THE EFFECTS OF BELIEF SYSTEM STYLES ON THE COMMUNICATION AND ADOPTION OF FARM PRACTICES

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THE EFFECTS OF BELIEF SYSTEM STYLES ON THE COMMUNICATION AND ADOPTION OF FARM PRACTICES

By

Juan F. Jamias

AN ABSTRACT OF A THESIS

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ABSTRACT

THE EFFECTS OF BELIEF SYSTEM STYLES ON THE COMMUNICATION AND ADOPTION OF FARM PRACTICES

by Juan F. Jamias

Past studies on the diffusion of farm practices have produced some generalizations about the communication and adoption of farming innovations. However, there has been a lack of studies directed at answering the question of why the observed relationships might have occurred. The purpose of this study was to extend the usefulness of certain of these past findings by advancing the theory of belief systems of Rokeach as an explanatory variable. Secondly, it was designed to empirically test Rokeach's concept of authority in its non-person form, specifically, the "value for innovativeness in a social system", which, in addition to the dogmatism of an individual, was expected to be related to adoption behavior.

A field study was conducted among dairy farmers in selected townships at Lapeer county, Michigan, to obtain evidence for seven hypotheses derived from the belief systems theory, hypotheses about the communication and adoption of farming innovations recommended by the extension service. Three townships were judged by extension service personnel as high "value for innovativeness" townships, three as "low" in this value, and two as "marginal" townships.

The line of inquiry developed in the interview questionnaire was focused on two specific dairy farming innovations, herd testing which included the D.H.I.A. and Owner Sampler programs, and heavy grain feeding. First, the field study was designed to elicit a

description of the stages of adoption passed through by the farm operators from the awareness to the adoption stage. The second stage in the adoption process, the information-seeking stage, was given special attention in one hypothesis. It was studied as a dependent variable called "information level."

The first hypothesis asserted that the high dogmatic individuals were more likely to "short-circuit" the five-stage sequence in the adoption process (i.e., skip the information-seeking stage) than relatively low dogmatic individuals. This hypothesis was not confirmed.

In the second hypothesis, it was expected that, in stating reasons for adoption, the low dogmatic persons would tend to mention "factual" reasons more than high dogmatic persons. The latter were expected to make statements about authority influence. This hypothesis was not confirmed.

The third and fourth hypotheses asserted that low dogmatic farm operators would use extended group members more than relatively high dogmatic persons as source of initial information (third hypothesis), as well as validating information (fourth hypothesis). Neither hypotheses was statistically supported.

The fifth hypothesis stating that the low dogmatic farm operators were more likely to attend to specialized mediated communication than high dogmatic persons was supported for the seeking of agricultural bulletins, but not for reading a dairy-farmer periodical.

The findings supported the predictions regarding the adoption of farming innovations. The sixth hypothesis, asserting that low dogmatic individuals would have a higher rate of adoption than high

dogmatic individuals, was confirmed. The seventh hypothesis stating that the strength of the "value for innovativeness" in a social system would affect the rate of adoption of high dogmatics but would have relatively little influence on the low dogmatic persons was supported by the data.

It was concluded that belief systems theory was more successful in predicting behavior with respect to adoption, the final product of the communication process, than with respect to the communication process per se. Furthermore, this study showed that the non-person form of Rokeach's core concept of authority can be empirically defined and its effects on human behavior investigated.

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THE RESEARCH PROBLEM

Introduction

Of continuing interest among professional agricultural communicators is the matter of gaining and speeding up the acceptance of new ideas and practices from scientific institutions by farm operators. The spread of innovations in social systems and among individuals -- called diffusion -- involves the communication of information about the practices from their sources of origin to their acceptance by potential users of the practice.

