Urban consumer attitudes toward farm supply cooperatives
by Glenn Richard Barth

A thesis submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree of DOCTOR OF PHILOSOPHY in Agricultural Economics
Montana State University

Abstract:
Farm supply cooperatives have secured a substantial share of the farm petroleum products market, both nationally and in Montana-western North Dakota. Yet, in spite of the successful penetration of the farm market the refinery operated by the Farmers Union Central Exchange at Laurel, Montana is being operated at less than the optimum volume. A virtually untapped market for Co-op gasoline exists in rapidly growing urban centers, but gasoline consumers in these centers have demonstrated little interest in patronizing cooperatives.

The purpose of the study was to identify and measure the attitudes of urban consumers toward farm supply cooperatives as sources of gasoline. It is hoped that the resulting information about urban attitudes will provide Cooperative managers with a better basis for planning sales expansion, educational efforts, and changes in cooperative policies and practices.

Urban gasoline consumers in Bismarck, North Dakota; and Billings and Missoula, Mbntana were found to have a generally unfavorable attitude toward farm supply cooperatives, considering them a type of cut rate gas station selling primarily to farmers. In contrast to their major competitors, cooperatives were thought to sell poor quality gasoline in unattractive surroundings and to be poor community citizens. Little outright hostility to cooperatives was found, but cooperatives have failed to interest urban residents in cooperative buying and the merits of the cooperative movement.

These research findings suggest that farm supply cooperatives should be able to win a substantial amount of urban business if they are willing and able to change unfavorable consumer attitudes through education and physical improvements. Such a public relations drive to court the urban consumer will demand a high level of cooperation between local and regional cooperatives and the abandoning of such traditional features as the strong rural flavor of most cooperatives. An alternative course of action would be the formation of a Separate organization geared to urban needs and in no way identified with the present farm supply cooperatives.

URBAN CONSUMER ATTITUDES TOWARD FARM SUPPLY COOPERATIVES

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Notwithstanding the substantial contributions made by others, any errors or omissions in this study are the responsibility of the author alone.

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ABSTRACT

Farm supply cooperatives have secured a substantial share of the farm petroleum products market, both nationally and in Montana-western North Dakota. Yet, in spite of the successful penetration of the farm market the refinery operated by the Farmers Union Central Exchange at Laurel, Montana is being operated at less than the optimum volume. A virtually untapped market for Co-op gasoline exists in rapidly growing urban centers, but gasoline consumers in these centers have demonstrated little interest in patronizing cooperatives.

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INTRODUCTION

General Background

Cooperatives today are a solidly established part of the American business scene. Mutual insurance companies, mutual investment funds, cooperative wholesale houses, federal credit unions, federal building and loan associations, the Railway Express Agency, the news wire services, and many other types of organizations are cooperatives in practice if not in name and serve all segments of our society. Electricity, telephone service, and credit are provided cooperatively to the agricultural sector of the economy. Marketing cooperatives, through which many farmers sell their products and supply cooperatives through which they buy their feed, fertilizer, seed, gasoline, and other necessary supplies are also important.

Figure 1 compares growth of Gross National Product, sales by farm supply cooperatives, and total cash expenditures by farmers for supplies and equipment from 1950 to 1960. Although the rate of increase in cooperative sales has been less than the rate of growth of Gross National Product during the same time period, it can be seen to be well ahead of all sales of farm supplies and equipment.

