

measures. A risk is unacceptable if the benefits from risk reduction measures are greater than the costs [8, 19, 21, 26].

The final measure compares the risk and benefits to society from an activity [4, 7, 10, 12, 22, 23, 29, 30]. This approach was first used by Starr [29] and was based on the assumption that society's risk acceptance reflected a balancing of risks and benefits. Starr concluded that the acceptability of risk was proportional to the benefits from the activity and that society was willing to accept higher levels of risk from voluntary as opposed to involuntary activities.

The information requirements of the four approaches vary to a considerable extent. Risk aversion is the least demanding since neither the benefits from the activity nor the costs of risk reduction are required. Risk balancing also avoids these considerations but requires more information in that the risks from various activities are compared. The other two approaches are more complex [21, 26]. The treatment of intangibles (pain and suffering) and incommensurables (life values) has resulted in recommendations that cost-effective analysis be used in place of cost-benefit analysis [9]. However, cost-effectiveness analysis provides less information to the policymaker since the degree of risk reduction is determined in advance and the magnitude of the ensuing costs and benefits are never compared. The major problem with respect to risk-benefit analysis pertains to the measurement of benefits [21, 22, 23]. At the moment, risk measurement (the probability of severity of harm and its economic consequences) is more highly advanced than benefit measurement (the utility derived from the activity in question).

Another approach to risk evaluation is to examine various considerations that might influence the decisions of policymakers. A list of considerations was developed by Lowrance [21] and is given in Table 1. Many of these considerations are inter-related. Thus, a risk where exposure is an essential, where no alternatives are available, and which is encountered occupationally is more likely to be tolerated by society than risks where exposure is a luxury, where alternatives are available and which are not encountered occupationally. Similarly, a risk which is assumed voluntarily, where the effects are immediate, and where the consequences are reversible is more acceptable than risks at the other end of the scale. The public is also more likely to accept a common hazard, e.g., death from drowning or heart disease than death from a dread hazard, e.g., death from radiation. Two other considerations reflect the obligation of society to protect individuals who are especially sensitive to substances in the environment or who are likely to misuse products (affects average people, will be used as intended). In both instances, concern for the vulnerable elements in society are likely to result in government regulations with high costs and small benefits since the number of beneficiaries is few. The final consideration is whether the risk is known with certainty or not known. Again, the public may be more likely to

TABLE 1. Considerations Influencing Safety Judgments

Risk assumed voluntarily	_____	Risk born involuntarily
Effect immediate	_____	Effect delayed
No alternatives available	_____	Many alternatives available
Risk known with certainty	_____	Risk not known
Exposure is an essential	_____	Exposure is a luxury
Encountered occupationally	_____	Encountered non-occupationally
Common hazard	_____	"Dread" hazard
Affects average people	_____	Affects especially sensitive people
Will be used as intended	_____	Likely to be misused
Consequences reversible	_____	Consequences irreversible

Source: Lowrance [21, p. 87].

tolerate the risk from coalmining or automobiles than the risk from new technologies such as nuclear reactors where the risk is not known with certainty. This response was also noted by Fischhoff [11] in his discussion of the problems facing the risk managers where new technologies such as nuclear reactors were involved.

While Lowrance's array of considerations provide insight into government decision-making, they lack a unified theme. A more comprehensive model was developed by Huber [16] in his analysis of the activities of various regulatory agencies such as FDA, EPA and OSHA. Huber reasoned that risk regulation has two goals - to reduce old risks and to exclude new risks. Old risks were those related to familiar activities such as driving a car or coalmining while new risks were those associated with toxic chemicals, nuclear power and artificial food additives.

Huber commented that the two goals resulted in different legislative commitments and different regulatory procedures. He stated:

Standard setting is reserved for our 'familiar killers' - risks that society has come to tolerate before the decision to regulate is reached. Screening regulates new risks that loom on the horizon - risks that threaten to undermine the perceived safety of the status quo [16, p. 24].

The use of two different procedures - standard setting and screening - means that old risks are

treated more leniently than new risks. According to Huber this double standard reflects the belief of Congress that it is "more costly to regulate old risks than new risks" [16]. For example, it is expensive to clean up our current risk environment. Both producers and consumers are likely to protest the cost of regulation and consumers may object to losing products to which they have become accustomed. In contrast, the exclusion of new technologies and new risky products is less painful since manufacturers and consumers do not have to modify production or consumption patterns. Even more important, consumers are unaware of the lost benefits from the failure to introduce a new technology. Huber [16] noted that the emphasis on screening makes risk regulation a prospective business. Thus, screening occurs before any pattern of harm is defined. Regulation is no longer based on proven harm as in the case of product liability but on unproven safety. In addition, the earlier we regulate the more difficult it is to measure the risks or benefits from the activity in question.

Huber also considered various approaches to risk regulation including risk-benefit analysis and comparative risk assessment. He felt that the information requirements of risk-benefit analysis would place a heavy burden on the introducers of new technologies or new products. In contrast comparative risk assessment is confined to an analysis of risks - both old and new. This approach recognizes that banning or regulating a risky product of substance may increase or decrease societal risk depending on what substitutes are left. At the moment such comparisons are not required. For example, the FDA banned bottles consisting of acrylonitrile because small amounts of the plastic which is carcinogenic could leach into the drink. However, the all-natural glass bottles containing soda under pressure may explode causing injuries. The FDA could not compare the risks from acrylonitrile bottles with those from glass bottles in making its decision.

Other instances have been cited by Whipple [34]. They include the manufacturer's response to a flammability standard which resulted in the use of a chemical additive (TRIS) which was later found to be carcinogenic, and a proposal by the NHTSA to recall intermediate cars for inspection and replacement of defective axle buttons which was later withdrawn when it was found that it entailed higher risks to car drivers due to extra driving for purposes of inspection. Havender [14] analyzed the ban on a grain fumigant - EDB. This product was banned because it was found to induce cancer in laboratory animals. However, two substitutes for EDB - phosphine and methyl bromide - posed more hazards to workers and might not reduce the risks to consumers.

In spite of the appeal of comparative risk assessment Huber noted that several objections might be raised to this procedure. A major one is unmeasurability so that one should regulate according to "maximum conceivable harm." However, if risks cannot be measured it is difficult to see how we can attempt to regulate them. A

second reservation deals with incommensurability which means in this case that we should not compare different kinds of risks. Thus, the risk from cancer is more of a "dread" hazard than the risk from a "common" hazard and should be regulated differently. Huber criticizes this objection and points out that fragmentation of risk based on various considerations can only weaken the major goal of any regulatory activity which is to improve our overall risk environment at the lowest possible cost.

CONCLUSION

The previous discussion indicates that there are no simple answers to achieving a risk-free environment. Reliance on individuals to determine what level of risk is acceptable is efficient due to variations in risk acceptance and willingness to pay for risk reduction. Seat belt usage, careful driving behavior, purchase of smoke detectors and preventive health measures (annual medical check-ups, proper diet and exercise) are examples of voluntary risk reduction measures which are left to the discretion of the individual.

Government intervention is more likely to occur when the risk is imposed by others. Thus, involuntary risk is more likely to stimulate intervention than voluntary risk. However, intervention places the burden of risk reevaluation on the government as opposed to the individual. Major criteria for evaluating risk include cost-benefit analysis, risk-benefit analysis and comparative risk assessment. All three methods provide different kinds of information to policymakers and have different information requirements. Cost-benefit analysis balances the costs and benefits from a risk reduction strategy while risk-benefit analysis balances the risks and benefits from a product or activity. Comparative risk regulation focuses on the consequences of risk regulation, i.e., will a transfer of risk occur "from one technology to the next or from one risk bearer to another" [34, p. 37]. At the moment there is no indication that any of the three methods is being used systematically by regulatory agencies. This may reflect the information requirements of the various approaches and the uncertainty which surrounds the measurements of risk itself [21].

In view of problems surrounding government regulatory activities, it is heartening to note that other government policies may lead to improvements in health and safety. These policies are related to economic growth. The relationship between health and income has been documented in several studies [3, 13, 33]. Whipple [34] estimated that the longevity gain between 1980 and 1983 due to economic growth was a little greater "than that which would occur by the permanent elimination of all motor vehicle accidents" [34, p. 42]. A decline in economic growth can have the reverse effect. Brenner [3] estimated that the 3 percent decline in per capita income from 1973 to 1974 resulted in approximately 60,000 excess mortalities. These findings suggest that risk management should consider both the economic

growth gains from the introduction of new technologies as well as the accompanying hazards. This type of risk-benefit balancing encompasses both the direct and indirect benefits from new technologies.

Finally the fact that a major part of the responsibility for reducing risk is given to the consumer means that consumer education in areas of health and safety is of the utmost importance. Consumers must be informed of the levels of risk to which they are exposed and methods for reducing risk if they are to make decisions that are optimal for them and for society as a whole. Information failures may pose the same threat to individual liberties as regulation since such failures are likely to stimulate government intervention.

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THE VALIDATION OF A CONSUMER CONSERVATION
ETHIC:
IDENTIFICATION AND ANALYSIS OF COMPONENTS

Virginia A. Haldeman,¹ Patricia A. Tripple,² and Jeanne M. Peters,³

University of Nevada--Reno

-----ABSTRACT-----

An energy future based on conservation will require that consumers subscribe to a consumer Energy Conservation Ethic. This study identifies the factors which are the best predictors of a conservation ethic.⁴

INTRODUCTION

Over the past decade researchers and practitioners with interests in resource conservation have expressed concern about increasing demands and diminishing supply of energy resources. They concluded that energy conservation was the most cost effective means of maintaining an adequate supply of energy. Furthermore, conservation would buy time for research and development of energy alternatives (5, 6, 8, 18).