Going on since the 1920's, diffusion research has produced an abundant harvest of findings in studies conducted in the United States, and, more recently in other countries as well.[1] In general, the findings have pointed up the individual, group, and situational factors influencing the magnitude of adoption through time. Two processes have been described -- the process of diffusion which occurs between persons and the process of adoption which is viewed on the individual level. Principal generalizations from this research tradition include the S-shaped growth curve of adoption, the five adopter categories, the five stages in the adoption process, and the role of the various communication channels at the different stages and with respect to the adopter categories.

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[1]For comprehensive summaries of diffusion research, see Everett M. Rogers, Diffusion of Innovations (New York: The Free Press of Glencoe, 1962) and Herbert F. Lionberger, Adoption of New Ideas and Practices (Ames: Iowa State University Press, 1960).

In spite of this appreciable harvest of data, there still remains the need for understanding the why's behind their occurrence. A specific statement of this concern appeared in the doctoral dissertation of Troldahl, dealing with the dissemination of horticultural information.[2] Past research, he stated, has produced information regarding the predictors of who will be influenced by different types of messages. Among these are such variables as sex, education, and occupation. However, these data fail to aid in the understanding of why any of these variables should be a good predictor. Given a theory, a researcher who finds a good predictor can refer back to the underlying theoretical formulation to understand why and how the effect occurred.

The purpose of this study was to extend the utility of certain of the major findings in diffusion research by advancing an explanatory variable adopted from the discipline of social psychology. The theory of systems of belief propounded by Rokeach[3] was here assayed to account for some regularly observed phenomena in connection with the acceptance of agricultural innovations. Specifically, a field study was conducted to test certain implications of the personality construct of open- and closed-mindedness with respect to three

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[2]Verling C. Troldahl, Mediated Communication and Personal Influence: A Field Experiment. Ph.D. Dissertation, University of Minnesota (1963), p. 213. Also see Verling C. Troldahl, The Communication of Horticultural Information and Influence in a Suburban Community, Report No. 10, Communications Research Center, Boston University, Boston, Mass. (March, 1963), p. 91.

[3]Milton Rokeach, The Open and Closed Mind: Investigations Into the Nature of Belief Systems and Personality Systems (New York: Basic Books, 1960).

diffusion topics: (1) "short-circuiting" (i.e., skipping one or more stages of the five-stage sequence in the adoption process), (2) selection of communication channels, and (3) the rate of adoption of innovations. The research questions asked were: Do persons with a particular belief system style "short-circuit" any of the five stages of the adoption process? Are differential preferences in the use of communication channels related to belief system styles? Are differential rates of adoption related to belief system styles?

A second purpose was concerned with research about the belief systems theory, particularly the approach to the core concept of authority. Past studies of this theory had seemed to favor the interpretation of authority as a person entity. This tendency however has disregarded the vital implications of the theory regarding the influence on human behavior of non-person forms of authority figures such as institutions, traditions and cultures. In short, this study develops the thesis that authority influence should be interpreted as also emanating from group forces which include the norms in a social system. This study then also aims to empirically represent and test the non-person form of the concept of authority. This form of authority is here considered to be one of the major variables affecting innovative behavior and is an integral part of the influence of dogmatism on adoption.

Significance of the Study

This study has a three-fold significance. First, the study should provide a means of obtaining a more complete understanding of past observations in agricultural diffusion research. Second, further

insight gained about the belief systems theory, in particular the core concept of authority, can apply to more fruitful studies with the theory. Third, this study should provide a test for ideas concerning certain methodological issues in diffusion research.

Obtaining empirical evidence showing that the audience of agricultural communication and extension services is composed of persons with differential personality predispositions and, consequenctly, differential behavioral tendencies, points up practical implications.

The delineation of two types of receivers as either open- or closed-minded will provide a parsimonious way of characterizing the targets of communications. If the effects of belief system styles on the communication and acceptance of farm practices are demonstrated, the "working ideology" in agricultural information work with respect to its audience will have to be revised in the following general form. The treatment of messages in information campaigns has to vary in emphasis depending on the perceived functions of messages by receivers potentially differing in their cognitive predispositions and response styles.