Similar data are provided in index number form in Table I. Farm supply cooperative sales started the 1950-1960 period at 81.1 percent of their ten-year average and rose to 115.9 percent of this average, an increase of 42.9 percent, at the end of the period. As a comparison, total cash expenditures by farmers began at 101.3 percent of their ten-year average but increased to only 106.6 percent, a 5.0 percent rise. The

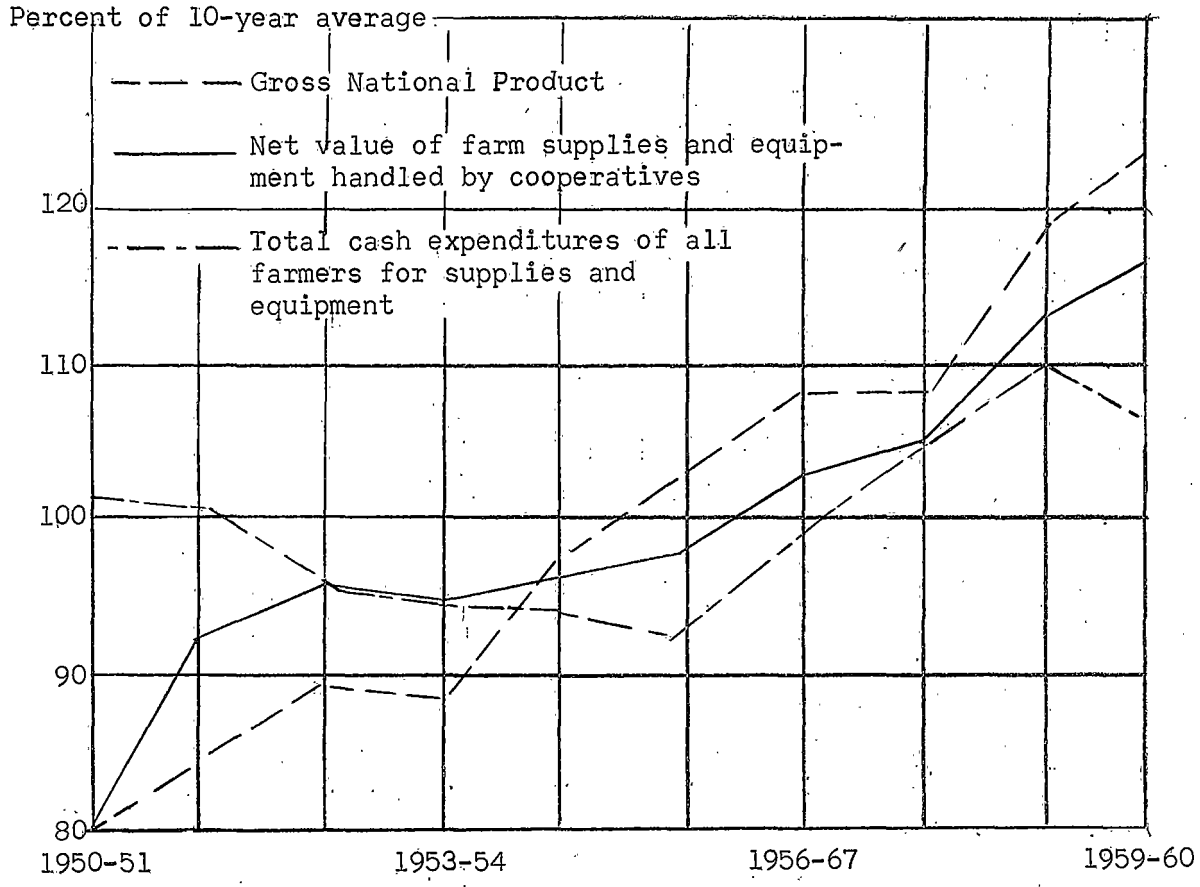

Figure 1. Growth trends of supplies and equipment handled cooperatively, cash expenditures of all farmers for supplies and equipment, and Gross National Product, 1950-60.*a/

*Source: United States Department of Agriculture, Trends in Growth of Farmer Cooperatives 1950-1960, General Report 110, Farmer Cooperative Service.

a/ Cooperative data are for fiscal years. Other data are for calendar years.