More recently a reported oil glut, lower gasoline prices, and promised rate decreases for natural gas have contributed to consumers' perception that the energy crisis is past (17). Consumer response to this perception has been to abandon energy conservation and to revert to an energy-intensive lifestyle (3, 9, 16).

This research is based on a previous study which provided a definition of a Consumer Energy Conservation Ethic (CECE) and initiated the assessment of the components of the posited construct. Specifically, the objectives of this research were to:

- a. test the validity of the components used to develop the CECE instrument;
- b. identify the components which are the best predictors of a conservation ethic; and to
- c. refine the CECE instrument to include the smallest number of useful items.

¹ Family Economics and Management Specialist and Research Scientist

² Professor and Research Scientist, Home Economics

³ Assistant Professor, Family Economics and Management

⁴ Research completed as part of "Consequences of Energy Conservation Policies for Western Region Households." Financial resources for the project were provided, in part, by USDA Regional Research Project W-159.

REVIEW OF THE LITERATURE

The Consumer Energy Conservation Ethic has been defined as the attitudes and behaviors held and engaged in by individuals and families which ultimately serve to reduce the overall societal consumption of energy (7). Factors repeatedly linked with an energy conservation ethic include attitudes and sets of behavior related to 1) energy policies, 2) investment in energy-saving features, 3) direct efforts to reduce the use of energy, and 4) ecologically responsible practices which may indirectly effect a decrease in total energy consumption (3, 6, 8, 9, 10, 12, 13, 15, 18).

Energy conservation programs have been based on the assumption that the key to establishing a conservation ethic was to convince consumers that conservation is not coincidental with a lower quality of life (3, 5, 8, 13, 18). Energy education programs aimed at enhancing consumer's attitudes toward conservation have been based on the assumption that consumers who believe that conserving energy is a positive action will act on that belief, adapt their attitudes, change their behavior patterns, and engage in conservation oriented practices. The education efforts have been successful in that consumer attitudes toward energy conservation have become more positive. However, consumer behaviors have not exhibited the same degree of change (3, 4, 10, 15).

By 1983, consumers had adjusted to higher energy prices. Many had already made energy conservation investments in some type of retrofit for their homes. Many believed that government had mismanaged the energy situation and had yet to develop a workable energy policy. Consumer perception of the availability of energy was affected by falling prices of gasoline, fuel oil, and natural gas. Reports of an "energy glut" induced a false feeling of security and consumers reverted to a more energy intensive life-style (17). Energy conservation experts maintained that energy consumption habits directly affected the energy problem and reported that two groups had emerged: conservers and users (6, 18).

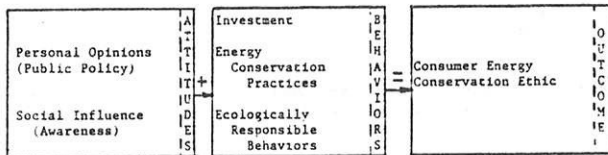
THE THEORETICAL MODEL

Researchers working with Nevada data from the USDA Regional Research Project, W-159, "Consequences of Energy Conservation Policies for Western Region Households" used Ajzen and Fishbein's Theory of Reasoned Action (2) to develop a conceptual model of a Consumer Energy Conservation Ethic.

According to Ajzen and Fishbein (2), personal and social aspects of attitude are combined to predict intentions and ultimately behavior. However, the theorists emphasize that differentiation must be made between predicted behavior and expected outcomes.

Indeed, outcomes are determined by behavior. The posited conceptual model depicted a Consumer Energy Conservation Ethic (CECE) as an expected outcome, determined by the attitudes and behaviors held and engaged in by individuals and families (7) (Figure 1).

Figure 1. Conceptual Model of the Consumer Energy Conservation Ethic



When the model was tested using regression analysis, the researchers identified four components, represented by specific sets of attitudes and behaviors, which contributed significantly to the explained variance in CECE scores. Those four components were:

1. Attitudes toward public policies for energy conservation (Public Policy Component);
2. Investment in energy saving features (Investment Component);
3. Direct efforts to reduce the use of energy (Energy Conservation Component);
4. Engaging in ecologically responsible practices which indirectly affect energy consumption (Evidence Component).

One factor originally included in the conceptual model, "Awareness of societal participation in energy conservation", did not contribute to the explained variance in CECE scores. Although there were some inconsistencies in assignment of scores across the instrument components, there was evidence that the conceptual model was valid and that further research was warranted (7). The purpose of this study was to assess the four remaining components of the conceptual model in order to determine the minimum number of items to be included in a revised instrument and then to predict group membership on the basis of high or low energy conservation attitudes and behaviors.

THE SAMPLE

The data used in this study were taken from the Nevada portion of the second wave of W-159, "Consequences of Energy Conservation Policies for Western Region Households." The sampling design for the initial data collection (1981) had provided for proportional representation of rural and urban households. The stratified random sample of 1481 Nevada households surveyed for the second wave included a longitudinal sample of 731 households that had participated in the original

study. Data were collected in February, 1983 using Dillman's Total Design Method. Of the 1481 questionnaires mailed, 995 were returned and usable, for a response rate of 67 percent.

Sixty-two percent of the respondents were male and 38 percent were female. Fifty percent had a total family income (before taxes) of more than \$25,000. Sixty two percent had some education beyond high school. Children under 18 years of age were present in 28 percent of the households. The majority (58 percent) of households consisted of married couples with no children present (33 percent), or related or unrelated adults living together (25 percent). The average age of the respondents was 48.2 years of age which contributed to the relatively high proportion of respondents indicating that they were retired (22 percent). Eighty percent reported owning the house or condominium in which they lived. The majority of respondents (68 percent) had moved into their present home since 1975, and 35.5 percent reported that their homes had been built since 1975. Although the evidence linking demographic characteristics with energy conservation behavior is inconsistent, the distinctive demographic profile of the sample⁵ should be kept in mind when interpreting the findings of this study.

THE MEASUREMENT INSTRUMENT

When the instrument to assess the CECE was developed, scores for each component were assigned on the basis of a Likert-type scale with a range from -2 to +2, including zero. Since summation of scores was used in the analysis of data, non-responses as well as neutral responses were scored as zeros. Summative scores are not affected in either a positive or negative direction by recorded scores of zero. Furthermore, in this study, it was assumed that a non-response was indicative that the respondent either had no opinion or had not engaged in a

⁵ The sample could be considered to be distinctive because it was predominantly male, middleaged, higher income, well educated, living in their own home in an adult-only household. Although elements of this demographic profile are distinctive, overall it is similar to those same demographic characteristics of the population of Nevada. The differences are that the average age of the sample is older, a slightly greater proportion of the sample is male, and there are slightly fewer couples with children present than in the general population of Nevada. These discrepancies could be due to the topic addressed by the survey. Energy use, energy policy, and energy investment could be of greater interest to males than females and to older, rather than younger members of society. Another reason for the differences could be that the sample was drawn from telephone directories. This could affect the age of the sample since in Nevada younger persons are more likely to be highly mobile and therefore are less likely to be included in telephone directories.

particular behavior. This assumption is supported by the Theory of Reasoned Action in that stated intentions are believed to be necessary precursors to behavior. When a subject failed to respond it was assumed that a zero was an appropriate indicator of a lack of opinion or behavior.

COMPONENT IDENTIFICATION AND SCORING

Responses to 38 items included in the Nevada Questionnaire, "Energy Directions: A 1983 Western Perspective" were identified as being indicative of the four components to be included in assessing a Consumer Energy Conservation Ethic. Items from each of the four components were scored using a Likert-type scale with a range of scores from -2 to +2. The Public Policy component included eight items (Table 1) that reflected respondents' opinions of energy policy. Response categories were:

Strongly oppose	-2
Oppose	-1
Neutral (or no response)	0
Favor	+1
Strongly favor	+2

Table 1. Statements Included in Public Policy Component.

* Give tax credits for improving home energy efficiency (TAXCRED) ^a
* Provide tax credit for adding home solar heating or cooling (TAXSOL)
* Change building codes & mortgage requirements to encourage new Types of energy-saving housing (CODMORT)
* Require land developers to have energy plans as part of their developments (LANDEV)
* Require utilities to provide regular reports to users on whether energy use is higher or lower than in previous years (UTILREP)
* Require utility companies to charge lowest rates to low energy users & high rates to high users (UTRATES)
* Require everyone's home to pass an energy audit (AUDIT)
* Discourage building homes away from towns & cities to lessen travel by car (CLOSTOWN)

^aTerms in parentheses are code names for the final items to be included in this component (factor).

The second component assessed was respondents attitudes and behaviors in terms of investment in energy-saving features that could be added to a home. The investment component included fourteen items (Table 2) that were scored as follows:

Doesn't exist and no plans to add	-2
Don't know	-1
No response	0
Plan to add or existed	+1
Added	+2

A score of +1 was given when an energy-saving feature already existed. It was assumed that the feature may have influenced the selection of the home, indicating an endorsement of the energy-saving feature.

Table 2. Items Included in the Investment Component

* Weather stripping and/or caulking (WEACALK) ^a
* Outside walls insulated (WALLINS)
* Four plus inches of ceiling insulation (CELLINGS)
* Double panes or storms on most windows (DUBWIN)
* Insulated interior window coverings
* Thick floor insulation
* Wood-burning stove (STOVE)
* Storm doors on all entrances (DOORS)
* Evaporative cooler
* Glass doors on fire place
* Outdoor window shades
* Clock set-back thermostats
* Solar hot water heater (SOLWAT)
* Solar heating (SOLHEAT)

^aTerms in parentheses are code names for the final items to be included in this component (factor).

The third component measured respondents' efforts to cut back on their household energy consumption. Six items were included in this component (Table 3). Scores for items in the energy conservation component were:

Don't do and no plans	-2
Don't know	-1
No response	0
Plan to do	+1
Do now	+2

Table 3. Items Included in the Energy Conservation Component.