There seems to be some standard belief among the agricultural information specialists in the public agencies that the farm audience or clientele are mostly reasoning and reason-seeking individuals. For example, agricultural bulletins which report the scientific findings to lay audiences predominantly give factual information about the experiment conducted or practice recommended. Oral presentations of farming and home economics innovations are often designed to give the reasons why the practices are recommended. The conceptual foundation of this study suggests, among others, that it may be that a sizable

segment of the rural clientele is not oriented towards obtaining factual information or knowledge about new ideas and practices. If this is the case, one possible outcome is that these people will tend not to "see" the publications or other media wherein such information is being transmitted.[4] In order to reach these persons, other channels, namely respected authority figures or perhaps their opinion leaders, will be more appropriate even as the style and content of publications for this segment of the audience can be presented more in keeping with their cognitive predispositions.

Implications of this study may be brought to bear on the group level. Such groups include those existing under the sway of certain religious, political, or cultural systems. To the extent that findings with the belief systems theory may be interpolated for analyzing behavior in groups, some ways may be suggested in effecting changes with respect to whole systems or groups. There are a variety of social systems in the world to which findings about general personality predispositions may be of pragmatic significance in the problem of social change.

The purpose of the present study then is to test the construct of belief systems as an explanatory variable for certain regularly observed phenomena in the diffusion of agricultural practices. The three selected topics include the stages in the process of adoption, selectivity in the use of communication channels, and the rate of

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[4] The phenomenon of selective exposure produced by prior attitudes is discussed in Herbert H. Hyman and Paul B. Sheatsley, "Some Reasons Why Information Campaigns Fail," The Public Opinion Quarterly, 11:413-423 (1947).

acceptance or adoption of farming innovations. This chapter presents a review of the diffusion literature which led to the development of the research problem, the theoretical foundation and background derived from Rokeach's belief systems theory, the hypotheses tested and the rationale behind them.

Review of Diffusion Research Findings

The Process of Adoption

As early as 1943 when the pioneer study of hybrid corn diffusion was made,[5] diffusion researchers had repeatedly observed that adoption occurs as "a process composed of learning, deciding and acting over a period of time."[6] Adoption ensues not as a result of a single decision but as a series of actions and mental decisions constituting four[7] or five stages starting from initial knowledge of the practice to its complete adoption.

The North Central regional committee for the study of farm practices[8] standardized the concept as a process consisting of five sequential stages of thinking and acting as follows:

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[5]Bryce Ryan and Neal C. Gross, "The Diffusion of Hybrid Seed Corn in Two Iowa Communities," Rural Sociology, 8:15-24 (1943).

[6]Wilkening quoted by Rogers, Diffusion..., p. 80.

[7]Eugene A. Wilkening, Adoption of Improved Farm Practices as Related to Family Factors. Wisconsin Agricultural Experiment Station Research Bulletin 183, Madison, Wis. (December, 1952). Ryan and Gross also identified four stages.

[8]Subcommittee for the Study of Diffusion of Farm Practices, How Farm People Accept New Ideas, North Central Regional Publication No. 1, Special Report No. 15, Agricultural Extension Service, Iowa State College, Ames, Iowa (November, 1955).

1. Awareness stage - the individual learns of the existence of the idea or practice but lacks information about it.

2. Interest-information stage - the individual develops interest in the idea and seeks additional information about it.

3. Evaluation stage - the individual makes mental application of the new idea to his present and anticipated future situation and decides whether or not to try it.

4. Trial stage - the individual actually applies the idea or practice on a small scale in order to determine its utility in his own situation.

5. Adoption stage - the individual uses the new practice on a full scale continuously.

In separate investigations, Beal, Rogers and Bohlen[9] and Copp, Sills and Brown[10] verified the validity of the five-stage sequence. According to Rogers, respondents in an Iowa study agreed to having gone through a series of stages from awareness to adoption.