TABLE I

COMPARISON OF ANNUAL INDEXES FOR NET VALUES OF FARM SUPPLIES AND EQUIPMENT OBTAINED THROUGH COOPERATIVES AND FOR CASH EXPENDITURES OF ALL FARMERS FOR FARMERS FOR FARM SUPPLIES AND EQUIPMENT 1950-1960*

Period	Annual Indexes for Farm Supplies and Equipment		
	Index of cooperative supply value a/	Index of cash expenditures of all farmers a/	Difference b/
1950-51	81.1	101.3	-20.2
1951-52	92.4	100.6	- 8.2
1952-53	96.9	96.4	+ 0.5
1953-54	95.2	94.4	+ 0.8
1954-55	97.3	95.2	+ 2.1
1955-56	98.5	93.9	+ 4.6
1956-67	103.3	97.4	+ 5.9
1957-58	105.3	104.0	+ 1.3
1958-59	114.1	110.2	+ 3.9
1959-60	115.9	106.6	+ 9.3
10-year average	100.00	100.00	___

*Source: United States Department of Agriculture, Trends in Growth of Farmer Cooperatives 1950-1960, General Report 110, Farmer Cooperative Service.

a/ Cooperative indexes are based on net business volumes for associations with fiscal years ending between July 1 and June 30. Net volume figures are adjusted for duplications arising from intercooperative business. Indexes for all farmers are based on cash expenditures of all farmers for farm supplies and equipment in calendar years. Comparison of the 1950-51 index for cooperatives is made with the 1951 index for all farmers. For example, 81.1, the cooperative index for 1950-51, and 101.3, the 1951 index for all farmers, are compared.

b/ Index of cooperative supply volume less index of cash expenditures of all farmers for supplies and equipment.

conclusion that farm supply cooperatives in the United States have been able to gain an increasing share of the farm supply market seems inescapable. Montana's growth in cooperative sales brought the cooperative share of the state farm supply market to 14.4 percent in 1963. (Table II shows Montana and U.S. total cooperative sales as percentages of their respective markets.) All supply cooperative sales represented 22.2 percent of the national market in 1963. The rapid growth of Montana supply cooperatives during the past few years is partially explained by their smaller initial market share.

The situation in sales of petroleum products during 1963 was somewhat different. As shown in Table III, Montana's cooperatives controlled a larger share of their petroleum products market, 47.4 percent, than did all U.S. cooperatives combined, 43.2 percent. With more than a 47 percent share of the petroleum products market, Montana supply cooperatives have achieved a market penetration held by few firms in any industry.

In addition to this already large market share, other forces may be barriers to further large scale expansion of cooperative sales of petroleum products to Montana farmers. Discussions with interested people repeatedly brought forth two such barriers. The most frequently mentioned was political or ideological in nature. Many cooperatives in Montana are closely associated with the Educational and Cooperative Union of America, commonly known as the Farmers Union. The Farmers Union Grain Terminal Association and the Farmers Union Central Exchange are two examples. Many farmers in Montana and adjoining states are strongly opposed to the

TABLE II

1963 SALES OF ALL FARM SUPPLIES--NET OF INTERCO-OP SALES

United States Total a/	$12,189,873,000
Cooperative Total b/	2,704,400,000
Cooperative Market Share	22.2%
Montana Total a/	179,571,000
Cooperative Total b/	25,812,000
Cooperative Market Share	14.4%

TABLE III

1963 SALES OF PETROLEUM FUEL AND OIL TO FARMERS

United States Total a/	$1,469,036,000
Cooperative Total b/	634,246,000
Cooperative Market Share	43.2%
Montana Total a/	26,315,000
Cooperative Total b/	12,467,000
Cooperative Market Share	47.4%

a/ Farmer Cooperative Service, U.S.D.A., Estimated Cash Expenditures for Production Supplies and Equipment by Farm Operators, Service Report No. 76, November 1965.

b/ Farmer Cooperative Service, U.S.D.A., Highlights of Farmer Cooperatives in Montana 1962-63, State Information Series.

political views and actions of the Farmers Union. Therefore, opposition to the Farmers Union could be expected to transfer to any cooperative having Farmers Union in its title, and finally to any cooperative, with resulting effects on cooperative sales.

