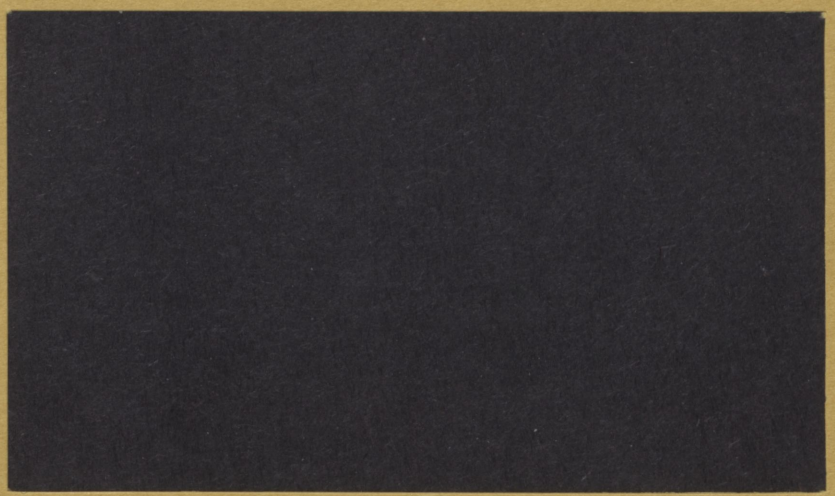


SCHOOL OF AGRICULTURAL ECONOMICS AND EXTENSION EDUCATION

ONTARIO AGRICULTURAL COLLEGE
UNIVERSITY OF GUELPH
Guelph, Ontario, Canada

OPINION LEADERSHIP TYPOLOGIES FOR FARM SUPPLIES

Thomas F. Funk

Research Bulletin AE/74/9 June 1974

This study was conducted as part of the contract for research in agricultural economics between the Ontario Ministry of Agriculture and Food and the University of Guelph. Additional financial support for the project was provided by an Operating Grant from Canada Department of Agriculture. Appreciation is expressed to Professors L. J. Martin and D. Blackburn for their many helpful suggestions and comments on this manuscript.

CONTENTS

INTRODUCTION

The agricultural community frequently has been referred to as a mass network of interpersonal communications. Despite the existence of many channels of communication within a rural community, the most prevalent form consists of person-to-person contact. Farmers, when seeking advice about new technological developments, brands of purchased farm supplies, and methods of farming, most often turn to their neighbors and friends.

Not all farmers in a rural community are sought by their neighbors as sources of information. Some farmers are never used as a source of information, while the advice of other farmers is widely sought. These latter farmers have been called opinion leaders. They act as the originators of information -- e.g., farm supply firms -- and other farmers. In this role they are an important group to firms selling inputs to farmers.

To be useful to farm supply firms in planning marketing programs, it is essential that this particular segment be identified in a meaningful fashion. This involves delineating the opinion leaders from the non-leaders, and then comparing these two groups on the basis of selected characteristics. Given this information, farm supply firms can use the desirable characteristics of this market segment in the implementation of their marketing programs.

Objectives

The objective of this research is to develop a profile of opinion leaders for the purchase of one type of agricultural production input -- commercial seed corn.

To accomplish this objective, several basic steps are involved. These are:

1. A definition and measure of the extent of opinion leadership must be developed, and on this basis, the sample sorted into leader and non-leader groups,

2. Each of the leadership groups must be described in terms of meaningful characteristics,

3. Appropriate statistical procedures must be utilized to test for significant differences between the leader and non-leader groups, and

4. Some measure must be developed which will show the relative importance of each of the descriptive characteristics in discriminating between the leadership groups.

To guide the development of profiles, the following hypotheses were established and evaluated in this research.

H_1 - Opinion leaders can be differentiated from non-leaders on the basis of selected socio-economic variables. Concentrations of opinion leaders can be found among:

1. Older farmers,
2. More experienced farmers,
3. Farmers with more education,
4. Farmers with higher levels of gross income,
5. Farmers with a greater number of tillable acres, and
6. Farmers specializing in grain production.

H_2 - Opinion leaders can be differentiated from non-leaders on the basis of a set of purchasing behavior variables. Concentrations of opinion leaders can be found among:

1. More innovative farmers,
2. Farmers reading more farm magazines,
3. More rational farmers,
4. Farmers who have a greater awareness of alternatives,
5. Farmers who are more deliberate purchasers, and
6. Farmers who are less brand loyal.

Data Source[1/]

Data for this study was obtained by personal interviews with a stratified, random sample of 153 Southwestern Ontario farmers. The sample was drawn from the master farmer list maintained by Statistics Canada. Stratification was on the basis of county of residence to insure proportional geographic representation.

The farmer survey was conducted in late July and early August of 1972 by undergraduate agricultural students from the University of Guelph. Each student was given a list of farmers and instructed to call each farmer to arrange an appointment for a personal interview. Prior to receiving this call, all the farmers received a personal letter from the University explaining the nature of the project and encouraging their cooperation. The questionnaire required a minimum of one hour per farmer to administer; in several instances over two hours were required to complete all of the questions.

1/ For a more detailed discussion of the sampling and survey procedures see: Funk, T.F., A Description of Seed Corn Buying Behavior, Working Paper AE/73/13, University of Guelph, August 1973.

MEASUREMENT OF OPINION LEADERSNIP

The measure of opinion leadership used in this project was the self-designating method[1/] developed by Rogers [10] and modified by Summers [12]. This method consists of a series of six questions from which an opinion leadership scale can be developed. The modified questions used in th in this project were:

1. In general do you like to talk about seed corn with your friends

   Yes ____ No ____

2. During the past six months, have you passed on any information about some variety of seed corn to other farmers?

   Yes ____ No ____

3. Would you say you give very little information, an average amount of information, or a great deal of information about various brands and varieties of seed corn to your friends and neighbors?

   You give very little information ____
   You give an average amount of information ____
   You give a great deal of information ____

4. Compared with your circle of friends and neighbors are you less likely, about as likely, or more likely to be asked for advice about the purchase of seed corn?

   Less likely to be asked ____
   About as likely to be asked ____
   More likely to be asked ____

1/ Although there are other, perhaps better measures of opinion leadership, the self-designating method was selected for this study because of the type of survey design. With a random sample of respondents chosen over a wide geographical area it is not possible to employ methods involving peer designation. This method is possible only if one community is used as a basis of analysis. The self-designating method of measurement has been widely used in opinion leadership studies. All available evidence indicated that it is reliable, valid, and unidimensional [11].

5. If you and your friends were asked to discuss seed corn, what part would you be most likely to play? Would you mainly listen to your friends' ideas or would you try to convince them of your own ideas?

   You mainly listen to your friends' ideas ____
   You try to convince them of your own ideas ____

6. Do you have the feeling that you are generally regarded by your friends and neighbors as a good source of advice about seed corn?

   Yes ____ No ____

Using the above questions an opinion leadership score was calculated for each of the 153 farmers contained in the sample. These scores were determined by an application of scalogram analysis to the responses of the above six opinion leadership questions. After the scores were determined, the farmers were classified into two categories designed to approximate those used in other opinion leadership studies [3] [12]. As a result, 53 farmers, or 34 percent of the sample farmers were classified as opinion leaders. The remaining 106 farmers were classified in the non-leader category.

Scalogram Analysis

Scalogram analysis, commonly termed Guttman Scaling after its originator, is a widely used technique in the construction of indexes or scales. In general, an index is a device used to predict some underlying continuum which can be only partially measured by any single variable included in the index.

A Guttman Scale is a type of scale which possesses two special properties not commonly found in other scales. First, a Guttman Scale is

unidimensional. This means that each of the component items must all measure the same single underlying object. Secondly, a Guttman Scale is cumulative. This implies that the items in the scale can be ordered by degree of difficulty, and that the respondents who reply favorably to a difficult item will always respond favorably to less difficult items and vice versa. It is this second property which differentiates Guttman Scales from most other types. It is also this property which permits the scale to develop a meaningful rank order of subjects.

In terms of the present analysis it is clear that the above questions attempt to measure movement toward or away from a single underlying object -- opinion leadership. Furthermore, it is also clear that the questions have been designed to reflect different positions on the opinion leadership continuum. For example, a positive response to question 3, indicating that the person gives a great deal of information, clearly indicates a greater degree of opinion leadership than a positive response to question 1, which would only indicate that the person likes to talk about seed corn.

The Scalogram Analysis subroutine of the SPSS system (Statistical Package for the Social Sciences) was used to construct the opinion leadership scale used in this research. The results of this analysis are summarized in Table 1.