* Open and close window coverings to take advantage of temperature differences
* Close off some rooms
* Have hot water heater set at 120°F (or less)
* In winter, set thermostat at 65°F or lower
* In summer, set thermostat at 78° or higher
* Change use of rooms to take advantage of sun warmed or shaded areas.

The final component assessed whether or not respondents engaged in selected practices which represented ecologically responsible behavior. For the evidence component, ten practices were listed and respondents were asked to indicate the frequency with which they engaged in each practice. Assigned scores were:

Never do it and don't plan to	-2
Plan to do within next 2 years	-1
No response	0
Sometimes do it	+1
Always do it	+2

Ecologically responsible behaviors were further divided into three groups on the basis of the connection of behaviors to direct conservation of resources:

1. Those practices identified in the literature as being evidence of ecologically responsible behavior (Direct Evidence)
2. Those practices intuitively identified as being indirectly indicative of ecologically responsible behavior (Indirect Evidence); and

3. A practice that is believed to be supportive of ecologically responsible behavior (Supportive Evidence). (Table 4)

Table 4. Ecologically Responsible Practices Included in Evidence Components.

DIRECT EVIDENCE	
*	Recycle cans (CYLCANS) ^a
*	Dry laundry on clothesline (DRYOUT)
*	Walk or ride bicycle on errands (RIDBIC)
*	Install plastic over windows in winter (PLASWIN)
*	Participate in a car pool or ride bus (CARPOOL)
INDIRECT EVIDENCE	
*	Keep records of home energy use
*	Make furniture or clothing for self/family (FURCLO)
*	Buy or trade used clothing (TRCLOTH)
*	Work at home as part of salaried job
SUPPORTIVE EVIDENCE	
*	Contribute to ecologically-oriented organizations

^aTerms in parentheses are code names for the final items to be included in this component (factor).

RESEARCH DESIGN

The purpose of the study was to test the validity of the components used to devise the CECE instrument, to identify the components which are the best predictors of a conservation ethic, and to refine the CECE instrument to include the smallest number of useful items. Factor analysis was used to assess the construct validity of the components and determine the minimum number of items in each component. Regressed factor scores for each of the components were then used as predictor variables in a stepwise discriminant analysis to predict group membership on the basis of high or low CECE scores. These groups were formed by summing all 38 items for each respondent. Respondents with summed scores one standard deviation below the mean were assigned to group one, "energy users", and respondents with summed scores one standard deviation above the mean were assigned to group two, "energy conservers". Order of entry of each predictor variable (component) into the discriminant function was indicative of the relative importance of that component to the overall prediction of a consumer energy conservation ethic.

STATISTICAL ANALYSIS

Factor extraction with varimax rotation was performed on all 38 items using the scores of the 995 respondents. The cases used in the analysis were evaluated for outliers, absence of multicollinearity, and factorability of the correlation matrices. No violation of the assumptions was found. Four well-defined factors were identified as distinguished by the Scree test. The factors were internally consistent and well defined by the variables.

Loadings of variables on factors, communalities, and percents of variance are presented in Table 5. Variables have been ordered and grouped by the size of the loadings for ease of interpretation. The cutoff point for including items in a factor was a loading of .30. Loading values under .30 have been omitted in Table 5.

Table 5. Factor Loadings, Communalities (h^2), and Percents of Variance for Twenty-Three Items on Four Factors.

Item	Factor 1	Factor 2	Factor 3	Factor 4	h^2
AUDIT	.4759				.3424
TAXCRED	.6559				.7549
TAXSOL	.6447				.6892
UTRATES	.5269				.3331
CLOSTOWN	.4234				.4293
CODMORT	.7193				.5266
UTILREP	.5325				.3034
LANDEV	.7038				.5396
OUBWIN		.6129			.4303
WEACAKL		.6338			.4639
CEILLINGS		.5660			.3712
WALLINS		.3418			.6572
DOORS		.5414			.3462
STOVE		.40245			.3390
CYLCANS			.3563		.1901
TRCLOTH			.4961		.2795
RIDBIC			.3261		.1930
FURCLO			.4945		.2954
CARPOOL			.3567		.2042
PLASWIN			.4548		.2694
DRYOUT			.3847		.2102
SOLWAT				.8033	.7038
SOLHEAT				.82088	.7176
Label	POLICY	INVEST	EVIDENCE	SOLAR	
Percent variance	25.2	22.0	13.1	10.4	
Eigenvalue	3.376	2.948	1.775	1.397	

Factor 1 includes the eight items in the public policy component which confirms both the validity of this element and the importance of including all eight items in measuring the construct. Factor 1 accounted for 25.2 percent of the variance in the 38 items, with an eigenvalue of 3.376.

Items included in factor 2 were from the investment component. Only six of the fourteen investment variables had loadings above .30. Of the remaining eight variables in the investment component, six did not contribute to the solution, and two emerged as a separate factor: the items pertaining to investment in solar energy devices. The validity of the investment component was supported, with the number of items necessary to measure this element reduced from fourteen to six variables. Factor 2 accounted for 22.0 percent of the item variance, with an eigenvalue of 2.948.

Factor 3 consisted of items from the evidence component. Seven of the ten evidence variables were included in the factor. The component was supported and included the Direct Evidence and Indirect Evidence variables, but not the Supportive Evidence variable. Factor 3 accounted for 13.1 percent of the total item variance, with an eigenvalue of 1.755.

The fourth factor included two variables related to investment in solar heat and solar hot water heaters. This factor was examined carefully because it included only two variables, and because it was the final true factor identified by the Scree test. Three criteria influenced the decision to accept the factor: the results of the Scree test, the magnitude of the eigenvalue (1.397), and the high correlation of the variables with each other (.71) and low correlation of the variables with the other 36 variables (<.25). This factor accounted for 10.4 percent of the item variance, and the four factors, in combination, accounted for 70.8 percent of the total variance in the 38 items.

The second step in the analysis was to sum the scores on the 38 items for all 995 cases in the study and identify the scores which were one standard deviation above and below the mean. The summed scores ranged from -68 to +45; the mean score was -16.71; and the standard deviation was 15.11. Respondents with summed scores less than -31 were assigned to group one (energy users) and those with summed scores greater than -2 were assigned to group 2 (energy conservers). This analysis produced two groups for the discriminant analysis: group one (N=152) had the lowest total CECE scores, and group two (N=149) had the highest CECE scores. Regressed factor scores generated for each case during the factor analysis were then used to predict group membership in the stepwise discriminant analysis.

The discriminant analysis was used to determine which CECE component (factor) was the best predictor for respondents with the highest and lowest total energy scores. The order of entry of the other factors then revealed how much each factor contributed, additionally, to the total variance accounted for by the discriminant function. The cases used in the stepwise discriminant analysis were evaluated for assumptions of linearity, normality, multicollinearity, singularity, and homogeneity of variance-covariance matrices. No violation of the assumptions was found.

Mahalanobis distance was used to direct the stepping procedure. One discriminant function was calculated with a combined $X^2(4)=512.71$, $p=.0000$. Correlations between predictor variables and discriminant function are presented in Table 6. The primary variable distinguishing between respondents with low and high CECE scores was factor three, the evidence component. The mean score for this factor was -.695 for respondents in group one (users) and .820 for respondents in group two (conservers).

The second variable to enter was factor two, the investment component. Factor four, the solar energy component entered next, and factor three, the public policy component entered last. Means for these three factors are shown in Table 6.

Table 6. Four Components of CECE as Predictor of Respondents with Highest and Lowest Scores: Results of Discriminant Analysis

Predictor Variable (PV)	Correlation Coefficient (PV with Disc Function)	Univar F (1,299)	Factor Mean Scores	
			Users	Conservers
Evidence	.50	342.012	-0.695	0.820
Investment	.49	292.409	-0.782	0.676
Solar	.21	54.501	-0.288	0.466
Public Policy	.14	34.91	-0.258	0.294

Canonical R=.91
Eigenvalue=4.620
Also referred to as Components or Factors

A classification function was also calculated for each group. The two classification functions were then used to predict group membership for each respondent. A classification matrix for actual and predicted group membership is presented in Table 7. Accuracy in prediction was 100 percent for both groups.

Table 7. Actual and Predicted Group Membership for Respondents with Highest and Lowest Energy Scores

Actual Group Membership	Number of Cases	Predicted Group Membership	
		Group 1 (Users)	Group 2 (Conservers)
Group 1 (Users)	152	152 (100%)	0
Group 2 (Conservers)	149	0	149 (100%)

CONCLUSIONS

Three of the four components of the initial Consumer Energy Conservation Ethic construct were validated by the analyses. The public policy, investment, and evidence components were supported but the energy conservation component (a fifth factor identified by factor analysis) did not contribute to the solution. The finding that the solar investment items formed a fourth component (or factor) orthogonal to, rather than a part of the investment component was unexpected. A third deviation from the original conceptualization of the construct was the finding that the direct, indirect, and supportive evidence items were actually one factor which included direct and indirect evidence items, but not the supportive evidence item.

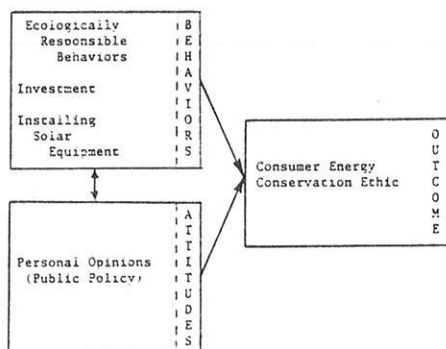
Using factor analysis, the number of items in the CECE instrument was reduced from 38 items to 23 items, with 100 percent of the predictive power of the instrument retained. The results of the discriminant analysis indicate that evidence items are the best predictors of a conservation ethic, with investment, solar investment, and public policy items adding to prediction in the order given.