The second reason is that cooperative buying does not appear to benefit the large farmer to the same degree that it does the small

TABLE IV

NUMBER OF FARMS, ALL LAND IN FARMS AND AVERAGE SIZE OF FARM, 1950-1963*

Year	Number of Farms	All Land in Farms	Average Size of Farm
	Thous.	Thous. Acres	Acres
1950	37.2	65,000	1,747
1951	36.8	65,200	1,772
1952	36.4	65,500	1,799
1953	35.9	65,800	1,833
1954	35.4	66,100	1,867
1955	34.8	66,100	1,899
1956	34.2	66,200	1,936
1957	33.6	66,300	1,973
1958	33.0	66,500	2,015
1959	32.4	66,600	2,056
1960	32.0	66,700	2,084
1961	31.6	66,800	2,114
1962	31.2	66,800	2,141
1963	30.8	66,700	2,166

*Source: Montana State Department of Agriculture, Montana Agricultural Statistics, Statistical Reporting Service, Volume 10, Helena, Montana, 1964.

operator. Table IV shows Montana farm size to be rapidly increasing. One operator of a large farm in north central Montana reported spending $2,500 on petroleum products each year. He stated that he could buy at prices comparable to those charged by the cooperative in his community, and get better service as well. It seems likely that many other Montana farmers who are not now cooperative members may buy sufficiently large quantities of petroleum products to be able to bargain effectively with their local suppliers.

The principal supplier of petroleum products to farm supply cooperatives in Montana and western North Dakota is the Farmers Union Central Exchange refinery at Laurel, Montana. Whether by direct shipment from the refinery or by trading product with other refiners, the sales of the farm supply cooperatives approximate the volume of product processed by this refinery. Refinery executives report that at the present time the quantity of product produced is substantially below the capacity of the refinery. As shown in Table V, operating the refinery at a volume close to its theoretical capacity would result in savings that could be passed on to the cooperative's members.

TABLE V

REFINERY COSTS AT SELECTED LEVELS OF OPERATION*

% of Capacity	Cost per Barrel
62%	$3.166
65	3.129
69	3.103
77	3.051
81	3.029
85	3.008
92	2.973

*Source: Information provided by the Farmers Union Central Exchange, Laurel, Montana.

Since farm supply cooperatives in this region find themselves caught between ideological and economic restraints to a rapid increase in sales to their traditional farmer members on one hand, and an inefficient level of operations of their refinery on the other, they would benefit by opening

a new market. One source of new patrons may be found in the region's growing urban areas. By 1975 it is estimated that 69 percent of Montana's population will live in urban areas (over 2,500 population).[1] North Dakota, part of which is included in this study, is expected to have 48 percent of its population in urban areas. On the other hand, small towns (2500 population and less) are expected to lose 87 percent of their population.

In most larger communities in Montana and western North Dakota, however, urban residents have shown little interest in patronizing farm supply cooperatives. Perhaps this lack of interest is due in part to mistaken ideas about the nature of cooperatives as seen through urban eyes. As an example of such erroneous ideas, Bell[2] found that urban cooperatives members come largely from middle and upper middle income groups, whereas he found the popular image of the cooperative member to be distinctly low income.

Research Objectives

The primary purpose of this research is to study and identify the attitudes of urban users of gasoline in this region (Montana-western North Dakota). It is hoped that identifying the present composite image[3]

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[1]John R. Burchard and Russel B. Adams, Projected Urban Growth in the Upper Midwest 1960-1975, Upper Midwest Economic Study, 1964, p. 12.

[2]Martin L. Bell, "A Revised Concept of the Consumers Co-op," Journal of Marketing, January, 1961.