The responses to the six opinion leadership questions are shown in the columns of this table. For example, under question 3 it can be seen that 149 farmers failed this question (responded negatively), while only 3 farmers passed it (responded positively). In the case of question 4, 132 farmers failed and 21 passed. In general, the questions are arranged so that as one reads from left to right the percentage of farmers passing an

TABLE 1. RESULTS OF SCALOGRAM ANALYSIS FOR CONSTRUCTION OF OPINION LEADERSHIP SCALE

SCALE TYPE	QUESTION 3		QUESTION 4		QUESTION 5		QUESTION 6		QUESTION 2		QUESTION 1		TOTAL
	FAIL	PASS	FAIL	PASS	FAIL	PASS	FAIL	PASS	FAIL	PASS	FAIL	PASS	
6	[0]	1	[0]	1	[0]	1	[0]	1	[0]	1	[0]	1	1
5	3	[1]	[0]	4	[1]	3	[0]	4	[0]	4	[0]	4	4
4	15	[1]	7	[9]	[9]	7	[0]	16	[1]	15	[0]	16	16
3	31	[1]	26	[6]	25	[7]	[4]	28	[7]	25	[3]	29	32
2	46	[0]	45	[1]	42	[4]	36	[10]	[12]	34	[3]	43	46
1	34	[0]	34	[0]	32	[2]	30	[4]	30	[4]	[10]	24	34
0	20	[0]	20	[0]	20	[0]	20	[0]	20	[0]	20	[0]	20
SUMS	149	4	132	21	129	24	90	63	70	83	36	117	153
PERCENTS	97	3	86	14	84	16	59	41	46	54	24	76	
ERRORS	0	3	0	16	10	13	4	14	20	4	16	0	100

an item increases. Thus, in the event that the relative difficulty of each item in the scale is not established a priori, it can be accomplished by observing the proportions of passes or failures for each question.

The first column of Table 1 shows the scale type, or the score for all respondents meeting the criteria to be included in each classification. For example, scale type 6 is the classification for all respondents who passed all 6 questions in the scale. In this case, the last column shows that only one farmer passed all six items, hence could be assigned a score of 6.

Now consider the row headed scale type 5. This row contains all of the respondents passing 5 out of 6 questions in the scale. The entry in the total column corresponding to this row indicates that 4 farmers fell into this category. Since the questions are arranged in decreasing order of difficulty, if the items formed a perfect scale, then these 4 respondents should all pass questions 4, 5, 6, 2, and 1, but fail question 3. The responses in Table 1 show that there are errors associated with this scale type. Specifically, not all of the 4 respondents who passed five out of the six items failed question 3. One farmer passed this question when he should have failed it according to the logic of this procedure. The same is true in the case of question 5. All four farmers should have passed this question when indeed only three did.

An inspection of the remaining scale types shows that there are other errors which cause this scale to deviate from a perfect Guttman Scale. In empirical research of this kind it would be rare to find a perfect scale. As a result, various criteria have been established to aid in the evaluation of the scalability of the items.

The most common criterion is called the coefficient of reproductibility. This coefficient is a measure of the extent to which a respondent's scale score is a predictor of his response pattern, and is defined by the following formula [13].

$$\text{Rep} = 1 - \frac{\text{Total Number of Errors}}{\text{Total Number of Responses}}$$

It is equal to the proportion of responses to the items that can be correctly reproduced. Since each subject responds once to each item it is apparent that

$$\text{Rep} = 1 - \frac{\text{Total Number of Errors}}{\text{Number of Items} \times \text{Number of Subjects}}$$

In this study the coefficient of reproductibility is

$$\text{Rep} = 1 - \frac{100}{6 \times 153} = 0.8911$$

The commonly accepted standard for the coefficient of reproducibility separating scales from non-scales is 0.90. The opinion leadership scale developed in this research fell short of this standard; however, because of the arbitrary nature of this standard, and the small difference between the standard and the coefficient of reproducibility observed, it was decided to accept the scale as a true Guttman Scale.

Having inspected the item responses according to the strict procedures of scalogram analysis, the next step was to construct the opinion leadership scale. In this procedure each respondent was assigned a score based upon the number of items passed. Thus referring to Table 1, the one

individual who passed all six items was given a scale score of 6, the four farmers who passed five of the six items were given scale scores of 5, and so on for the remainder of the respondents. Following the criteria used in other opinion leadership studies, it was decided to place approximately 30 percent of the farmers in the leader category. Thus those farmers with scale scores of thres and above were classified as leaders. This procedure resulted in classifying 34 percent of the farmers as leaders and 66 percent as non-leaders.

DEVELOPMENT OF TYPOLOGIES

Two broad categories of characteristics -- socio-economic and purchasing behavior -- were used in this research to identify opinion leaders. The chi-square test of independence was used to determine significant differences between the opinion leader and non-leader groups. All differences with a probability greater than 0.20 were accepted as significant and are discussed in the remainder of this section.

Socio-Economic Variables

The first hypothesis stated that opinion leaders can be differentiated from non-leaders on the basis of selected socio-economic variables. The specific socio-economic variables identified in this hypothesis were: age, farming experience, formal education, gross income, tillable acres, degree of specialization, and type of enterprise. Of these only age, gross income tillable acres, and degree of specialization were found to be significantly different between the leadership groups. No significant differences between groups could be found for farming experience, formal education, or type of enterprise.

Age

The relationship between age of the operator and opinion leadership is shown in Figure 1. This graph shows that there is a general tendency for opinion leaders to be concentrated in the young to middle age categories, while non-leaders tend to be either in the very young or older age groupings. This result is contrary to the original hypothesis that concentrations of opinion leaders should be found in the older age categories.

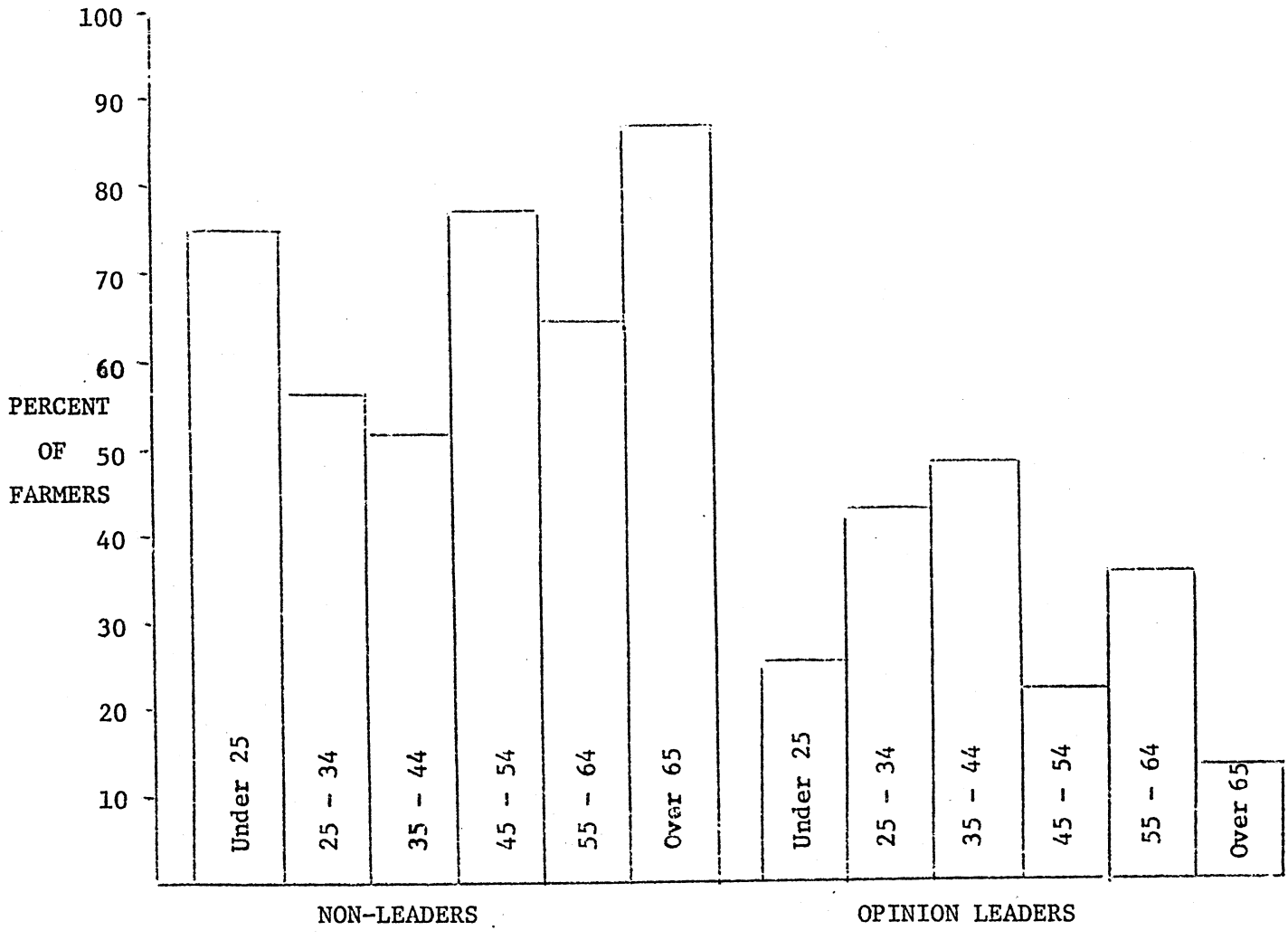
Gross Income

A significant difference was also found between opinion leaders and non-leaders in terms of gross income. In general, the concentration of opinion leaders in the higher gross income categories was found to be substantially higher than non-leaders. This tendency was particularly true in the two income categories above $35,000. Thus the data shown in Figure 2 tends to support the hypothesis that concentrations of opinion leaders are found among farmers with higher levels of gross income.

Tillable Acres

Another measure of farm size is number of tillable acres. Like gross income, this variable was found to be different between the opinion leader and non-leader groups. With the exception of the 200-299 acre group, the graph in Figure 3 shows that the concentration of opinion leaders tends to increase as the number of acres increases, thus supporting the original hypothesis.