> The respondents were forced to answer specific questions; thus it might be argued that the idea of the stages was 'forced'. However, if the stages were not meaningful to the respondents, they would have stated so, refused to answer, given 'don't know' answers, or suggested other stages or action taken.[11]

Other researchers have found that not all decisions involved a clear-cut five-stage sequence. Continuing where the validating

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[9] George M. Beal, Everett M. Rogers, and Joe M. Bohlen, "Validity of the Concept of Stages in the Adoption Process," Rural Sociology, 22:166-168 (1957).

[10] James H. Copp, Maurice L. Sill and Emory J. Brown, "The Function of Information Sources in the Farm Practice Adoption Process," Rural Sociology, 23:146-157 (1958).

[11] Rogers, Diffusion..., p. 96.

studies implied problems of fact and methodology, Mason[12] conducted an investigation wherein he concluded that there may be more than one adoption process varying according to the practice and according to the individual farmer.

Furthermore, other writers indicated that some farmers skipped or blended stages. Lionberger has stated that decisions may be made "simply on the basis of habit or tradition, or at least without extended deliberation."[13] In a study made in a Latin American setting, Deutschmann and Fals Borda found that Andean peasants adopted with little or no delay after awareness. They averred that the Andean farmer was much more receptive to an authoritative source and more likely to act directly without question upon receiving information from someone.[14] Some tentative evidence of direct acceptance appeared in the study of Troldahl. This researcher reported the tendency, which he called "short-circuiting," of persons to change their beliefs even without having obtained considerable information upon which to base a decision. This observation implied that the followers skipped the interest-information stage, or even also the evaluation stage. According to Troldahl, this finding indicated a

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[12]Robert Mason, "An Ordinal Scale for Measuring the Adoption Process," in Studies of Innovation and of Communication to the Public Studies in the Utilization of Behavioral Science, Vol. II, Institute for Communication Research, Stanford University, Stanford, Calif. (1962).

[13]Lionberger, Adoption..., p. 24.

[14]Paul J. Deutschmann and Orlando Fals Borda, Communication and Adoption Patterns in an Andean Village, Programa Interamericano de informacion Popular and Universidad Nacional de Columbia, San Jose, Costa Rica. (December, 1962) p. 22.

type of "Tell me how to do it; don't bother me with reasons why;" approach to problems.[15]

Farmers' Sources of Information

Diffusion research in the United States indicates that knowledge about new ideas and practices spreads through various communication channels.[16] At the awareness and interest-information stages, the channels used, in the order of their importance, are the mass media, friends and neighbors, agricultural agencies including extension agents, and dealers and salesmen. Personal sources in general are utilized at the stages of "validation", that is, from the time that the worth of an idea or practice to one's situation is mentally evaluated to the time it is actually tried or adopted.

Parallel to these observations in a rural setting, it has been found with respect to messages originating from the mass media that personal influence also made for maximum effectiveness at the validation stage. In studies on personal influence,[17] researchers established the "two-step flow" of communication and influence. This finding meant that mass media messages did not characteristically affect the audience directly as earlier believed. Rather, the opinion

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[15] Troldahl, The Communication..., p. 107.

[16] Subcommittee for the Study of Diffusion of Farm Practices, Adopters of New Farm Ideas: Characteristics and Communications Behavior, North Central Regional Extension Publication No. 13 (October, 1961).

[17] Elihu Katz and Paul F. Lazarsfeld, Personal Influence (Glencoe, Illinois: The Free Press, 1955). See also Elihu Katz, "The Two-Step Flow of Communication: An Up-to-date Report on an Hypothesis," Public Opinion Quarterly, 21:61-78 (1957).

leaders in a community were first influenced by the mass media. These key persons in turn served as intermediaries for the content of the communications to others over whom they were influential. In this second step, people decided what food or household goods to buy or what movies to see.