[3]"Attitude implies an evaluation of an object or concept, whereas image is concerned with description alone." Marketing Research, Boyd & Westfall, p. 323.

of farm supply cooperatives in the minds of urban gasoline buyers; and identifying their attitudes toward patronizing cooperatives will provide cooperative managers with better tools for planning sales expansion, educational efforts, or changes in their cooperative policies and practices.

The identification of consumer attitudes with sufficient accuracy to be the basis of management decisions is more difficult than the gathering of the types of economic or consumer data which are readily available and quantifiable. Attitudes are so much a part of a person that they may not be recognized by the holder, and if recognized may not be willingly revealed. If attitudes can be determined accurately the problem of quantification for comparison purposes remains. These aspects of attitudinal measurement are discussed in greater detail in the following chapter.

Research Methodology

The study was based on an "area probability" or "cluster" random sample of heads of households who were gasoline buyers in Bismarck, North Dakota; Billings, Montana; and Missoula, Montana. Eighty interviews were conducted in each city. Instead of the customary questionnaire, data was recorded by the subject on Spectro-Fan Cards provided by the Cooperative Extension Service of Montana State University. When properly used, these cards encourage more spontaneous and unguarded responses, resulting in increased validity. They also permit a more rapid compilation of the data than is possible with the printed forms usually employed.

The study was limited to only three cities so that it could be done in sufficient depth to arrive at useful conclusions, and to eliminate as many as possible of the variables that make generalizations impossible. These three cities are among the largest and fastest growing in the area and show promise of continued rapid growth.[4] Thus they represent the type of cities which will be among the more important markets for consumer products in this region in future years. These cities are spaced quite evenly from the western to the eastern boundaries of the study area.

The research was further limited to a study of urban consumer attitudes toward ten different qualities or attributes of supply cooperatives. The principal consideration in choosing these was a three-step process using Montana State University students as subjects. Other interesting attributes of cooperatives could have been studied, but those selected were the ones judged most important and most amenable to corrective action if unfavorable attitudes toward cooperatives were found.

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[4] Burchard and Adams, Loc. Cit.

CHAPTER II

Attitude Measurement

An attitude study of gasoline users in several cities implies a need for some technique of measurement so that intercity comparisons can be made, and so that some quantitative conclusions can be reached. A large number of unquantifiable impressions or feelings would be difficult to evaluate or to use. If people are asked whether they like daytime television programs they might answer: "Sometimes"; "yes"; "They're terrible". These comments indicate something about attitudes toward daytime television, but if they are to be used to measure attitudes they must be put in at least two categories, "favorable", and "unfavorable". Some answers like, "they could be better", are hard to classify in either category.

Another major difficulty in attitude measurement is that attitudes are subjective. No one can see, weigh, or otherwise measure them. Direct questioning of respondents about their attitudes is often ineffective because even the respondent himself may not be aware of his attitudes or cannot articulate them.[1] Other respondents are aware and articulate but are unwilling to express an unpopular view or one they consider unworthy.

A number of scaling techniques have been developed to overcome these basic problems of communication. The word "scaling" is used because most such measuring devices involve some type of numbered scale. For instance, the respondent may be asked to indicate his acceptance of some

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[1]Chester R. Wassan, The Strategy of Marketing Research, Appleton-Century-Crofts, New York, p. 132.

product on a scale from one to seven, or to indicate the extent of his agreement with a statement on a scale from one to five. Four standard attitude scales, the Thurstone, Guttman, Likert and Semantic Differential were considered for use in this research.

The Thurstone Scale

The Thurstone, or method of equal-appearing intervals, is based on the assumption that even though people cannot assign cardinal or quantitative measurements to their own attitudes they can tell the difference between the attitude represented by two different statements and can identify items that are approximately halfway between the two.[2] Each item is assigned a scale value and this scale value indicates the strength of attitude of an agreement response to the item. The scaling procedure finds these scale values after a series of rather complex steps. Thurstone scales are not widely used in marketing research, probably because after the time consuming task of preparing them the results produced are no better than those resulting from simpler methods.

