7. Many of the people in government do not seem to know what they are doing most of the time.

Scale	α	measurement traditions.*
Social Responsibility	.822	
Materialistic Life Style	.673	* For an example of such reliabilities and more
Distrust of Business and Government	.789	information on this question, see (18); especially,
Responsibility of Government	.764	Chapter 3.

These reliabilities are of a magnitude similar to those of other attitude scales having well-examined

TABLE 3. MULTIPLE CLASSIFICATION OF ENERGY-RELATED ATTITUDES BY SOCIAL VARIABLES

	Social Resp.	Life Style	Distrust of Bus.	Resp. of Gov't
Father's Education				
Grade School	-.25	.10	.35	.43
High School	-.12	.04	.01	-.04
College	.23	-.08	-.11	-.07
Grade Point Average				
Under 3.00	-.11	.13	.03	-.03
3.00 and Over	.12	-.16	-.04	.03
Expected Income 5 Years after Graduation				
Under \$15,000	.07	-.13	-.10	-.08
\$15,000 and Over	-.07	.14	.10	.08
Desired Community of Residence				
Farm	.32	-.19	.07	.11
Small City	.06	-.16	-.07	-.11
Large City	-.20	.22	.02	.05
Desired Family Size				
0 to 2 Children	.13	-.03	-.05	-.03
3 or more Children	-.13	.03	.05	.03
N	573	581	597	578
F	6.16	6.02	1.76	2.84
p	.001	.001	n.s.	.01
Covariates*				
F	8.71	0.85	8.59	4.62
p	.001	n.s.	.001	.01
R	.329	.272	.246	.235
R Squared	.108	.074	.061	.055

* Covariates were Parental Family Income, Mother's Education, and Father's Occupation.

Table 3 presents a multiple classification analysis of the four energy-related attitudinal scales with various social variables. (13:398-433) Father's education, grade point average, expected income five years after graduation, desired size of community of residence, and desired family size were included as variates while parental family income, mother's education, and father's occupation were the covariates. An examination of Table 3 shows that the variates related significantly to the measures of social responsibility, distrust of business and government, and responsibility of government.

The relationships between specific variates and specific scales is also of interest. Let us first examine the Social Responsibility scale. An attitude of social responsibility for energy conservation was provided by those whose fathers went to college, whose grade point average was 3.00 and over, who

expected incomes five years after graduation of less than \$15,000 annually, who wanted to live on a farm, and who wanted less than three children. These variates plus the covariates accounted for 10.8 per cent of the variance in the Social Responsibility scale.

The results for the Life Style scale were, by and large, opposite of those for the Social Responsibility scale. Specifically, those who desired a materialistic life style requiring heavy energy use were those whose fathers had less than a high school education, who had less than a 3.00 grade point average, who expected to earn \$15,000 or more annually five years after graduation, and who wanted to live in large cities.

Results for the Distrust of Business and Government scale were statistically insignificant for the

variates but were significant for the covariates. We note, nevertheless, that the greatest distrust of business and government was evidenced from those whose fathers had less than a high school education. Paradoxically, those who believed that government was responsible for solutions to the energy problems were also predominantly from among those whose fathers had less than a high school education.

DISCUSSION

These findings suggest that energy-related attitudes are deeply embedded in the world views and life styles of our subjects. Responses to "the energy crisis" reflect a basic consistency in overall orientations toward social life. From our multiple classification analysis of energy-related attitudes, at least two separable profiles of interrelated variables emerged among our student subjects.

One of these profiles may be identified as encompassing a low sense of social responsibility, a distrust of business corporations, the view that government is responsible for problem-solving, and a personal emphasis upon materialistic values. This profile is more nearly characteristic of those students who are from less privileged socioeconomic backgrounds, who have lower grade point averages, who prefer to live in a large city, and who expect to be earning high levels of income five years after graduation. These are the students who have taken seriously "the American Dream," and are oriented toward an enhancement of their own personal interests when they come into conflict with the interests of their community.

The second profile may be characterized as reflecting an overall sense of collective morality and a tendency to identify their personal interest with the future interests of their society. This profile emphasizes the need for energy conservation, a sense of confidence in basic social institutions, a willingness to become personally involved in solving social problems, and a low emphasis upon materialistic values. These students are from more privileged socioeconomic backgrounds, are above average in academic performance, and expect to be earning less than \$15,000 per year five years after graduation.

They are also more likely to limit their desired family size to two children or less. Students reflecting this profile of responses are characterized by a greater sense of integration into the mainstream of American life and are less committed to status and mobility values.

The construction of these profiles necessarily raises more questions than are answered. How are these orientations transformed into concrete patterns of behavior? What are the specific learning experiences which promote one set of values as compared to another? How stable are the conceptions of self and society which are held by college students as compared to a random sample of adults in community-wide populations? These are obviously questions for future research, and their answers are likely to provide insights into the numerous ways in which specific attitudes toward energy problems are linked with the meanings which individuals give to the organization of social life in general.

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