Diffusion research has shown that the use of communication channels also varied with respect to the "adopter categories". These five categories of adopters resulted from general findings that members in a social system did not adopt new ideas at the same time. On the basis of relative time of adoption, the distribution of the adopters was seen as forming a bell-shaped curve approaching normality. The first 2 1/2 per cent to adopt in a social system were defined as Innovators; the second group constituting 13 1/2 per cent of the curve are called Early Adopters; the third group, composed of 34 per cent, are the Early Majority; the fourth group constituting 34 per cent are the Late Majority; while the last to adopt are the Laggards, who make up 16 per cent of the distribution.

These five categories of adopters use different information sources. The Innovators obtain their knowledge about new ideas and practices primarily from scientists, other innovators and agricultural bulletins. Early Adopters make the most use of local change agents and farm magazines. Early Majority Adopters rely on farm magazines and on friends and neighbors. Late Majority Adopters and Laggards depend mainly on personal sources such as family and other farmers for initial as well as validating information.

Socio-psychological approaches to the observed differences in the use of communication channels have utilized more abstract

conceptualizations of this phenomenon. Emery and Oeser equate an agrarian culture with a traditional orientation and urbanization with an instrumental attitude towards knowledge.

> ...Among the former, knowledge must be achieved and tested by personal practice and experience, and it is handed on from father to son and between contemporaries by means of traditional rules by face-to-face communication. In an urbanized culture, however, knowledge is accepted as being instrumental rather than traditional; as generally or publicly holdable; and as testable by means other than personal practice and experience. It is transmitted by impersonal means such as books, and by teachers who are institutionally and physically remote from the places of work and production.[18]

Lerner[19] conceived of the progress from traditional societies to modernism as moving hand in hand with changes from the use of oral means of communication to the use of mass media.

Sociological theory has introduced the dimensions of localiteness and cosmopoliteness among influentials.[20] The localite who is mainly concerned with the local community tends to attend mostly to local media. The cosmopolite, on the other hand, has his sights directed to the larger society and mostly selects media focused on events outside his community. In the field of mass communication, the concept of "perceived psychological distance" has been forwarded by

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[18] F. E. Emery and O. A. Oeser, Information, Decision and Action: A Study of the Psychological Determinants of Changes in Farming Techniques," (Melbourne, Australia: Melbourne University Press, 1958).

[19] Daniel Lerner, The Passing of Traditional Society: Modernizing the Middle East (Glencoe, Illinois: The Free Press, 1958).

[20] Robert Merton, Social Theory and Social Structure (Glencoe, Illinois: The Free Press, 1957), pp. 387-420.

MacLean and Pinna[21] as a determinant of differential news receivership.

The Rate of Adoption

Of central interest in the study of diffusion is the determination of the variables or factors influencing acceptance or adoption. Past researchers have usually measured adoption as involving (1) the number of practices accepted or (2) the length of time allowed between availability of a practice and its use by farm operators.

Of the types of variables studied, certain "demographic" characteristics of farm operators have been found repeatedly to be associated with adoption. Educational level, size of farm operations, financial and socio-economic status as well as participation in formal organizations influence rate of acceptance and early adoption.[22] Early adopters tend to be younger than slower adopters, but not necessarily younger than innovators. The laggards have the least education and are the oldest.

The limitations of these demographic factors in accounting for the observed behavioral phenomenona for the purpose of understanding and explaining their occurrence have been pointed out. In due course, interest became focused on the studies which looked at individual attitudes or personality predispositions as correlates of adoption.

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[21]Malcolm S. MacLean, Jr. and Luca Pinna, "Distance and News Interest in Scarperia, Italy," Journalism Quarterly, 35:36-48 (Winter, 1958). Also MacLean and Pinna, "Mass Media in Scarperia," Reprinted from Gazette, (1958).

[22]George M. Beal and Joe M. Bohlen, The Diffusion Process, Special Report No. 18, Agricultural Extension Service, Iowa State College, Ames, Iowa (March, 1957).

In this type of investigation, researchers drew their concepts from many disciplines, principally cultural anthropology, psychology, and sociology.