The Guttman Scale

The Guttman scale consists of a relatively small set of homogenous items that are supposedly unidimensional.[3] A unidimensional scale

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[2]Boyd and Westfall, Marketing Research, Richard D. Irwin, Inc., Homewood, Illinois, 1964.

[3]United States Department of Agriculture, Attitudinal Research Relating to Farmers' Use of Short Term Credits, ERS-25, Farm Economics Division, Economic Research Service, Washington, D.C., 1961.

measures only one variable. In practice, the researcher asks the subject his opinion on a series of questions so arranged that if he answers "yes" to the first question he can be expected to answer "yes" to the following questions. If he answers "no" to the first question and "yes" to the second, he can be expected to answer "yes" to the remainder, etc. Then follows a process of sorting or scaling to assure that the questions are arranged in the prescribed order described above. Any deviations from this order are considered "errors" and detract from the reliability score of the test.

Certain problems are reported in using the Guttman scale for analysis of attitudes. A sample of at least 100 respondents is needed for any scale to be constructed. If two different groups are to be compared, a sample of 100 of each is needed. Constructing a set of statements that will satisfy the requirements of a scale is not easy.

The Likert Scale

Likert scales, like Thurstone scales, involve a list of statements related to the attitude in question. Instead of checking only those statements with which they, however, respondents also indicate the extent of agreement or disagreement. For instance, the extent of agreement may be indicated by choosing one of the following:

1. agree very strongly
2. agree fairly strongly
3. agree
4. undecided
5. disagree
6. disagree fairly strongly
7. disagree very strongly
8. don't know

Each degree of agreement is given a numerical score and the respondent's total score is computed by summing these scores from all statements. The statements to be evaluated are of the nature: 1. automobiles are too expensive; 2. winter is too short; 3. Montana is cold. All should be statements of opinion, not of fact.

Likert scales are developed in the same way as Thurstone scales but are considered more discriminating and reliable because of the larger range of responses typically given in Likert scales.[4] However, they are also somewhat difficult to prepare. The preparation of long lists of statements and the ratings of these statements by a number of judges (20 or more)[5] is more easily adapted to the classroom than to field operations.

The Semantic Differential Scale

The Semantic Differential attitude scale, described in great detail by Osgood,[6] was chosen as the basis of this study for several reasons. First, the Semantic Differential is frequently used in marketing research and appears to be the choice of practitioners in this field, perhaps because it permits the development of descriptive profiles, such as those shown in Chapter IV, that facilitate comparisons of competitive

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[4]Boyd and Westfall, loc. cit.

[5]Fred N. Kerlinger, Foundations of Behavioral Research, Holt, Rinehart, and Winston, Inc., New York, 1964.

[6]Osgood, Soci, Tannenbaum, The Measurement of Meaning, University of Illinois Press, Urbana, 1957.

items. Second, according to Mindak,[7] "It is a quick, efficient means of getting in readily quantifiable form and for large samples not only the direction but also the intensity of opinions and attitudes toward a concept....be it brand, product, or company." Third, and least important, in comparison with the other attitude scales described above it is easily prepared and readily adapted to research in the field.

Although people see things differently, they act in their daily lives as though they believe some common core of verbal meaning exists. They talk to one another through shared meanings of words and usually communicate effectively. Accepting the assumption of common or shared meanings, Osgood developed the Semantic Differential method to measure the meanings of various concepts.

The Semantic Differential method can be defined as essentially a combination of controlled association and scaling procedures. In developing and using the Semantic Differential, Osgood provided the subject with a concept to be differentiated and a set of bipolar adjectival scales against which to do it. The subject's only task was to indicate for each item--by pairing a concept with a seven-point scale--the direction of his association and its intensity.