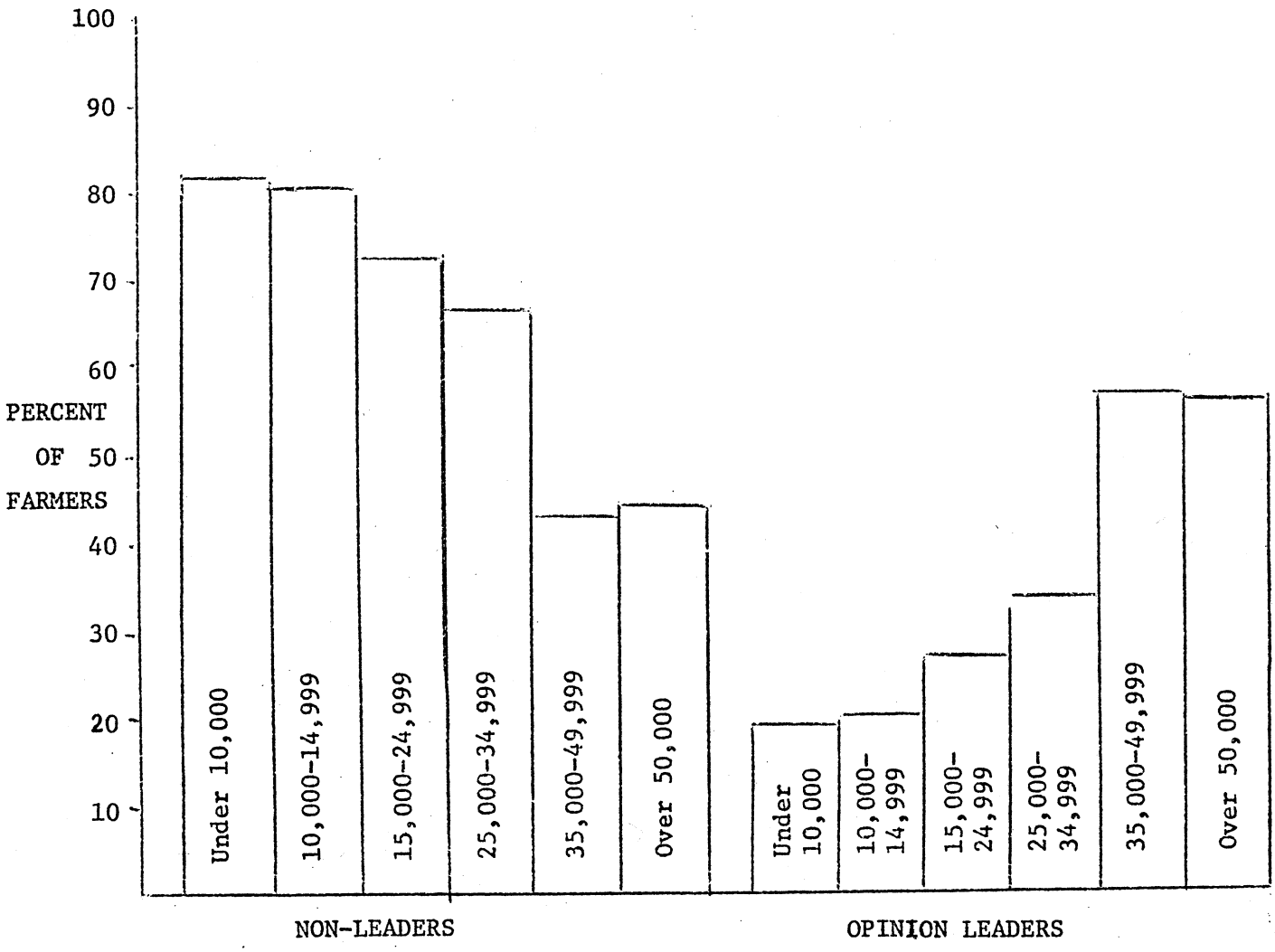
FIGURE 1. RELATIONSHIP BETWEEN AGE AND OPINION LEADERSHIP



A G E	NON-LEADER		LEADER		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Under 25	3	75.0	1	25.0	4	100
25 - 34	13	56.5	10	43.5	23	100
35 - 44	22	52.4	20	47.6	42	100
45 - 54	27	77.1	8	22.9	35	100
55 - 64	22	64.7	12	35.3	34	100
Over 65	13	86.7	2	13.3	15	100

ari χ^2 χ^2 = 9.24 with 5 d.f.; p = .10

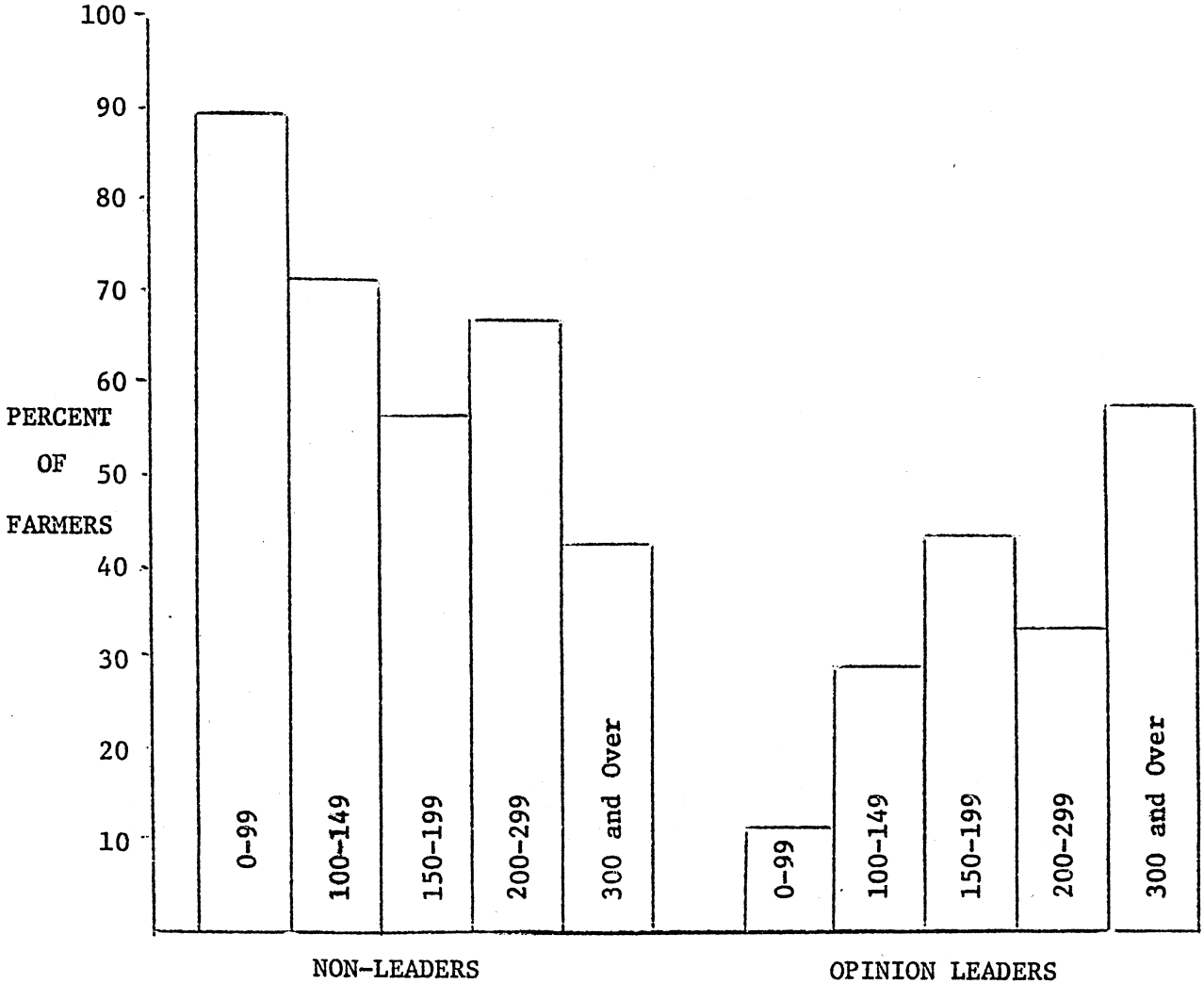
FIGURE 2. RELATIONSHIP BETWEEN GROSS INCOME AND OPINION LEADERSHIP



GROSS INCOME	NON-LEADER		LEADER		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Under 10,000	18	81.8	4	18.2	22	100
10,000-14,999	21	80.8	5	19.2	26	100
15,000-24,999	22	73.3	8	26.7	30	100
25,000-34,999	18	66.7	9	33.3	27	100
35,000-49,999	10	43.5	13	56.5	23	100
Over 50,000	11	44.0	14	56.0	25	100