The validated components (or factors) that contribute to a Consumer Energy Conservation Ethic are:

- * Engaging in ecologically responsible behavior (Evidence Component);
- * Investing in energy saving devices (other than solar) (Investment Component);
- * Investing in solar devices (Solar Component): and
- * Having a favorable attitude toward public policies for energy conservation (Public Policy Component).

The results of the validation study lead to the conclusion that the conceptual model of the Consumer Energy conservation Ethic should be revised to reflect the validated components which contribute to a CECE. The adapted model is presented in Figure 2.

Figure 2. Adapted Conceptual Model of the Consumer Energy Conservation Ethic



RECOMMENDATIONS

The results of this study contribute to the confirmation of the validity of the CECE construct. In future research the refined instrument can be used for hypothesis testing with CECE scores as the dependent variable. Earlier studies have shown inconsistent results when demographics have been used to predict the practice of conservation behaviors (3). CECE scores (which combine assessment of behaviors, investments, and attitudes), should provide more reliable estimates of relationships with demographic variables.

Professionals with responsibility for developing energy conservation educational programs can use the results of these analyses in making decisions about program content. Furthermore, the revised instrument can be used as a pretest to assess whether or not program participants subscribe to a Consumer Energy Conservation Ethic. A delayed, post program assessment would provide information regarding changes in attitudes, behaviors, and investments as well as an assessment of program effectiveness.

There is no "quick-fix" to the energy problem. Fostering and promoting a Consumer Energy Conservation Ethic will help buy the time needed to invent and introduce additional sources of energy into our distribution network. Continued practice of a Conservation Ethic will provide a means of achieving the goal of improving the economic well-being of individuals and families without sacrificing quality of life.

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CONSUMER ACCEPTANCE OF
INNOVATIONS: CONTROL OF ACCEPTANCE VS.
DEGREE OF BEHAVIORAL CHANGE

Frederick W. Langrehr, Brigham Young University¹
Virginia B. Langrehr, Brigham Young University²

ABSTRACT

Consumer acceptance of innovations are dependent upon numerous factors. Researchers have focused on both the characteristics of innovations and consumers in attempting to explain adoptions. This paper specifically looks at the relationship of the degree of control consumers have in accepting an innovation and the amount of behavior change they must make to use the new product/service. The supposition is that consumers will be more negative toward adoptions they are forced to use even if there is little required behavior change. The thrust of the paper is more the negative or positive opinion of an innovation and not only the rate of adoption of the innovation.

Why do consumers readily accept some innovations but reject others? This question has stimulated a great deal of research over the past 30 years. Two good reviews of these past efforts are contained in Gatignon and Robertson [1] and Rogers [8]. But looking anew at this question is still important given the changes at the retail checkout and consumer reaction to this change.

During the last decade, supermarkets have replaced registers where clerks manually enter prices with scanners where a bar code is "read" and the price is looked up in the store computer. From the standpoint of the retailer, this has eliminated the need to place prices on each package. Consumers, however, have expressed very negative opinions toward item price removal [3, 4, 6]. On the other hand, they have been accepting of the basic technology, scanner checkouts, and of technology in general [5]. This negative reaction to item price removal (IPR) has lead some states and cities to require item pricing. Opposition to IPR is not limited to the United States [11].

Why have consumers not accepted IPR? A simple and partially accurate answer is that it is not in the best interest of the consumer. Harrell and his colleagues [2] and Ziethaml [12] found that consumers had lower price awareness and recall in an IPR environment. But there is more to the issue than simply self interest.

This paper is based on the supposition that consumer acceptance of innovations is partially related to the amount of individual control an individual has in accepting or rejecting the change and in the amount of behavior change necessary to use the innovation. As a point of reference, innovations in other fields will be used as

comparisons to item price removal. Some of the new products and services which will be included are home computers, at-home shopping, debit cards, and new types of financial accounts like NOWs and IRAs.

Innovations: Control

Innovations can be classed according to the amount of control an individual has in their use and adoption. Rogers [8] suggested three levels of control: optional, collective, and authority. With optional decisions, individuals can accept or reject an innovation independent of other people. Collective decisions to adopt are based on a consensus of group members. The individual in the final analysis will have to adopt if required by law. But in some societies the individual may be able to influence the decision of the group. Finally, with authority based decisions, the individual has no control and must follow the dictates of a leader.

Retail checkout innovations from a customer perspective were all authority decisions. To the extent that a person wanted to shop at a specific store they would have to accept the scanner checkouts and, if implemented along with scanners, IPR. Of course, the consumer could switch stores, but what if the price marking stores were not accessible (especially true for low income or elderly shoppers)? Also, what if all the chains in a market removed item prices?

Home computer based changes, mail order buying, new savings accounts, and money market mutual funds, on the other hand, are all examples of optional or individually controlled adoption decisions. These are graphed on the horizontal axis in the Figure on the next page.

Innovations: Behavior Change

Robertson [7] classed innovations according to the degree of behavior change necessary to use or adopt the change. Innovations could be continuous, requiring little behavior change, dynamically continuous, requiring moderate changes, and discontinuous, requiring totally new behavior. Many of the retail changes were continuous. This is especially true for point of sale systems, store security systems, scanners without IPR, and new types of savings accounts. Others tended to be dynamically continuous (money market mutual funds, most mail order retailing and scanners with IPR), and discontinuous (debit cards and automated teller machines [ATM] and computer based home banking and buying). These are graphed on the vertical axis of the Figure.

¹Visiting Associate Professor

²Visiting Associate Professor

The degree of behavior change may also be influenced by the attributes of the innovations. Rogers suggested innovations have the following five attributes: 1) relative advantage, 2) compatibility, 3) complexity, 4) trailability, and 5) observability [8].

In the context of this paper if an innovation provides an advantage to the adopter they will more likely adopt the innovation. From this perspective consumers might accept scanner checkouts since they would receive a receipt containing more information. However, they would reject IPR because there was no advantage to the consumer. In fact, because they had to change behavior with no resulting reward, there were disadvantages.

The more compatible an innovation is to existing values, attitudes, and behavior, the more readily it will be accepted. Item price removal required new price checking behavior of the shopper. For example, store price comparisons between frozen and canned vegetables were hindered unless the shopper memorized the price of the item when she/he was in the frozen/canned food section. The price was no longer on the item in the shopping cart. Also longitudinal price comparisons between in stock and newly purchased items were only possible if the shopper saved his/her prior receipts. Of course the consumer could mark their own prices on items, but this also required new behavior on the part of the consumer. Again, IPR would have a higher likelihood of being rejected by store shoppers who consistently performed cross-sectional and longitudinal price comparisons since new behaviors were required to accomplish these tasks.

Did IPR make the consumer's life more complex? If they performed the price comparisons and self-price marking mentioned in the previous paragraph, the answer is yes. Then these shoppers would be opposed to IPR.

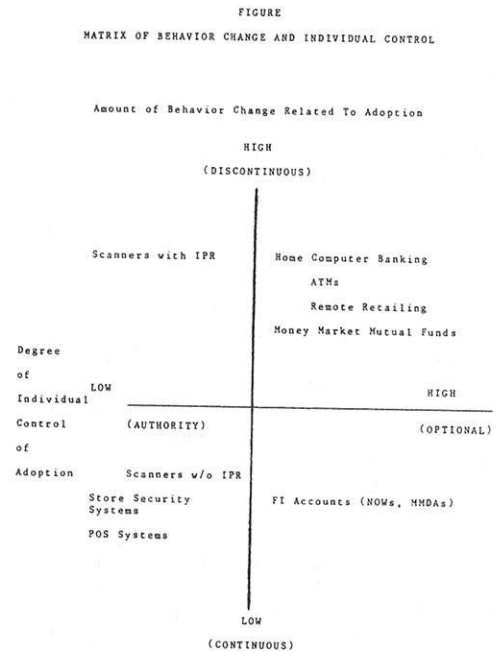
On the positive side, IPR's trialability was high. A consumer could shop in a price removed environment once or twice and if he/she disliked it, could return to a price-on store. That is, if not all the stores in a market removed their prices.

Were the results of the innovation observable? Yes. The only problem was that the negative results were observable since there were few, if any, positive results that could be observed.

The preceding discussion leads to the conclusion that not only did IPR require new behaviors, but there were few, if any, positive advantages to changing prior behaviors. Again the changes in behavior for most shoppers might be relatively minor, and in fact if they were not price-oriented shoppers there may have been no change. However, for all shoppers there appears to be no relative advantage to IPR. Thus even if shoppers made small changes in behavior they could have very negative reactions to IPR since they saw no net gain from the innovation.

Innovations: Control and Behavior Change Combined

The Figure resulting from the graphing of these two dimensions has four quadrants. The southeast quadrant contains those innovations that require the least behavior change and where the consumer has the most control over adoptions. Savings and checking accounts that are slight modifications of previous offerings fit here. Both NOW accounts (interest paying checking and money market deposit accounts [MMDAs]) were very similar in use to current checking and passbook accounts. Writing checks on and depositing money to these new accounts was virtually the same as with the previous services. Consumers were also free to choose not to use these accounts. In fact, many financial institutions probably preferred for their customers to keep their deposits in non-interest paying checking and low yield passbooks.



The southwest quadrant contains those innovations where consumers have little control over adoption and use but the changes have little impact on their behavior. The changes at the retail checkstand best fit here. In stores where checkers both scanned and bagged groceries in one operation, consumers might change how they placed items on the belt or in their cart (heavy, bulky items first; light, breakable ones later). But, in most situations there needed to be little change in behavior when scanners were installed. Store security systems, especially hanging tags on garments, may have been inconvenient, but for consumers who did not shoplift, little behavioral change was necessary. Finally, price reading wands in department stores were put in

place by management and not the consumer, but again, little change in shopper behavior was necessary.