Osgood began by postulating a semantic space, a region of some unknown dimensionality and Euclidian in character. Each semantic scale, defined by a pair of polar (opposite-in-meaning) adjectives, is assumed to represent a straight line function that passes through the origin of

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[7]William A. Mindak, "Fitting the Semantic Differential to the Marketing Problem," Journal of Marketing, April, 1961.

this space, and a sample of such scales than represents a multidimensional space. If through research the general meanings of the dimensions have been determined, then the meaning of each point in the space would be some combination of the meanings of the dimensions. That is, Osgood says that when a subject judges (differentiates) a concept against a series of scales each judgment represents a selection among a set of given alternatives and serves to localize the concept as a point in the semantic space. space.

Father

Happy	_ _ _ _ _ X _	Sad
Hard	X _ _ _ _ _ _	Soft
Slow	_ _ _ X _ _ _	Fast

The point in space which serves as an operational definition of meaning has two essential properties--direction from the origin, and distance from the origin. Osgood identifies these properties with the quality and intensity of meaning, respectively. For instance, in the example above, the concept Father is judged to be two units of intensity, counting from the middle of the scale, in the direction of the quality sad, three units in the direction of hard, and at the origin as regards slow and fast.

The three most significant dimensions Osgood found were named Evaluative, Potency, and Activity. Evaluative is interpreted as "goodness," potency as "strength," and activity as "motion and action". Through research, Osgood found that adjective pairs like good-bad, bitter-sweet, large-small, and clean-dirty fall into clusters. The most

important cluster seems to consist of adjectives that are Evaluative, such as good-bad and pleasant-unpleasant. A second cluster is made up of adjectives that seem to share strength or potency ideas such as strong-weak, or rugged-delicate. Examples of the third factor, activity, are fast-slow and hot-cold.

In describing the construction and administration of the Semantic Differential, Osgood says, "although we often refer to the Semantic Differential as if it were a 'test' having some definite set of items and a specific score, this is not the case. To the contrary, it is a very general way of getting at a certain type of information, a highly generalized technique of measurement which must be adapted to the requirements of each research problem to which it is applied. There are no standard concepts and no standard scales; rather, the concepts and scales used in a particular study depend upon the purposes of the research." The adjectives chosen for use in this study are all thought to be Evaluative in a gasoline buying context.

Although the Semantic Differential was developed as a tool for measuring the meaning of words, it is readily adapted to the measurement of attitudes. Again quoting Osgood,

> One of the significant by-products of our work in experimental semantics, we believe, has been a new approach and rationale for attitude measurement. It has been feasible to identify 'attitude' as one of the major dimensions of meaning-in-general and thus to extent the measurement procedures of the Semantic Differential to an important area of social psychology. Despite a plethora of definitions of 'attitude' in contemporary social science, some consensus and agreement is evident, particularly with respect to the major properties that attitudes are learned and implicit--they are inferred states of the organism that are presumably acquired in much

> the same manner that other such internal learned activity is acquired. Further, they are predispositions to respond, but are distinguished from other such states of readiness in that they predispose toward an evaluative response.

Kerlinger[8] describes attitudes as an integral part of personality, along with such other parts as intelligence and aptitude. He says

> Personality measurements are mostly measurements of traits. A Trait is an enduring characteristic of the individual to respond in a certain manner in all situations. If one is dominant, one exhibits dominant behavior in most situations. If one is anxious, anxious behavior permeates most of one's activities. An attitude, on the other hand, is a predisposition to think, feel, perceive, and behave toward a cognitive object. One has an attitude toward something "out there". A trait has subjective reference; an attitude has objective reference. One who has a hostile attitude toward foreigners may be hostile only to foreigners, but one who has the trait hostility is hostile toward everyone (at least partially).