$\chi 2 = 16.12$ with 5 d.f.; $p = .01$

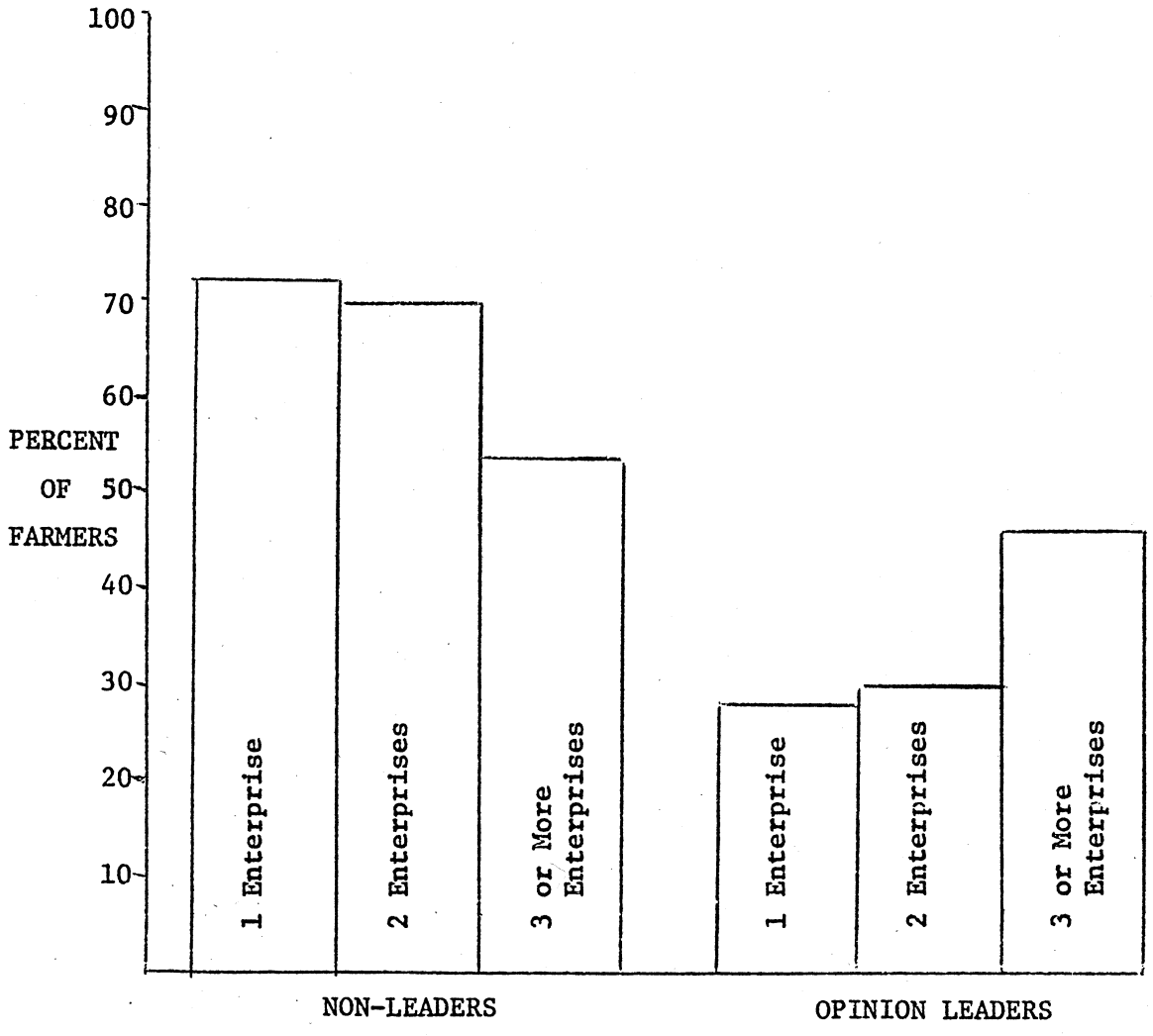
FIGURE 3. RELATIONSHIP BETWEEN TILLABLE ACRES AND OPINION LEADERSHIP



TILLABLE ACRES	NON-LEADER		LEADER		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
0-99	25	89.3	3	10.7	28	100
100-149	25	71.4	10	28.6	35	100
150-199	18	56.3	14	43.8	32	100
200-299	20	66.7	10	33.3	30	100
300 & Over	12	42.9	16	57.1	28	100

$\chi^2 = 15.10$ with 4 d.f.; $p = .01$

FIGURE 4. RELATIONSHIP BETWEEN SPECIALIZATION AND OPINION LEADERSHIP



SPECIAL-IZATION	NON-LEADER		LEADER		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
1 Enterprise	21	72.4	8	27.6	29	100
2 Enterprises	52	70.3	22	29.7	74	100
3 or more Enterprises	27	54.0	23	46.0	50	100

$\chi^2 = 4.27$ with 2 d.f.; $p = .20$

Specialization

A measure of farm specialization was developed to reflect the degree to which a farmer tended to specialize in one or a few enterprises or operate a more general farm with many enterprises. All farmers in the sample were asked to rank the importance of the following six enterprises on their farms: cash grain, dairy, hogs, beef cattle, poultry, and other. Given this information the farmers were categorized in terms of the number of enterprises they operated. Those farmers with only one enterprise were obviously highly specialized, those with two enterprises were categorized as average or medium, and those with three or more were categorized as low. The percentages of farmers falling into the three groups were: 19 percent highly specialized, 48 percent medium, and 33 percent low.

When the opinion leaders and non-leaders were compared in terms of specialization it was found that there was a general tendency for opinion leaders to be concentrated in the non-specialized class. This result, together with the fact that no significant difference was found between leadership groups for type of farm, tends to dispute the hypothesis that concentrations of opinion leaders are found among farmers specializing in grain production.

Behavioral Variables

The second hypothesis stated that opinion leaders can be differentiated from non-leaders on the basis of certain purchasing behavior variables. The specific behavioral variables identified in this hypothesis were: innovativeness, magazine readership, rationality, brand awareness, search, and brand loyalty. Significant differences between leadership

groups were found in the case of all of these variables with the exception of brand loyalty.

Innovativeness

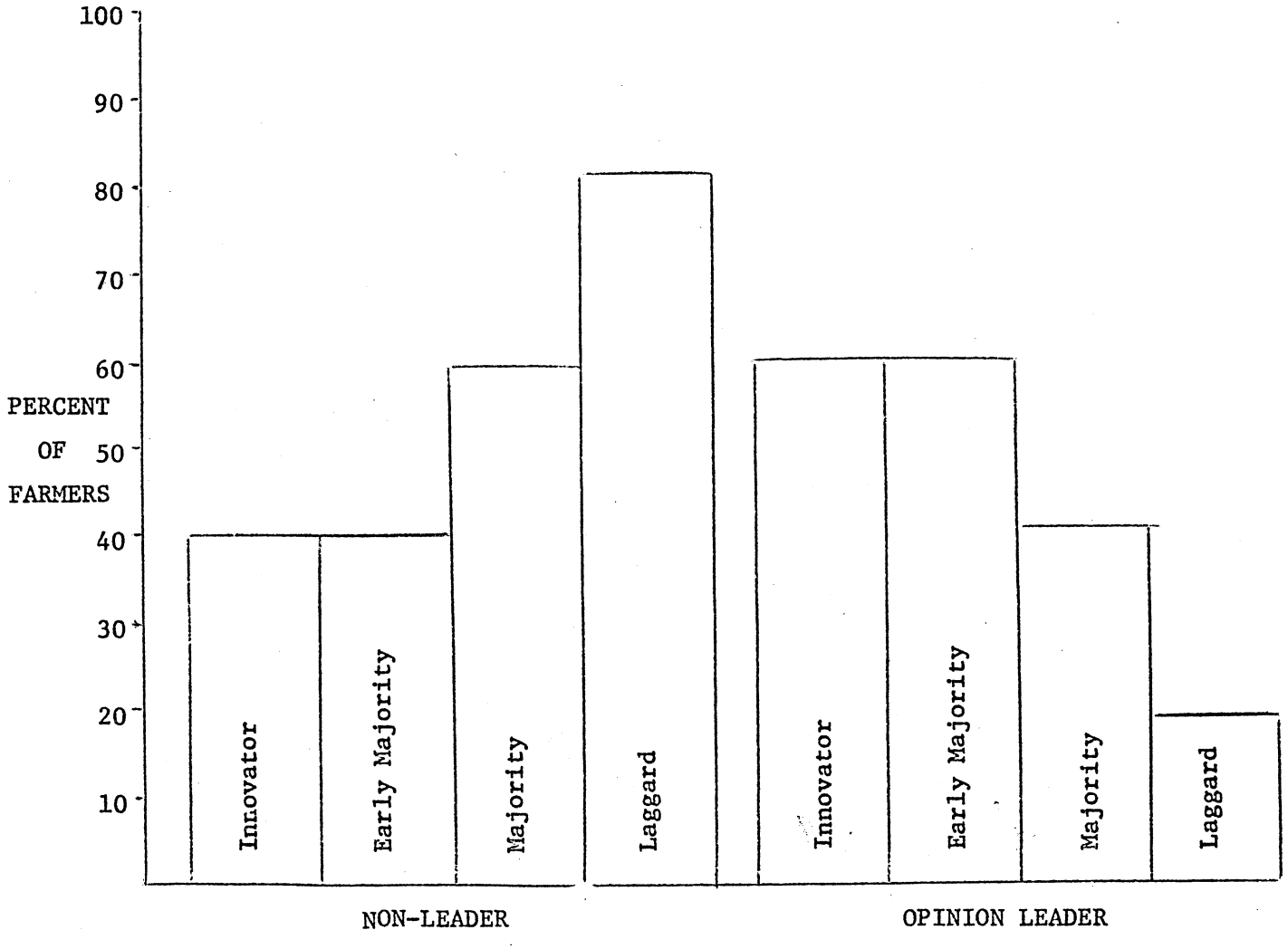
The variable innovativeness was measured using a self-designating method developed by Rocke [9]. This method consists of describing four categories of innovative behavior and asking the farmer to select the one description which best matches his own behavior. The categories and descriptions used were:

> When some new seed corn variety is developed and released are you?
>
> Innovator - Generally the first to try it in your neighborhood?
>
> Early Majority - Among the first to try it?
>
> Majority - Try it as soon as most of your neighbors?
>
> Laggard - Wait to see how it works on your neighbors' farms?