The northeast quadrant contains those changes that the consumer has control over adopting but require major changes in behavior. Home computer retailing, debit cards, and ATMs are sited here. Taking debit cards and ATMs as an example, consumers did have to change their behavior. They now had to use plastic to access their account. They used machines and not humans to interact with the financial institution. They may have had to go to a different location, but they could have 24-hour, seven-day-a-week access to their account. Consumers did have the option of not using the system, although some banks were encouraging depositors to use machines by charging to use tellers and providing ATM services at no charge.

The northwest quadrant contains those innovations/changes consumers are least likely to accept. Here they must change their behavior and have little control over the decision to adopt the change. Item price removal (IPR) in supermarkets may best illustrate this type of change. IPR requires behavioral changes. Consumers must now obtain and use price information from different sources. For example, without individual consumer price marking, price checking of the store shelf listed price and computer stored prices at checkout is impossible without an accurate memory or self-price marking. Consumers also have little or no control over whether an individual store or chain marks item prices. They do have a choice to shop at a different chain but what if all chains remove prices? (This is the case in certain markets in the United States.)

Thus, even though ATMs or home computers might require greater behavioral changes than IPR environments, consumers who use the first two innovations are more willing to accept them simply because they have a choice to use or reject them. This may explain why there has been more organized resistance to IPR than to debit cards.

IMPLICATIONS

Given the preceding discussion, what are the implications for consumer groups? Consumer groups' most important contributions as consumer representatives may be in the northwest quadrant. The area where consumers have the least control over the decision to use or not use an innovation that requires major changes in their behavior. Here consumers are placed in a position of having no choice in making behavioral changes. In this situation they may require more active representation than in those cases where they have freedom to choose or reject innovations or where innovations have little impact on their behavior.

This is not to imply that consumer groups have no role with innovations in the other quadrants. Consumers who do freely adopt the changes in the northeast quadrant still may need a voice in the

development of regulation. Such was the case in developing procedures for using (and losing) debit cards and controlled access to ATMs.

Even in the southeast quadrant where change is personally controlled and little change in behavior is required, there may be some unexpected consequences of the minor changes. For example, the deregulation of checking and savings accounts lead to higher rates of interest on deposits. However, at least partially due to this reason, this lead financial institutions to charge more for services and in many cases to discourage low balance customers. Unfortunately, even if the financial institutions did not need these customers, consumers needed to use the financial institution services. Again consumer groups are providing a voice for these people. In reality the situation for low income consumers was one of where they were forced to change their financial transaction behavior, so for them banking deregulation was really in the northwest quadrant.

In conclusion, consumers will be most resistant to those changes that are imposed on them and require major changes in their behavior. Consumer group representation is most needed in this situation. Consumers need a voice to either require that the changes be at the discretion of the user and not the provider or to temper the amount or type of behavioral change required.

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CONTRIBUTION TO DISCUSSION OF PAPERS
ON CONSUMER BEHAVIOR

John Thirlwell, Consumers' Association, London

ABSTRACT

The three papers on nominally different themes are in fact complementary, the first and third providing important reviews, the second offering a new inquiry.

Before making detailed comments, there are basic ideas to consider.

Energy, the price and supply of which has been at the center of two, or even three recent financial crises, is far wider than oil or gas. The papers show that coal and nuclear energy are also essential, but we have not formulated consumer attitudes to all of this. However, simple claims for Consumer Information, Good Quality, and Value for Money may offer a very inadequate guide.

Do consumers believe that access to all energy supplies--coal, oil, natural gas, solar, and nuclear--can be regulated by the marketplace, by a simple money criteria or are there other questions? The need to conserve for future generations? The need to make "better" use of petro-chemicals rather than just burning them? The need to consider risk during production and use?

Considering energy alone, there are considerations of ecological damage, of physical risk of extractions for coal and oil, of consumer and public risk with nuclear energy. So a defined attitude as well as a reasoned response is needed to comprehend these issues as consumer behavior.

Dardis shows that the public and individuals are less tolerant of imposed risks, and Langrehr of imposed conditions of working and living. There is a real demand for "freedom."

Where there are real dangers, as with nuclear power, coal mining, or food additives, it is inevitable that Government intervention occurs, or is demanded by citizens, their public representatives or by State and Federal Agencies. This is partly real resentment, a resistance to pressure, but in part too, a media action which may exaggerate the dangers of the developing technologies.

Less sensationally, in the case of Item Price Removal, the change may come by subterfuge, in the guise of advantage at the check-out. In either case, if the development happens without experiment or consultation or the provision of full information--through either subterfuge or authoritarian edict--it is probable that resistance will occur. The threatened tribe will always close ranks against a perceived threat. Consumers are no different.

Taking the papers: considering Dardis, speaking as a European, I must state that in some areas, the results have differed from those obtained in American experience.

In the United Kingdom and in Scandinavia, smoking is much less acceptable socially than in the US. In the London Underground, the subway, it is forbidden, and it appears that enforcement is quite simple. This has now been effective for nearly two years. There is little disagreement. It has been imposed, as a twelve month experiment and accepted and continued it seems by consent.

The question of alcohol is more difficult. There is a wide concern that drunken driving is dangerous and morally wrong. Control is almost a disaster. UK campaigning has had little positive effect. Sometimes negative. The Scandinavians are ferocious and restrictive. So too are the Czechs. It appears however that drinking alcohol remains a socially acceptable practice, and even the efforts of Mr. Gorbachev are of little avail.

So social acceptability may be an issue.

Information is however also a matter. Heating systems are needed in housing for old persons. However, it is common experience that the same old persons fail to use the heating, or underuse it, for fear of over-spending. And so we have hypothermia.

The fire-proofing of fabrics for furniture similarly is both difficult to establish, enforce, or control. Only successive fires, themselves quite lethal in old persons' homes due to cigarette combustion, resulted in any serious action.

The FDA action on additives is a similar story, cost, side-effects are considered but public outcry is effective, even if misinformed.

It may be that with technological advance the potential (or actual) benefits are never considered, but only the detriment is costed.

I live in a city where the main drainage system is 100 years old. It must soon be replaced. The benefits of that century are clear. Could the system have been afforded at all if it had been costed? It was accepted for the "public good." But it is now necessary to subject the "public good" to a cost benefit analysis.

So I conclude that Dardis is developing important themes, to which the answers are difficult.

However, the effect of public action, main drainage, economic growth, and so forth may have

consequences so much greater than those arising from specific control. For example, on drunken driving and the use of additives, the scope of Government action should always be considered relevant to the consumer.

Halderman and collaborators have made a specific technical study. I have no quarrel with the techniques employed. The sample seemed non-typical, but it may well be correct in the West, so I do not wish to comment technically.

My comments are firstly that the result is as expected, and reflect the first paper.

More work should be done. An energy ethic needs to comprehend both total consumption and source.

Whilst household consumption may be controlled, consumers have been much more inclined to "splurge" energy on motor vehicles. Now that the crisis is past, there is less enthusiasm for the compact car; UK studies show motorists to be uninterested in economic driving to reduce gas consumption; public transportation systems, which are much more economic of energy consumption, receive limited support. Is this worth study?

No doubt a wide range of new or alternative fuels may be used and a study of their acceptability is also very important.

Langrehr, in handling innovation, handles problems with which we are all familiar.

Item Price Removal (IPR) is an international issue. So too are new electronic devices and supermarkets. There is a clear conflict. Lack of Price Marking reduces comprehension, but scanners provide more information and some protection against fraud by check-out staff. But it is impersonal and this is the source of resentment. However, whilst the concept of the matrix in the figures is good, it is much more difficult to place procedures within it.

The spread of financial scandal immediately increases consumer distrust of financial institutions and de-regulation may increase the number and kind of financial instruments offered. I come from the most sophisticated financial marketplace and would counter acceptance of any new financial instrument without consumer information and education. At home, "Money Which?" is a successful operation because it offers impartial information.

Conclusions

1. None of these papers reduces the need for improved consumer information.
2. Representation is always needed, even where seemingly easy innovations are proposed.
3. We need to study consumer needs far more.
4. There is a basis for studies of consumer ethics.

RETIREES AS VOLUNTEER CONSUMER EDUCATORS

Mary Ellen Edmondson, University of Kentucky¹

Raymond E. Forgue, University of Kentucky²

ABSTRACT

Volunteer retirees were selected to provide in-service consumer economics education to the staff members of agencies serving the elderly. Six consumer economics topics were selected as the foci of twenty-six hours of training for the volunteers. A statistically significant increase in mean scores was achieved for the pre- and post-tests used to evaluate the training of the volunteers. Twenty-five in-service programs were conducted by the volunteers. The average scores on the evaluation items completed by the sponsoring agencies consistently exceeded four on a five-point scale. Those wishing to develop similar programs are advised to put special emphasis on developing volunteers' presentation skills as well as consumer economics content information.

INTRODUCTION

The quality and quantity of consumer education has long been a concern of consumer educators. Much of this concern has focused on consumer education within the schools and in other formalized settings. Yet, consumer education efforts in such settings reach only a small segment of the population. Among those who are not reached by formalized consumer education are the elderly. The elderly are particularly in need of consumer education because of: (a) the lack of consumer education in the schools prior to 1930, (b) the recent, rapid changes in the marketplace due to deregulation, and (c) the susceptibility of the elderly to fraudulent schemes and scams.

The elderly represent a large and growing proportion of the population. In 1982, 11 percent of the American public was age 65 and over and this percentage is predicted to grow to 19 percent by 2025, primarily due to birthrate increases after World Wars I and II and to increased longevity [1, p. 20]. This predicted increase in the percentage of elderly will be particularly high among the most aged. These individuals will be most likely to have low

incomes, [2, p. 9] and therefore, be especially at risk.