"It is apparent that the Semantic Differential may be used as a generalized attitude scale," writes Osgood. "If we are careful to select as our evaluative scales those which maintain high and pure loading on the evaluative factor regardless of the concept class being judged, it is probable that high correlations with standard attitude measuring instruments would be obtained regularly." For this reason, adjectives found to be highly evaluative by Osgood were used whenever consistant with the objectives of this research.

The theoretical usefulness of consumer attitude surveys in economic prediction is to provide data for predicting consumer behavior. Analysis

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[8]Kerlinger, loc. cit.

[9]Stephen Paranka, "Marketing Predictions from Consumer Attitudinal Data," Journal of Marketing, July, 1960.

of the past accuracy of such surveys shows that they do not always indicate the purchases consumers will make in the future.[9]

Osgood agrees and calls the frequent failure to predict consumer behavior one of the most common criticisms of attitude scales. But he says, "Like most such arguments, this one is overdone. Most proponents of attitude measurement have agreed that attitude scores indicate only a disposition toward certain classes of behaviors, broadly defined, and that what overt response actually occurs in a real-life situation depends also upon the context provided by that situation." Downey[10] supports the predictive value of attitude scales and reports that cooperative members having a strong sense of cooperative awareness and a favorable attitude toward cooperation buy a far larger percentage of their farm supplies from cooperatives than do those members showing definite anti-cooperative feelings. It seems probable therefore, that favorable consumer attitudes toward cooperatives would facilitate their successful entry into the urban gasoline market and that unfavorable attitudes would hinder this entry.

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[9]Stephen Paranka, "Marketing Predictions from Consumer Attitudinal Data," Journal of Marketing, July, 1960.

[10]Downey, Kohls, Wilson, "Purchasing Behavior of Cooperative Members," Purdue University Research Bulletin No. 797.

CHAPTER III

Research Design

The Sample

Three cities, Missoula, Billings, and Bismarck were used as sites for taking the 240 interviews used in this attitude study. Missoula at the western end of Montana, had a 1960 population of 34,200. It is the site of the University of Montana and the principal trade center for a large, but sparsely populated area. The principal industrial activity is tied to the lumber industry. Its probable 1975 population is estimated at 50,900.[1]

Billings, the second largest city in Montana, had a 1960 urban area population of 57,500 and a probable 1975 population of 90,100. It is located in south central Montana and is becoming a major wholesale and retail center, as well as an oil refining center.

Bismarck, the capital of North Dakota, with its neighboring city of Mandan, had a 1960 population of 40,100. The combined population in 1975 is estimated at 52,700. Bismarck's economy depends heavily upon state and federal offices and upon retail and service facilities serving a large farming area.

To make more efficient use of interviewer time, an area probability or "cluster" sampling method was used to select subjects to be interviewed in each city. After obtaining maps of all three cities, each block

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[1]John R. Burchard and Russell B. Adams, loc. cit.

shown was numbered. A sample of 50 blocks was chosen using a table of random numbers. These blocks were then numbered from 1 to 50 in the order they were selected.

Interviewers attempted to obtain data from the first five heads of households found by starting on the northeast corner of the block and going clockwise. If there were no northeast corner, the interviewer was instructed to use the north. Each residence was taken in order and two call-backs were made to obtain interviews in the event the heads of households were not available the first time. In case of a refusal to cooperate the household was to be skipped. Because people living on the same block may be similar in many ways, some reliability was probably lost by this method. But, by limiting the number of interviews on any one block to a maximum of five, this loss was expected to be slight.

It was expected that some of the interviews would, upon examination, turn out to be unusuable for one reason or another. To avoid the necessity of returning to the various cities and continuing the interviews on the preselected blocks to replace the unusuable interviews, several extra interviews were obtained in each city. Then, even though some interviews were unusuable there would be at least the planned sample available from each city.

The Interview

The interview was designed to permit the use of Spectro-Fan Cards, Figure 2, developed by the Cooperative Extension Service of Montana State University. Instructions for the use of the cards are shown in Appendix D. After gaining admission to the home, the interviewer first explained