Responses to this question indicated that 7 percent of the farmers were innovators, 23 percent were early majority, 18 percent were majority, and 52 percent were laggards.

Figure 5, shows the difference between opinion leaders and non-leaders in terms of innovativeness. Clearly, there is a strong tendency for opinion leaders to be innovators. In both the early majority and innovator categories the results show a high proportion of opinion leaders and a low proportion of non-leaders. The opposite situation occurs in the majority and laggard categories.

FIGURE 5. RELATIONSHIP BETWEEN INNOVATIVENESS AND OPINION LEADERSHIP



INNOVATIVENESS	NON-LEADER NUMBER	NON-LEADER PERCENT	LEADER NUMBER	LEADER PERCENT	TOTAL NUMBER	TOTAL PERCENT
Innovator	4	40.0	6	60.0	10	100
Early Majority	14	40.0	21	60.0	35	100
Majority	16	59.3	11	40.7	27	100
Laggard	66	81.5	15	18.5	81	100

$\chi^2 = 22.52$ with 3 d.f.; $p = .001$

Magazine Readership

The measure of farm magazine readership used in this project was simply the number of farm magazines read. Each farmer was presented with a list containing the names of most of the common farm magazines available in this geographical area. The farmers were then instructed to check those for which they currently had subscriptions. Given this information, a frequency count was performed and farmers were placed into four groups on the basis of number of subscriptions. The groups were: low readership, 2 or fewer subscriptions; low medium readership, 3 to 4 subscriptions; high medium readership, 5 to 6 subscriptions; and high readership, 7 or more subscriptions. The percentage of farmers in each group were 19 percent, 39 percent, 33 percent, and 9 percent respectively.

Figure 6, shows the differences between opinion leaders and non-leaders in terms of magazine subscriptions. It is evident that there is tendency for opinion leaders to read a greater number of farm magazines than non-leaders.

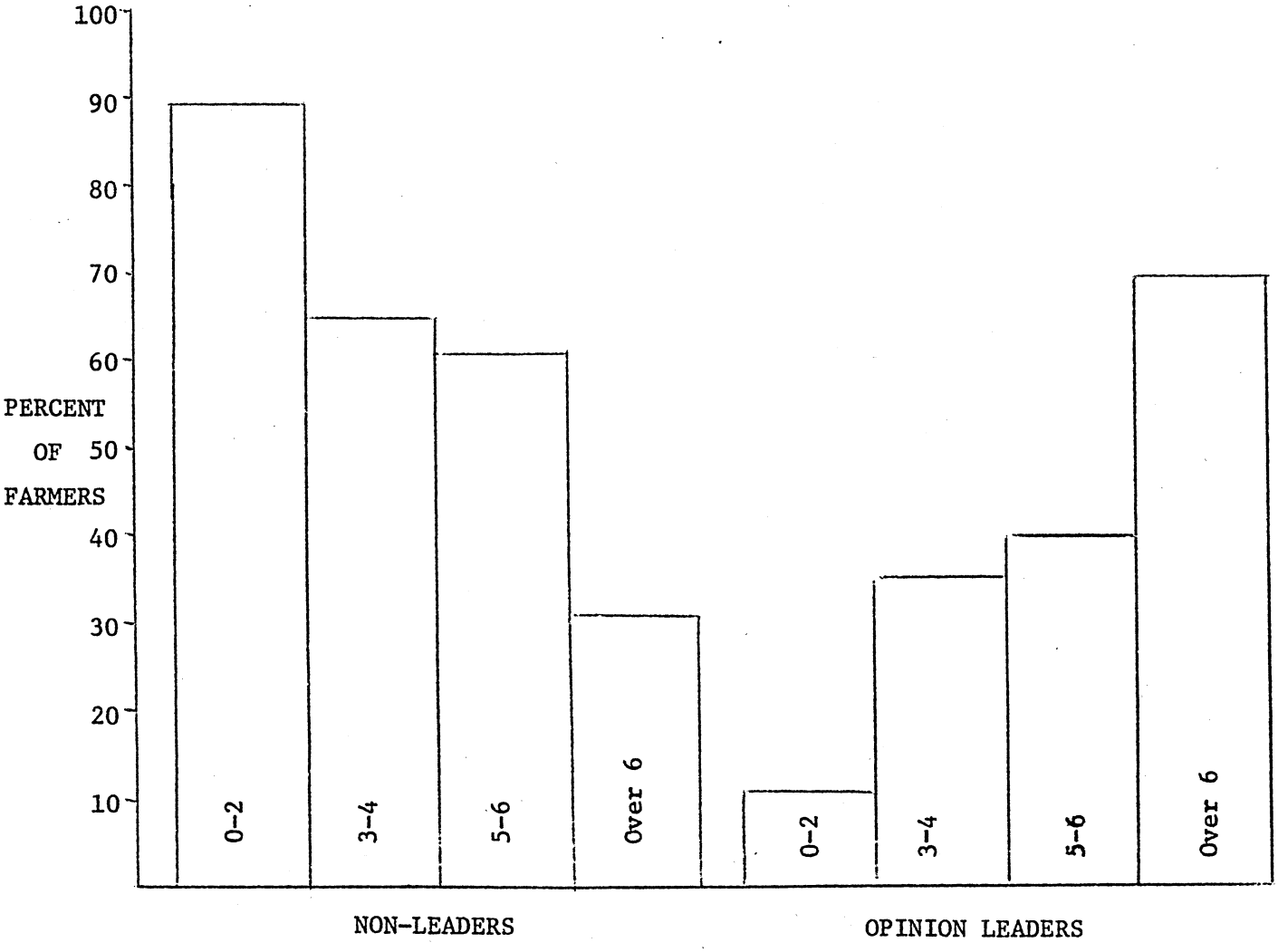
Rationality

Another variable found to be related to opinion leadership was rationality of the decision-maker. A measure of rationality was developed based upon a rationality index constructed by Dean, Aurbach, and Marsh [1]. The rationality index used in this research is as follows:

1. How do you decide how many acres of corn to plant?

   3 - plant what is needed to feed livestock
   - plant according to market conditions
   - plant what is required in rotation

FIGURE 6. RELATIONSHIP BETWEEN MAGAZINE READERSHIP AND OPINION LEADERSHIP



MAGAZINE READERSHIP	NON-LEADER		LEADER		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
0-2	26	89.7	3	10.3	29	100
3-4	39	65.0	21	35.0	60	100
5-6	31	60.8	20	39.2	51	100
Over 6	4	30.8	9	69.2	13	100

$\chi^2 = 14.90$ with 3 d.f.; $p = .01$

2 - plant according to general needs
- plant what can be handled
- plant all acreage in corn

1 - always plant the same amount
- don't know

2. How do you decide which variety of seed corn to plant?

3 - followed recommendations of professionals
- according to the Ontario Hybrid Corn Performance Trials Results
- to experiment with a new variety
- to solve some specific problem

2 - recommendations of relatives, neighbors, and other farmers
- followed recommendations of commercial interests

1 - always plant the same variety
- don't know

3. How did you decide how much fertilizer to apply to your corn this year?

3 - according to soil tests
- followed recommendations of professionals

2 - on the basis of general experience
- recommendations of fertilizer companies
- recommendations of relatives, neighbors, and other farmers