Consumer education/information efforts have both benefits and costs. Among the benefits is the more efficient use of limited resources. Consumer education/information also serves as a form of consumer protection as the recipients are better able to function in the marketplace [3, p. 88]. However, these benefits are achieved at considerable cost. There are costs to the recipients in terms of their time and money. Also, there are the costs to the providers of the education/information.

In the absence of an on-going, established delivery system such as the schools, these costs could be even higher due to the start-up costs of establishing such a delivery system. Yet, three resources can be used to defray the costs of providing consumer education/information to the elderly. The first two resources are the assets of time and the pool of skills that retirees have developed over a lifetime of productive work. The third resource is the infrastructure of helping agencies serving the elderly. Examples are such programs as meal on wheels, local senior citizen organizations, senior citizen housing and nursing care facilities, and social service agencies.

THE GERONTOLOGY EXTENSION PROJECT

In an effort to tap these resources the Gerontology Extension Project (GEP) was established at the University of Kentucky. The project consisted of two phases. The first phase involved training forty-three retired volunteers in one of five specialty areas (home health care/ nursing, consumer economics, drugs and medication practices, coping skills and adaptation, and nutrition and food preparation). GEP staff solicited volunteers from among the University's Emeritus Corps (retired professors and administrators), from similar programs at other Kentucky universities, and from the University's Donovan Senior Citizen Fellowship program. These combined sources provided a potential volunteer pool numbering several hundred. The University's Council on Aging provided access to other groups of potential volunteers as well. Applicants were solicited from the pool of volunteers and 36 plus 10 alternates were ultimately selected for training. The training consisted of six, 4-hour sessions in a specialty area. Volunteers also participated in a two-hour session focusing on presentation skills.

¹ Assistant Professor

² Assistant Professor

Special acknowledgements to Principal Investigator, Jon Hendricks and Project Co-investigator, Linda Brasfield of the Gerontology Extension Project. The project was funded through the Center for Developmental Change, University of Kentucky by the Administration on Aging, Department of Health and Human Services.

In the consumer economics specialty area nine volunteers received training from the authors in the following areas: (1) frauds and consumer assistance, (2) money management, (3) insurance, (4) investing during retirement, (5) housing for the elderly, and (6) social programs and agencies. In addition, each volunteer prepared lesson plans for two of these topics. These were duplicated and distributed to the other volunteers so that each would have a repertoire from which to choose when called upon to do in-service training. Evaluation of the volunteers' knowledge in the specialty areas was based on identical pre- and post-tests. The test focused on basic knowledge related to the six topics of the consumer economics specialty area.

The second phase began after completion of the training. During this phase, the volunteers served as a pool of resource people to provide in-service training throughout the state to staff members of social service agencies helping the elderly. The information and awareness could then be passed on to the clients of the agencies as they received the services of the agency. Evaluation of the volunteers' performance during the in-service activities was based on feedback from staff members of the social service agencies receiving the training. Personnel representing each agency were asked to evaluate the in-service training in the following areas: (1) the presenter's command of the subject matter, (2) the effectiveness of the presentation, and (3) the appropriateness of the presentation for the specific needs of the organization.

RESULTS

A t-test was performed to compare the volunteers' mean pre-test and post-test scores. The mean score on the pre-test was 59.9 percent with a standard deviation of 8.4 percentage points. The mean score on the post-test was 72.5 percent with a standard deviation of 5.8 percentage points. The t-test of differences of means yielded a t-value of 3.83 indicating a statistically significant improvement in scores at the .005 level of probability.

As of the completion of the project on November 1, 1985, the consumer economics trainees had conducted twenty-five in-service training sessions for the staffs of agencies in Kentucky providing services to the elderly. Organizations sponsoring the in-service training included visiting nurses associations, county cooperative extension offices, senior citizen church groups, retired teachers associations, county senior citizen centers, and foster grandparents programs. Mean scores for these items (See Table 1) were consistently above four on the three five-point scales. An additional item related to interest in hearing presentations from other volunteers produced a 3.75 mean score on a four-point scale. The results of the agency evaluations indicated that the volunteers were effective.

TABLE 1. Summary of Evaluations of In-Service Presentations

Evaluation Item	Mean Score	Points Possible
The volunteer presenter's command of the subject matter.	4.33	5
The effectiveness with which the volunteer/presenter presented the material and engaged the attention of the audience.	4.25	5
The appropriateness of the presentation for the specific needs of the organization or group.	4.50	5
Interest in hearing presentations from other volunteer/presenters in the Gerontology Extension Program.	3.75	4

DISCUSSION

There are two basic components to an understanding of the success of the Gerontology Extension Project in improving the consumer economics functioning of the elderly. The first component is the success in training the volunteers in the subject matter of consumer economics. The second component is the volunteers' success in imparting that knowledge to service providers via the in-service training sessions.

There are two primary indicators of the success of the training of the volunteers. The most obvious indicator was the significant increase in the post-test scores. On average, scores increased over 12 percentage points. In addition, the decrease in the standard deviations of the pre- and post-tests from 8.4 percentage points to 5.8 percentage points can also be viewed as a success. Such a decrease indicates that the range of scores diminished due to a more marked improvement on the part of those volunteers who scored relatively lower on the pre-test. Such a result can be attributed to the wide range of knowledge among the elderly concerning consumer economics concepts. Those who came into the project with relatively less knowledge benefited more from the training.

Although there was a significant increase in knowledge from pre- to post-test, neither group

mean was high. It could be argued that the level of knowledge was indeed low both before and after the training. However, it is important to note that the elderly volunteers were many years past their previous test taking experiences and that the test was difficult and the items specific. Many consumer educators have been concerned that young people's attainment on standardized tests of consumer knowledge have been low even after instruction. Should the elderly be that much different?

The second indicator (Table 1) was that evaluations by personnel of agencies were very positive. Each of the nine volunteers in the consumer economics section was selected to present at least two in-service sessions with several presenting at least four sessions. As would be expected, there were varying levels of quality in the presentations. Comments on open-ended questions indicated that the primary problem with the less satisfactory presentations appeared to be the inability of the presenter to relate to his/her audience and thereby more effectively communicate the message being presented. Part of this problem was due to the sponsoring agency's lack of explicitness concerning their goals for the in-service session. In some instances, this was exacerbated by the difficulty of some presenters to adapt a pre-planned talk when it became clear that it was less than appropriate or even to recognize when such was the case. Of course, this was not always the case. At one in-service session, volunteer presenters were commended for adjusting and adapting. Several volunteers were scheduled for several hours during that session. When time became a problem, the volunteers were able to adjust their presentations, and the evaluator noted that the problems originated with the agency and not the presenters.

CONCLUSIONS

It appears that retired volunteers can be valuable resources in the delivery of consumer education/information to agencies working with the elderly. Those interested in developing programs similar to the Gerontology Extension Project should consider the following points. First, there is a wide variation among the elderly regarding the level of knowledge of consumer education concepts possessed. Training should be as individualized as possible so that each trainee receives the specific concepts they need at the appropriate level of sophistication. Second, more emphasis should be placed on developing the volunteers' presentation and teaching skills, especially in recognizing and adapting to the needs and desires of the audience that become evident during the presentation. Third, there should be better communication between agencies requesting in-service programs and the project personnel. This would help the agency more carefully focus its request in terms of the topic(s) to be covered. A major unknown of this project is the actual impact of the program of the elderly. The

volunteers showed significant improvement in the knowledge base. Social service agencies receiving the training from the volunteers were generally pleased with what they received. But the true benefits will be the information that is passed on to the elderly which in turn helps change behaviors. To this end funding is being sought to continue the in-service to social service agencies and to more fully evaluate the impact of the project.

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HIGH SCHOOL AND COLLEGE STUDENTS' CONSUMER ACTIONS:
IMPLICATIONS FOR CONSUMER EDUCATION

Barbara Pershing, University of Northern Iowa--Cedar Falls¹

ABSTRACT

A Consumer Action Survey was developed to assess the consumer actions of high school and college students. College students were found to carry out significantly more positive consumer actions than the high school students. The positive effects of previous consumer education were apparent when consumer actions of never-married and married college students with previous consumer education were compared. Further analysis found the most positive consumer actions were by married college students who had taken consumer education courses. This study suggests that the benefits of consumer education, as measured by the Consumer Action Survey, may not be evident until an opportunity or need to apply previously learned information and skills occurs.

INTRODUCTION

Does the consumer actions of high school students differ from that of college students, and if so, to what are the differences attributable? The literature suggests that age, sex, stage in the consumer life cycle, need for consumer information life cycle change, family, mass media, maturity, experiences in the marketplace, and consumer education all may affect consumer actions. Other possibilities may include sources of information available and timing of consumer education.

Studies which have examined the effects of consumer education have predominately focused on comparisons of students who were enrolled in consumer education or consumer economics courses with those who did not take such a course (3,4,5,9,10). Research on socialization and acquisition of consumer competencies has focused on the effects of family, mass media, peers, age maturity and experience (1,6,7,11). Research has failed to show definitively that consumer education courses make a difference in consumer knowledge or competencies. The effects of consumer education may be a necessary but not sufficient condition for positive consumer actions. Experience in the marketplace, after taking consumer education courses may be a requirement for previous learning to be applied or change in consumer actions to occur. If age, maturity, and experiences make a difference in the increase in consumer knowledge and change in behavior, as suggested by Bell and Durr (1), then perhaps the benefits of consumer education are not evident until the individual is actively participating in the marketplace, is experiencing marketplace problems, and is in need of consumer skills to manage his/her own resources.

Consumer actions of high school students have been studied more than students of college age. Stampfl (8) recognized that the variations in life cycle stages of college age consumers may explain the lack of research on consumer behavior of the college age consumer. Perhaps competencies developed in consumer education should more appropriately be taught at a higher level or perhaps knowledge gained in high school consumer education will become more meaningful at a later age, given factors such as age, maturity, experiences or life cycle changes.

OBJECTIVES

This study reports on a survey designed specifically to address consumer actions of high school and college students. The objectives of the study were to:

- 1) develop a consumer action survey to assess consumer actions of high school and college consumers;
- 2) assess the effects of previous consumer education on consumer actions of high school and college students;
- 3) determine differences in consumer actions of high school and college students;
- 4) explore the effect of previous consumer education on consumer actions of married college students; and,
- 5) identify factors that have implications for consumer education.

METHODOLOGY

Consumer actions encompass a wide range of activities or behaviors related to the consumer role. Conceptually, consumer actions were classified into planning and implementing actions based on the process/action component of the systems model for management (2). Over 100 items representing consumer actions of high school and college youth were generated by teachers of consumer education who were participants in a teaching consumer education workshop. The Consumer Action Survey (CAS) consisted of these action items using a 1 to 5 always-to-never Likert-type response scale, with the items scaled so that "1" represented positive consumer actions. In addition to the action items, data on sex, age, grade level, marital status, purchase experiences, and consumer education of the students were collected.

¹Associate Professor

The sample for this study consisted of 439 high school students from nine high schools representative of socio-economic and demographic characteristics of the 326 students in the college sample. The college sample consisted of freshmen through seniors enrolled in general education courses and represented a cross section of majors offered at the university. Demographic data were compared to the factor scores using analysis of variance procedures with the factor scores as the criterion variables.

Factor analysis was used to test the conceptual framework used to generate the statements and to eliminate items with factor loadings of .40 or less. Fifty-six items in twelve factors representing four planning actions and 8 implementing actions evolved. The high Cronbach alpha's for both samples (.83 for high school and .87 for the college sample) indicated a high degree of commonality among the combined items of the CAS, and ordinarily is a basis for not conducting or using the factor analysis in additional analysis; however, due to the diversity among the items representing planning and implementing actions, factor analysis data were used to identify specific areas of consumer actions within the CAS where students might differ.

The factors representing planning actions were identified as reading consumer publications, use of pre-purchase information, use of label information, and pre-planning decisions. The factors representing implementation actions were impulse buying, marketplace convenience, price consciousness, return of defective items, conservation of energy, influence of TV advertisement, good consumer practices, i.e. comparison shopping, and influence of other on purchases.

Sample items include: "When I shop, I buy the item that appeals to me at the moment" (impulse buying); "I buy the least expensive item that serves my purpose when buying personal items" (cost conscious); "I read magazines such as Consumer Reports for information before buying major items" (read consumer publications); "I read product labels before making a purchase" (pre-purchase information); and, "I make a decision on what I plan to buy before shopping" (planning).

Multivariate analysis failed to explain substantial differences in consumer actions by age, education level or consumer experiences. Therefore, the high school/college student comparisons serve as proxy variables for differences in age, experience, education level and maturity. Understanding the differences in consumer actions of the two groups have implications for consumer education.

FINDINGS

College students carried out significantly more positive consumer actions than the high school students as indicated by the consumer index scores

and by factor means (Table 1). The college students were significantly more likely than the high school students to follow the four planning actions. The college students also were significantly more likely to follow implementation actions in the three areas of being more cost conscious, conservative in energy use, and more likely to follow good consumer practices such as comparison shopping and paying bills on time.

TABLE 1. Comparison of High School and College Students' Factor Means and Consumer Index Score Means.

Factor Name	High School (N=439)	College (N=326)	ANOVA
	Factor Means		F-Test P
PLANNING			
Read Consumer Publications	4.45	4.11**	.001
Use Pre-purchase Information	2.61	2.33**	.001
Use Label Information	3.12	2.76**	.001
Planning	2.79	2.47**	.001
IMPLEMENTING			
Impulse Buying	2.55	2.68	.10
Convenience	2.39	2.41	.828
Cost Conscious	3.19	3.02**	.001
Return Items	2.44	2.30	.10
Conserve Energy	2.59	2.32**	.001
TV Ad Information	2.70	2.65	.338
Good Consumer Practices	2.63	2.21**	.001
Influenced by Others	3.03*	3.19	.001
CONSUMER INDEX SCORE	2.85	2.69**	.001

*Significant positive consumer actions of high school students.

**Significant positive consumer actions of college students.

The Consumer Index Score is an additive summary index of the items included in the factors. The factor means and index score are based on the 1 to 5 scale where 1 - the more positive consumer actions.

Thirty-eight percent of the college students and 44 percent of the high school students reported that they had previously taken a course or units in a course that covered consumer education content in subject areas of home economics, business, economics or social studies. There were no significant differences in the consumer index scores between the college students who had and those who had not previously taken a consumer course (Table 2).

Grade level or taking more than one consumer related course had no significant effect on the college students consumer actions. The high school students who had taken a consumer course were significantly more likely to read consumer publications, use pre-purchase information, and return defective items than those high school students who had no previous consumer education courses. The recency of consumer education for the high school students may account for these differences, or consumer experiences and maturity may be the equalizing factor for the college students. A comparison of subject areas of consumer education revealed no significant differences between subject areas of home

TABLE 2. Effect of Consumer Education/Consumer Economics on Consumer Actions of High School and College Students.

	High School		College	
	Previous C. Ed/Econ N=194	All Others N=245	Previous C. Ed/Econ N=123	All Others N=203
	Factor Means			
PLANNING				
Read Consumer Publications	4.36*	4.54	4.18	4.07
Use Pre-purchase Information	2.53**	2.69	2.30	2.35
Use Label Information	3.06	3.17	2.70	2.81
Planning	2.77	2.82	2.46	2.47
IMPLEMENTING				
Impulse Buying	2.56	2.54	2.51	2.46
Convenience	2.46	2.34	2.36	2.44
Cost Conscious	3.14	3.24	3.05	3.00
Return Items	2.31*	2.55	2.29	2.32
Conserve Energy	2.52	2.66	2.31	2.33
TV Ad Information	2.71	2.70	2.74	2.60
Good Consumer Practices	2.58	2.68	2.17	2.23
Influenced by Others	3.05	3.01	3.20	3.17
CONSUMER INDEX SCORE	2.84	2.86	2.68	2.68

Factor means and index score are based on a 1-5 scale where 1 = more positive consumer actions.

*significant at the .05 level

**significant at the .01 level

economics, business, economics or social studies for either the high school or college students.

To test the proposition that maturity, experience, and need for the information from consumer education are the factors that determine the usefulness of previous consumer education, two comparisons were made with the assumption that the married college students would be more mature, have had more experiences in the marketplace, and be in need of using consumer education knowledge and information in their current life style. From the college sample, the 47 married students were compared to the single students and the married students who had previous consumer education were compared to the never-married students who reported previous consumer education. The married students were better in the consumer index score and 10 of the 12 factor mean scores. Nine of the comparisons were significant at the $p < .001$ level and all were in the direction of positive consumer actions for the married students (Table 3).

The comparison of the consumer index score and factor means scores of the married students and the never-married students who had previous consumer education found 11 out of 12 factors and the consumer index score significant in the direction of the married students. Further assessment of the married students who had previous consumer education seemed appropriate. A 2-tail t-test comparing the factor means of married students who had consumer education and those with no previous consumer education found positive consumer actions represented by all but one factor (reading consumer publications). Six of the implementing

TABLE 3. Effect of Marriage on Consumer Actions for All College Students and for College Students Who Had Taken a Consumer Education Course.

	All College Students (N=326)		College Students Having Taken Cons. Ed. Course (N=123)	
	Never Married N=279	Married N=47	Never Married N=111	Married N=12
	Factor Means			
PLANNING				
Read Consumer Publications	4.20	3.61***	4.20	4.00
Use Pre-purchase Information	2.35	2.16*	2.34	1.91*
Use Label Information	2.82	2.45***	2.74	2.24**
Planning	2.55	1.94***	2.52	1.69***
IMPLEMENTING				
Impulse Buying	2.52	2.19***	2.57	1.93***
Convenience	2.42	2.35	2.38	2.02*
Cost Conscious	3.05	2.82*	3.12	2.41**
Return Items	2.34	2.08	2.35	1.50**
Conserve Energy	2.43	1.66***	2.40	1.25***
TV Ad Information	2.71	2.33***	2.79	2.13**
Good Consumer Practices	2.26	1.93***	2.22	1.69**
Influenced by Others	3.24	2.86***	3.26	2.62**
CONSUMER INDEX SCORE	2.74	2.37***	2.74	2.11***

Factor means and index score are based on a 1-5 scale where 1 = more positive consumer actions.

*significant at the .05 level

**significant at the .01 level

***significant at the .001 level

factors, one planning factor and the consumer index score were significant in the direction of the married students who had previous consumer education courses (Table 4).

TABLE 4. Effect of Consumer Education on Married College Students Consumer Actions.

Factor Name	Previous Cons Ed/Econ N=12	No Consumer Education Course N=35	2 Tail T-Test P
	Factor Means		
PLANNING			
Read Consumer Publications	4.00	3.5	.197
Use Pre-purchase Information	1.91	2.26	.113
Use Label Information	2.24	2.63	.079
Planning	1.69	2.14	.023
IMPLEMENTING			
Impulse Buying	1.93	2.29	.025
Convenience	2.02	2.53	.006
Cost Conscious	2.41	3.13	.006
Return Items	1.50	2.24	.003
Conserve Energy	1.25	1.91	.004
TV Ad Information	2.13	2.45	.125
Good Consumer Practices	1.69	2.03	.038
Influenced by Others	2.62	2.91	.301
CONSUMER INDEX SCORE	2.11	2.50	.001

Factor means and index score are based on a 1 to 5 scale where 1 = the more positive consumer actions.