1 - same as last year
- always use the same amount
- don't know

4. Have you had any of your fields soil tested in the last five years?

3 - yes

1 - no
- don't know

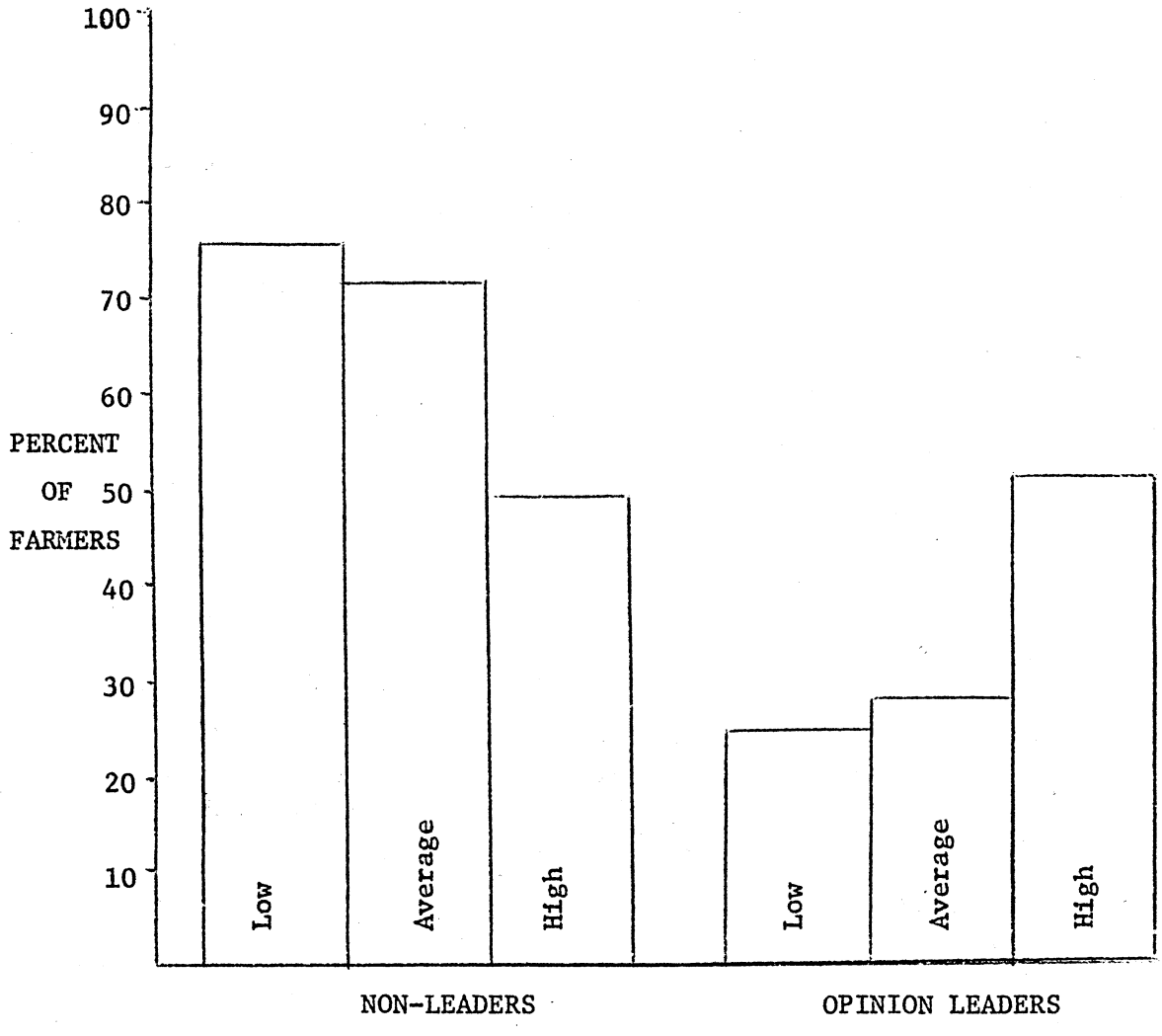
5. Have you ever tried to figure out on paper what your cost of production is for corn?

3 - yes

1 - no
- don't know

The actual responses of farmers to the five questions were coded based upon the criteria set out above and a rationality score was computed for each farmer. Each farmer was then placed into one of three groups based upon this score. The groups, and the percentage of farmers in each group were: high, 33 percent; average, 44 percent; and low, 23 percent.

FIGURE 7. RELATIONSHIP BETWEEN RATIONALITY AND OPINION LEADERSHIP



RATIONALITY	NON-LEADER		LEADER		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Low	25	75.8	8	24.2	33	100
Average	50	72.5	19	27.5	69	100
High	25	49.0	26	51.0	51	100

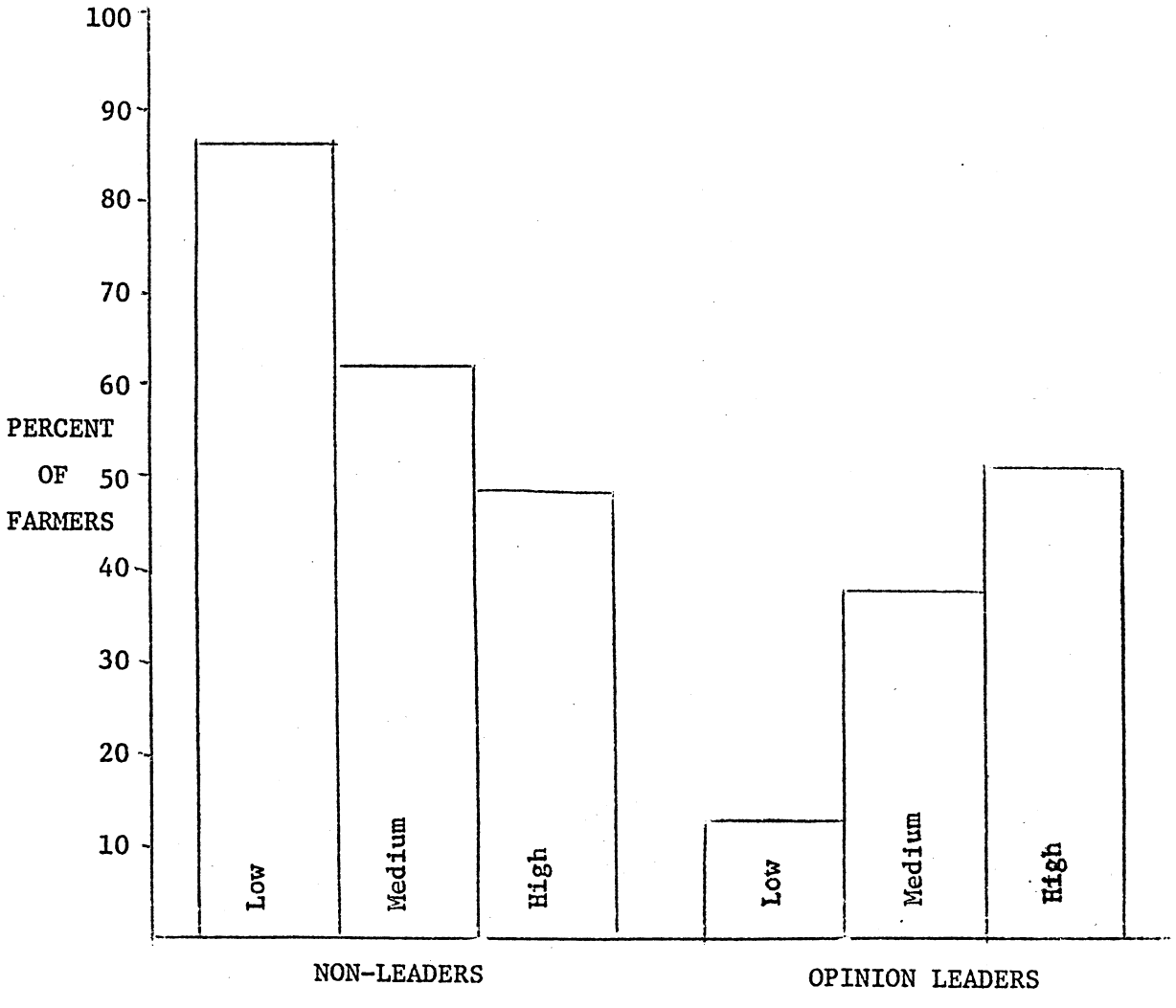
$\chi^2 = 9.12$ with 2 d.f.; $p = .02$

When opinion leaders and non-leaders were compared in terms of rationality, a significant difference was observed. This difference is shown in Figure 7. In general, it can be observed that the proportion of opinion leaders increases as the level of rationality increases.

Awareness

An awareness score was developed for each farmer based upon three measures of awareness toward dealers and brands. The three measures included in this score were: number of brands for which the farmer was aware, number of dealers he could identify, and his score on a slogan recall test. To determine the number of visible brands, each farmer was given a sheet containing a list of all brands available in his geographic area, and then asked to check each brand he had heard of previously. The total number of brands checked formed the first dimension of the awareness score. The second dimension, number of dealers identified, was determined in a similar manner. On a sheet containing a list of all brands available, the farmer was asked to write in the name of a dealer from whom he could purchase that brand. The total number of dealers identified formed the second dimension of the awareness score. The third dimension was measured by a slogan and variety designation recall test. The farmer was presented with a list of six common advertising slogans and nine variety designations for brands of seed corn. He was then asked to identify the brand associated with each slogan and variety designation. The number of correct answers to this test formed the third dimension of the awareness score.

FIGURE 8. RELATIONSHIP BETWEEN AWARENESS AND OPINION LEADERSHIP



AWARENESS	NON-LEADER		LEADER		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Low	33	86.8	5	13.2	38	100
Medium	50	62.5	30	37.5	80	100
High	17	48.6	18	51.4	35	100

$\chi^2 = 12.39$ with 2 d.f.; $p = .01$

The final awareness score was a combination of the above three dimensions. The raw scores for each dimension were transformed to standard scores and summed to calculate the overall awareness score. Based on this score, the farmers were arrayed from high to low and three groups -- high, average, and low awareness -- were formed. Twenty-three percent of the farmers were categorized in the high awareness group, 52 percent in the average group, and 25 percent in the low group.

When the opinion leaders and non-leaders were compared in terms of awareness, a highly significant difference was found between the two groups. Farmers classified as opinion leaders tended to have a much higher level of dealer and brand awareness than other farmers.