These findings support assumptions from previous research that suggest age, maturity, and experiences make a difference in consumer knowledge and behavior. This study further suggests that the benefits of consumer education, as measured by the Consumer Action Survey, are not evident until the consumer has the necessary resources and the opportunity or need to apply previously learned information and skills, as was exhibited by the married students with previous consumer education.

CONCLUSIONS AND IMPLICATIONS

The high school and college students in this study differed as consumers with the college students having more positive consumer actions as measured by the consumer index score and the factor mean scores of the Consumer Action Survey. Age, maturity, consumer experience and opportunity or need to apply previous consumer information and skills appear to be plausible explanations for some of the differences in consumer actions of the high school and college students.

While some positive actions were related to consumer education of the high school students, the effect of consumer education was not apparent until comparisons were made of the married college students who had previous consumer courses. The effect of marriage on consumer actions strongly supports the "needs" assumption regarding the application of consumer knowledge and skills. Because the need for consumer information for most students comes after formal education, much of the information provided in the consumer education classroom will have future rather than present usefulness. The challenge for teachers at both the high school and college level is to plan educational experiences that are behaviorally relevant for their students.

More research on the latent effects of consumer education should be pursued. Follow-up studies assessing both knowledge and consumer actions should be conducted. Longitudinal research would be the ideal sampling method for making comparisons between age levels and identifying the points at which formal consumer education makes a difference. Identification of the consumer actions, i.e. what the consumer does rather than assessment of knowledge, seems an appropriate method of assessing change over time.

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A NEW ASSESSMENT OF THE BENEFITS OF CONSUMER EDUCATION

Mary L. Carsky, Ph.D. - The University of Connecticut¹
Glen H. Mitchell, Ph.D. - V.P.I. & S.U.²

ABSTRACT

This paper discusses the measurement and assessment of the benefits of consumer education. The methodology and findings of previous research are reviewed and causes for failure to demonstrate positive outcomes are identified. A case study of an investigation on consumer behavior in the marketplace which evidenced the benefits of consumer education is presented and recommendations are offered for further research to measure the per-effects of educational efforts in this subject area.

Consumer education as a program of study is currently being deemphasized and continuation of courses in this subject area within the nation's schools is in jeopardy. The apparent declining interest in consumer education might be attributable to the elimination of federal funding for its support, the natural cycle of educational movements, and, at least in part, to the failure of evaluation studies to demonstrate positive outcomes of consumer education courses reflecting increased knowledge, attitude change, or more efficient decision making and marketplace behavior.

This paper discusses the measurement and assessment of the benefits of consumer education and suggests that the failure to show positive outcomes from enrollment in consumer education courses may be the result of the methodology and design of evaluation studies. It is suggested that the benefits of consumer education may be more pervasive than generally recognized and that alternative approaches to its evaluation may more fully demonstrate these benefits. Due to courses in the subject matter having been taught for more than 20 years, querying consumers in the marketplace might be a more appropriate measure of the pervasiveness and long range benefits of consumer education.

An Overview

Consumer Education had its strong beginnings in the 1930s where economic need was its primary focus. Consumer education sought to prepare students for the dual role of producer and consumer. Early texts [22,23,34] emphasized buymanship for the consumer perspective and knowledge of merchandise for the producer role or sales perspective. The decade of the fifties was a dormancy period for consumer education as the economy experienced growth and the relative economic position of individuals in society was enhanced.

By the beginning of the sixties, interest in con-

sumer education became once again evident; however, its focus was different as the greater majority of Americans were able to meet basic needs and were more concerned with achieving satisfaction in the marketplace [25]. The emphasis during this period was on inequities in the marketplace created by producer power and the need for a proactive consumer voice to correct this imbalance. The importance of consumer education as a means to alleviate these inequities was expressed through President' Ford's November, 1975 White House News release proclaiming the "right to consumer education" and the subsequent establishment of an office for Consumer Education within the Department of Education. National studies such as the Sentry Survey 1977 [9] reiterated the need for consumer education and others such as Kelso [12] and Wilhelms [31] testified to the lack of functional competency in society.

Concurrent with the expressed need for consumer education, scholars were attempting to define and limit the scope and content of consumer education. Richardson [24], Willett [32], and Wilcox [30] among others assessed the state of the art and addressed the mission and goal of consumer education. Bannister and Monsma [1], following extensive efforts, developed The Classification of Concepts in Consumer Education and posited the following definition:

Consumer education is the process of gaining the knowledge and skills needed in managing consumer resources and taking actions to influence the factors which affect consumer decisions [1, p. 5].

The definition explicitly specifies an impending change in the cognitive and behavioral domains and implies a change in attitude toward a proactive stance on consumer issues. This definition is reflective of the evaluation research conducted during the 1970s which sought to identify and validate the benefits of consumer education. Unfortunately much of this research concluded that consumer education produced little or no change [2, 5, 28, 29] in the cognitive domain, findings in the affective domain that were inconsistent [4, 7, 8, 13], and no difference in behavior between students who had enrolled in consumer education and those who had not [10].

Bloom [3] suggested that consumer education could help to bring about changes in satisfaction levels of consumers. Perhaps in interpreting the definition of consumer education Bloom intuitively perceived satisfaction to be an outcome as he stated, "consumer education courses generally attempt to change knowledge, behavior, attitudes, and satisfaction of students while hoping to have an indirect effect on marketplace concentration" [3, p.

¹Lecturer, School of Family Studies

²Professor, College of Human Resources

270]. Although the consumer movement of the sixties and the seventies was rooted in dissatisfaction with the marketplace, measurement of satisfaction as an outcome of consumer education was not typically included in evaluation research.^a

REVIEW OF PREVIOUS RESEARCH

Traditional assessments of consumer education have included pretest-posttest quasi-experimental designs which measured the effects of consumer education in terms of knowledge gained, attitude change or by direct questioning on behavior in the marketplace. Most of the studies utilized student populations for which the effects were measured immediately following the completion of a consumer education course. In spite of the fact that consumer education is "education for living," few researchers sampled adult subjects who were active participants in the marketplace utilizing credit, buying homes and automobiles, and attempting to make rational decisions in an environment characterized by product proliferation and increasing market complexities.

Cognitive Change

Studies which measured cognitive change as a result of consumer education often found demographic variables such as age, mental ability, prior knowledge, and sex of the student to be significant predictors of consumer competency [14]. Carsky, Lytton, and McLaughlin [4] found major field of study and sex to be significant factors in assessing differential knowledge gains among university students enrolled in a consumer education course. Several studies utilized quasi-experimental designs and compared the change in consumer knowledge of students enrolled in consumer education courses to control groups of students not similarly enrolled. Bibb [2], Claar [5], and Thomas [28] found no differences in consumer competency. Waddell [29] found a weak effect in comparing two methods of consumer education instruction to a control group. Langrehr [13] reported significant differences in consumer economic competency among high school economics, consumer education, and control classes, with the consumer education class having the highest scores. Garman, McLaughlin, McLaughlin, and Eckert [8] compared university students enrolled in a consumer education course to a control group and found a significant difference in gain scores between the two.

The failure of several of these to demonstrate an effect of consumer education might have been due to several methodological issues. First, none of these studies were true experiments in the sense that there was no random assignment to either the

experimental or control groups so that differential results may have been due to individual characteristics as identified by Carsky, Lytton, and McLaughlin rather than to the effect of instruction. Second, it has been acknowledged [33] that consumer education in secondary schools does not attract the best students. Failure to find results may be due to student characteristics. Students placed in consumer education classes may possess the same mental ability as those not enrolled, but they may lack motivation and interest in the subject matter. Third, the use of closed end multiple choice and true false questions to test students might be measuring their reasoning ability more than their recall. Fourth, as instruction in any subject matter should be expected to result in some knowledge gain, the use of a pre/post test design to measure cognitive change when comparing students enrolled in a consumer education course to a control group might not be appropriate.

A study by Dickinson [6] to measure consumer awareness found statistically significant differences between adults who had previously enrolled in consumer education and those who had not. Although an η^2 of 0.07 indicated a weak effect, the finding of a positive outcome of consumer education in this study might be of greater practical significance and indicative of the pervasive influence of consumer education. This study differs from those previously discussed in that the instrument developed by Dickinson required recall rather than recognition for response, the sample was comprised of adults who were active in the marketplace, and those who had formal consumer education were not drawn from a recently completed class.

Attitude Change

Based on the results of several studies [4, 7, 8, 13], it could be concluded that attitudes toward the operation of the economy and the marketplace do change as a result of consumer education. However, findings on the direction of change have been inconsistent. Garman [7] using a modified Burton Opinionnaire (1970) found that attitudes of university students "changed drastically" and generally moved in the direction of those held by consumer advocates. In another study using the Lown Consumer Issue Attitude Inventory [17], Garman, McLaughlin, McLaughlin, and Eckert [8] found that students' attitudes on Information, Redress, and Public Policy, and Consumer Voice moved in the direction of the advocate position.

Carsky, et. al. [4] using the Lown Consumer Issue Attitude Inventory also reported that university students' attitudes changed following a consumer education course, but the direction of change was opposite that found by Garman. These students' attitudes moved toward agreement with the business position. This finding was not unique as Langrehr [13] using a Business Opinion Survey found that attitudes of high school students enrolled in a consumer education course while being more negative toward business on a pretest were more positive on a posttest than students who were enrolled in an economics course. Langrehr postulated that

^aAs much of the movement of the sixties focused on dissatisfaction, there might have been efforts to raise dissatisfaction levels through consumer education (ie. Johansson [18] postulated that consumers were satisfied because their aspirations were too low). Others indicated that consumer attitudes should move in the direction of the advocates [4].