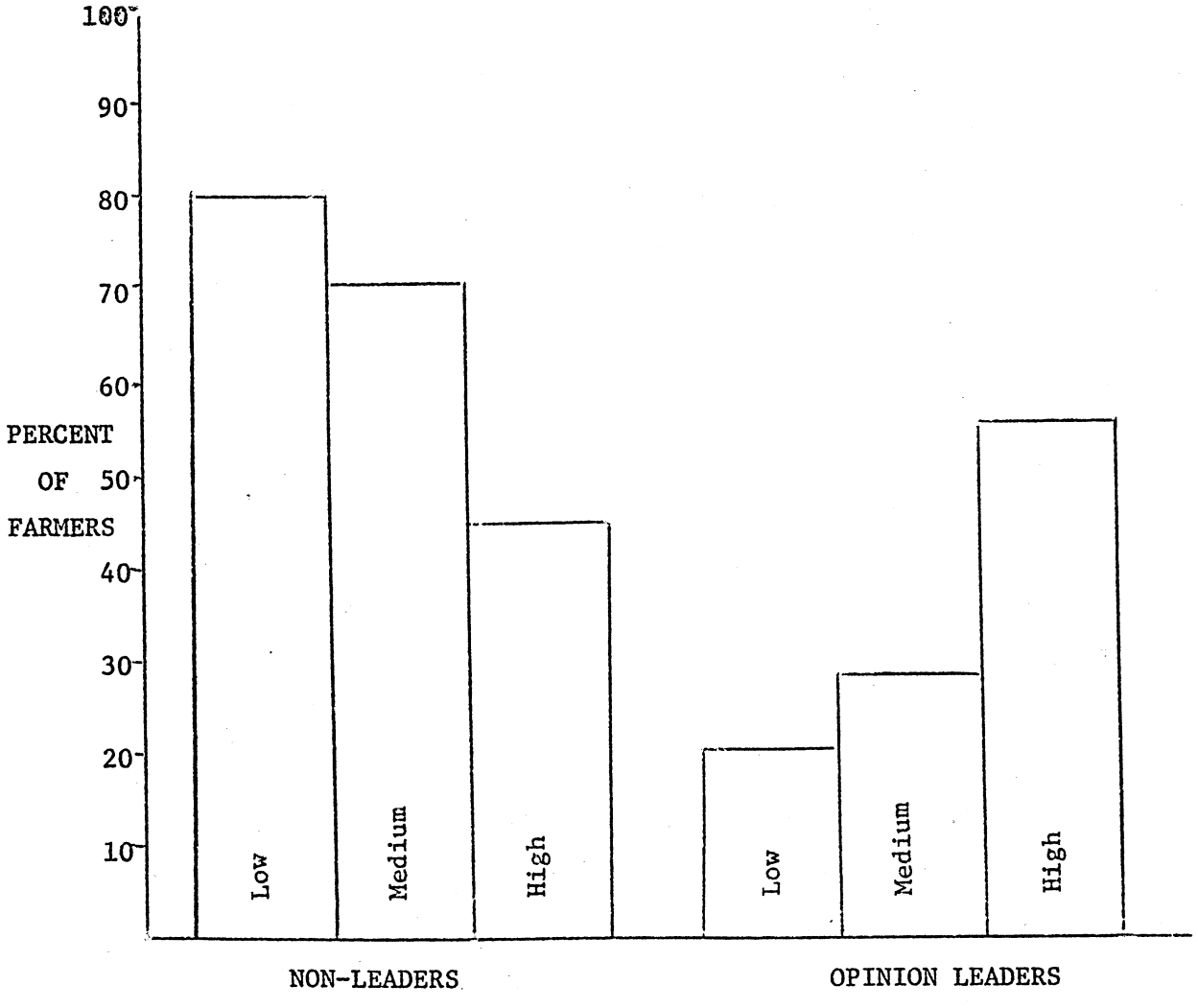
Search Activities

The final behavioral variable for which a significant difference was found between opinion leaders and non-leaders was the extent of the farmer's search activities. Searching activities, in this instance, were defined to include those activities through which farmers compare alternative product offerings.

A search index was computed for each farmer based upon his participation in six search activities -- attending corn field days, planting test plots, checking variety yields, seeking specific advice from neighbors and friends, reading the Ontario Hybrid Corn Performance Trials Report, and contacting dealers.

Figure 9, shows the relationship between the extent of search and opinion leadership. As expected, farmers who were classified as opinion leaders were found to have a much greater tendency to search for alternative

FIGURE 9. RELATIONSHIP BETWEEN SEARCH AND OPINION LEADERSHIP



SEARCH	NON-LEADER		LEADER		TOTAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Low	32	80.0	8	20.0	40	100
Medium	45	72.6	17	27.4	62	100
High	23	45.1	28	54.9	51	100

$\chi^2 = 14.46$ with 2 d.f.; $p = .001$

TABLE 2. RELATIONSHIP BETWEEN INDIVIDUAL SEARCH ACTIVITIES AND OPINION LEADERSHIP

Search Activity	Participation	Non-Leaders		Leaders		Total		χ^2	Significance
		Number	Percent	Number	Percent	Number	Percent		
Attend	Yes	19	52.8	17	47.2	36	100	2.6044	.20
Field Days	No	81	69.2	36	30.8	117	100		
Plant	Yes	12	41.4	17	58.6	29	100	8.2190	.10
Test Plots	No	86	71.7	34	28.3	120	100		
Check	Yes	33	50.8	32	49.2	65	100	10.3755	.10
Variety	No	65	77.4	19	22.6	84	100		
Seek Friend's	Yes	39	60.9	25	39.1	64	100	0.6441	N.S.
Advice	No	61	68.5	28	31.5	89	100		
Read	Yes	53	54.6	44	45.4	100	100	12.1897	.001
OHCPTR	No	47	83.9	9	16.1	53	100		

brands than were the non-leader farmers.

The differences in participation in the individual searching activities between the two leadership groups are shown in Table 2. Although significant differences were found with respect to attending field days, planting test plots, and checking variety yields, it is apparent that the major difference is in terms of using the OHCPTR.

Discriminant Analysis

In the previous two sections, cross-classification analysis was used to describe opinion leaders in terms of selected socio-economic and purchasing behavior variables. In this analysis, attention was focused on finding variables which were significantly different between the leader and non-leader groups. Although the results of this analysis showed that several of these variables were different between leadership groups, no indication of the relative discriminating power of these variables was given. To look at this issue, the technique of multiple discriminant analysis was used.

Overview of Discriminant Analysis

"The objective of discriminant analysis is to classify objects, by a set of independent variables, into one of two or more mutually exclusive and exhaustive categories"[8]. For example, on the basis of a farmer's age, gross income brand awareness, etc. he can be classified either as an opinion leader or non-leader.

The linear discriminant function can be expressed as:-

$$Z_i = b_0 + b_1x_{1i} + b_2x_{2i} + \ldots + b_nx_{ni}$$

where x_{ji} = the ith individual's value of the jth dependent variable

b_j = the discriminant coefficient for the jth variable

Z_i = the ith individual's discriminant score

The discriminant coefficients, or weights, are estimated by finding the linear combination of the original variables that maximizes the ratio of among to within group variability. Classification is accomplished by substituting the appropriate x_{ji} values for each individual into the discriminant function and calculating a value for Z_i. This value is then compared with a critical value for Z:

if $Z_i > Z_{crit.}$, classify individual i in Group 1

if $Z_i < Z_{crit.}$, classify individual i in Group 2

Application of Discriminant Analysis

In this research, discriminant analysis was used to differentiate between opinion leaders and non-leaders on the basis of the same twelve independent variables listed in the two original hypotheses. To facilitate interpretation, each of these independent variables was standardized prior to use. Computations were performed using the BMD stepwise discriminant analysis program.

Table 3, shows the mean values of the standardized independent variables for the two leadership groups. In the case of age and years farming, the means are positive for the non-leaders and negative for the leaders indicating that the leaders tend to be younger farmers with less experience. For the remaining ten variables the situation is reversed; higher values of these variables are associated with opinion leadership. The univariate F ratios in the last column of Table 3 test the discriminating power of each of the

TABLE 3. MEANS, MEAN DIFFERENCES, AND UNIVARIATE F RATIOS FOR TWELVE INDEPENDENT VARIABLES IN DISCRIMINANT ANALYSIS

Independent Variables	Means		Mean Differences	Univariate F
	Non-Leaders	Leaders		
Age	0.112	-0.216	0.328	3.6892
Years Farming	0.029	-0.123	0.152	0.7735
Education	-0.045	0.087	0.132	0.6095
Gross Income	-0.234	0.442	0.676	17.5359 *
Tillable Acres	-0.089	0.168	0.257	2.3232
Specialization	-0.109	0.206	0.315	3.4970
Innovativeness	-0.270	0.510	0.780	24.3571 *
Magazine Readership	-0.209	0.395	0.604	13.7259 *
Rationality	-0.179	0.339	0.518	9.8534 *
Awareness	-0.199	0.376	0.575	12.2574 *
Search	-0.234	0.440	0.674	17.4386 *
Brand Loyalty	-0.124	0.234	0.358	4.5311 *

* $p > .05$

independent variables taken separately. In general, those variables which are shown to be significant discriminators with the univariate F test are the same as those determined to be significant in the earlier cross-classification analysis.

Table 4, presents the coefficients of the twelve variables for the two discriminant functions. Each coefficient represents the effect of the variable on the probability of classification in the group correspondending to the particular discriminant function. As such, the coefficients are more sensitive measures of group characteristics than the means of the variables shown in Table 3. Moreover, the discriminant coefficients take into account correlations among variables. For example, since farmers with more years of farming experience also tend to be older, the means of these two variables tend to be highly correlated from group to group. The discriminant coefficient, on the other hand, gives the effect of years farming, holding age constant, and vice versa.

The leader and non-leader group characteristics can be observed by comparing the discriminant coefficients for each variable in Table 4. A variable contributes most to the probability of classification in that group for which it has the highest positive value. Conversely, negative coefficients indicate the extent to which farmers scoring high on a variable are not likely to be associated with the group. The F value associated with each variable tests the significance of that variable in discriminating between the two leadership groups when the effect of all the other variables has been considered.

The results in Table 4 show that only three variables -- innovativeness, gross income, and search -- are significant discriminators between leadership

TABLE 4. DISCRIMINANT SCORES FOR OPINION LEADERSHIP GROUPS

Characteristic	Non-Leader	Leader	F Value
Age	+.07	-.01	0.6152
Years Farming	-.03	-.11	0.0685
Education	+.12	-.24	1.8282
Gross Income	-.13	+.25	8.1368 **
Tillable Acres	+.02	-.04	0.0863
Specialization	-.10	+.20	2.1479
Innovativeness	-.22	+.43	25.3570 **
Magazine Readership	-.05	+.13	1.1122
Rationality	-.03	+.06	0.1778
Awareness	-.03	+.06	0.1967
Search	-.12	+.22	3.2243 *
Brand Loyalty	-.02	+.04	0.0715
Constant	-.77	-.97	

* $p > .100$

** $p > .001$

groups. In each case the discriminant coefficients are positive for the leader group and negative for the non-leader group. This finding confirms the results of the earlier cross-classification analysis which showed a positive relationship between these independent variables and opinion leadership. In the cross-classification analysis, however, several other significant relationships were found which were not found here. This, of course, is because in simple cross-classification, the comparison is between the dependent variable and a single independent variable without controlling for the effect of the other independent variables. In discriminant analysis, each discriminant coefficient shows the effect of that variable on the probability of group classification, assuming all other variables are held constant.

In evaluating the results of discriminant analysis a useful procedure is to determine the model's ability to predict group membership. This is accomplished by substituting the values of the independent variables for each individual into the discriminant function, and on the basis of the resulting discriminant score, classifying the individual into the appropriate group. Since each individual's actual group membership is known, it is possible to determine the proportion of cases correctly classified by the model. As the proportion correctly classified increases, the predictive ability of the model also increases.

Using the above procedure, the predictive ability of the discriminant function estimated in this research was evaluated. The results of this evaluation are shown in Table 5. These results show that the model classified 64 farmers as opinion leaders and 89 as non-leaders compared to the a priori classification of 53 leaders and 100 non-leaders.

TABLE 5. RESULTS OF PREDICTIVE TESTS

Actual	Classified		Total
	Leader	Non-Leader	
Leader	36	17	53
Non-Leader	28	72	100
Total	64	89	153

Of the 64 classified as leaders, 36 were actually leaders while 28 were non-leaders. In the case of the 89 non-leaders, 72 were in fact non-leaders. while 17 were leaders. Overall the model correctly classified 108 of the 153 farmers, or 71 percent.

In order to determine whether a certain percentage of correct classifications is acceptable, it is necessary to determine the percentage of correct classifications which would result from chance. The appropriate chance model to use in this context is [8]:

$$P(\text{Correct}) = P(\text{Correct}|\text{Classified Group 1})\, P(\text{Classified Group 1}) + P(\text{Correct}|\text{Classified Group 2})\, P(\text{Classified Group 2})$$

where $P(\text{Correct})$ = the probability of an individual being correctly classified

Letting p = the true proportion of Group 1 individuals

α = the proportion classified as Group 1

Then $P(\text{Correct} = p\alpha + (1-p)(1-\alpha)$

Since $p = \alpha$, the chance model reduces to

$$P(\text{Correct}) = \alpha^2 + (1-\alpha)^2$$

In the present application of discriminant analysis, the proportion of individuals classified as opinion leaders was 34 percent. Thus the percentage of correct classifications that could be expected by chance is:

$$P(\text{Correct}) = (.34)^2 + (.66)^2 = .55, \text{ or } 55 \text{ percent}$$

Comparing this percentage with the actual percentage of 71 percent, it is seen that the predictive ability of the discriminant model is substantially greater than simple chance prediction.

SUMMARY AND IMPLICATIONS

Two broad categories of descriptive variables -- socio-economic and behavioral -- were employed in this research to develop typologies for opinion leaders with respect to seed corn. Of the seven socio-economic variables considered in cross-classification analysis, four were found to be related to opinion leadership. These were: age, gross income, tillable acres, and farm specialization. No significant relationships were found for farming experience, formal education, and type of farming operation.

In addition to the socio-economic variables, six behavioral variables were used in the analysis. Five of these -- innovativeness, magazine readership, rationality, awareness, and search -- were found to be related to opinion leadership. No significant relationship was found between brand loyalty and opinion leadership. A summary of these findings is shown in Table 6.

In addition to the cross-classification analysis, a multiple discriminant analysis was performed using the twelve socio-economic and behavioral variables to predict membership in the leader and non-leader

TABLE 6. OPINION LEADERSHIP PROFILE

Characteristic	Concentrations of Opinion Leaders Found in	Level of Significance
Age	Middle Aged	$p > .10$
Years Farming		N.S.
Education		N.S.
Gross Income	Higher	$p > .01$
Tillable Acres	Higher	$p > .01$
Type of Enterprise		N.S.
Farm Specialization	Less Specialized	$p > .20$
Innovativeness	Greater	$p > .001$
Magazine Readership	Higher	$p > .01$
Rationality	Higher	$p > .02$
Awareness	Higher	$p > .01$
Search	Greater	$p > .001$
Brand Loyalty		N.S.

groups. Results of this analysis showed that this discriminant model could successfully predict over 70 percent of the cases into the proper category. Of the twelve independent variables included in the model, only three were found to be significant discriminators between the leadership classes. These were innovativeness, gross income, and searching activities. In each case, higher values of these variables were associated with the opinion leader group. The remaining nine independent variables, although not significant discriminators in a statistical sense, did help to improve the predictive ability of the model, hence are useful in differentiating between the two groups.

Based upon the cross-classification and discriminant analysis performed in this research, farm supply opinion leaders were differentiated from non-leaders on a variety of socio-economic and behavioral measures. Thus the farm supply opinion leader does represent an identifiable and significant market segment and can be integrated into a marketing strategy on at least two dimensions.

First, farm supply opinion leaders represent a significant market segment with high sales potential. By the operational definition used in this research, 34 percent of the sample were characterized as opinion leaders. Moreover, the analysis showed that the opinion leader group tended to farm larger acreages with higher gross incomes, hence have a greater need for purchased farm inputs.

Second, opinion leaders represent important change agents in disseminating information concerning brands and uses of farm supplies. Thus they are also important as a market segment beyond their individual purchase capacity. They are links in the communication network between farm supply

firms and the majority of farmers. As such, the profile developed in this research can be used to direct information to this group. Particularly important in this regard is the fact that opinion leaders tend to be larger farmers. Since the large farmer segment is readily accessible and identifiable, various media sources, direct mail, and personal selling can be used to selectively reach this group. Because of the heavy concentration of opinion leaders among larger farmers, firms can be reasonably sure that information directed to this segment will be disseminated throughout the entire farming community. Because of the dominant relationship between opinion leadership and innovativeness, a strategy of introducing new products and services through the opinion leader segment should be highly effective.

The opinion leadership profile also can be used in selecting the type of information and appeals which will be most meaningful and effective. For example, given the concentration of opinion leaders in the high farm magazine readership categories implies that this media source might be particularly effective. Moreover, the higher rationality and the greater searching activity on the part of opinion leaders implies that performance oriented appeals might be the most meaningful for this group.

Although the results of this research have provided initial insights into the characteristics of farm supply opinion leaders, further research is needed in extending the profile to include other social, attitudinal, and information source variables. With this broader base of descriptive information, marketers will be able to utilize this important market segment more effectively in designing and implementing successful marketing strategies.

REFERENCES

1. Dean, A., H.A.Aurbach, and C.P.Marsh, "Some Factors Related to Rationality in Decision-Making Among Farm Operators", Rural Sociology, Vol.23, pp.121-135, 1958.

2. Funk, T.F., A Description of Seed Corn Buying Behavior, Working Paper AE/73/13, University of Guelph, August 1973.

3. Katz, E., and P.Lazarsfeld, Personal Influence, (Glencoe, Illinois: Free Press, 1955).

4. Lionberger, H.F., "Some Characteristics of Farm Operators Sought as Sources of Farm Information in a Missouri Community", Rural Sociology, Vol.1 , pp.327-338, 1953.

5. Lionberger, H.F., "The Relation of Informal Social Groups to the Diffusion of Farm Information in a Northeast Missouri Farming Community", Rural Sociology, Vol.19, pp.233-243, 1954.

6. Lionberger, H.F., and M.C.Coughenour, Social Structure and the Diffusion of Farm Information, Research Bulletin 631, Missouri Agricultural Experiment Station, April 1957.

7. Licnberger, H.F., and J.D.Francis, "Views Held of Innovator and Influence Referents as a Source of Farm Information in a Missouri Community", Rural Sociology, Vol.34, pp.197-211, 1969.

8. Morrison, D.G., "On the Interpretation of Discriminant Analysis", Journal of Marketing Research, Vol.6, May 1969.

9. Rocke, D.C., Farmer Behavior and Decision-Making in Purchasing Supplies, Unpublished Ph.D.Thesis, Purdue University, 1965.

10. Rogers, E.M., Characteristics of Agricultural Innovators and Other Adopter Categories, Research Bulletin 882, Ohio Agricultural Experiment Station, May 1961.

11. Rogers, E.M., and D.G.Cartano, "Methods of Measuring Opinion Leadership, Public Opinion Quarterly, Vol.26, Fall 1962.

12. Summers, J.O., "The Identity of Women's Clothing Fashion Opinion Leaders", Journal of Marketing Research, Vol.7, pp.178-185, May 1970.

13. Torgerson, W.S., Theory and Methods of Scaling, (New York: John Wiley and Sons, 1960).