The role of values or value-orientations has been studied by a number of diffusion students. A representative study, that of Ramsey and associates, relating twelve farmers' values to adoption, gave low correlations.[23] Only the values of security and traditionalism showed a significant correlation with adoption.

Copp[24] found "flexible" farmers progressively inclined in their farming while the "rigid" farmers were more traditional in outlook; while the former tended to have a rational-approach to farming the latter seemed to regard farm operation in terms of strictly set formulas. An exploratory study of seven personality correlates of adoption, including dogmatism, was conducted by Rogers with 26 subjects.[25] Only rigidity, change orientation, innovative proneness and adoption self-ratings were found to be significantly related. The correlation of -.15 between dogmatism and adoption was in the expected direction but was not statistically significant. In this study, Rogers used only the ten items from the Rokeach's dogmatism index that Rokeach had found most highly correlated with the total dogmatism scores.

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[23] Charles E. Ramsey, Robert A. Polson and George E. Spencer, "Values and the Adoption of Practices," Rural Sociology, 24:35-47 (1959).

[24] James H. Copp, Personal and Social Factors Associated with the Adoption of Recommended Farm Practices Among Cattlemen, Kansas Agricultural Experiment Station Technical Bulletin 83, Kansas State College, Manhattan, Kansas. (1956).

[25] Everett M. Rogers, "Personality Correlates of the Adoption of Technological Practices," Rural Sociology, 22:267-268 (1957).

Studies of Group Influence on Adoption

Another perspective, one that looks at group influence as a determinant of adoption behavior, has been developed in the work of several researchers.

This investigational approach is thematically described by Lionberger who asserts that the acceptance of change may be facilitated or retarded by group behavior:

> We are all members of many social groups or systems...Whether a farmer lives in a neighborhood or a community, he always has neighbors. He is not at liberty to disregard their interest and expectations, at least if he has any concern about what they think of him. This means that neighbors must be and are considered in many of the decisions that people make.[26]

In this connection, Marsh and Coleman have stated,[27] "It is a basic sociological postulate that when a number of persons are in interaction over an extended period of time, mutual expectations and norms develop concerning the behavior of the persons involved, and the individual's actions are not independent of these norms and expectations."

Van den Ban[28] found that the social organization and culture of locality groups in Wisconsin were major factors influencing

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[26] Lionberger, Adoption..., p. 67.

[27] C. Paul Marsh and A. Lee Coleman, "Group Influences and Agricultural Innovations: Some Tentative Findings and Hypotheses," American Journal of Sociology, 61:588-594 (1956).

[28] Anne Willem Van den Ban, "Locality Group Differences in the Adoption of New Farm Practices," Rural Sociology, 25:308-320 (1960).

practice adoption and resulted in the observed differences in the levels of adoption between townships. In the Ohio study of Rogers, 20 per cent of the amount of variability among persons in innovativeness, striking enough as adoption correlations go, was accounted for by community norms.[29]

In their study of 13 Kentucky neighborhoods, Marsh and Coleman[30] found that the acceptance of farming practices varied widely among the neighborhoods. Findings supported the hypothesis that norms in some neighborhoods were more favorable to the acceptance of new ideas than those in other neighborhoods. The same researchers investigated the same groups five years later. They found that the farm operators in the high adoption neighborhood had a more scientific orientation in farming matters and made more use of different information sources, including other farmers, than those in the low-adoption neighborhoods.[31] Moreover, a greater proportion of farmers in high-adoption areas were influenced by neighbors both to adopt and to reject new practices than in low adoption areas. These authors reasoned that, in the low-adoption neighborhoods, the methods of farming were very traditional and largely predetermined. As a consequence, alternative methods were given little or no consideration and the influence of neighbors remained dormant.

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[29] Rogers, Diffusion..., p. 71.

[30] C. Paul Marsh and A. Lee Coleman, "The relation of neighborhood of residence to adoption of recommended farm practices," Rural Sociology, 19:385-389 (1954).

[31] C. Paul Marsh and A. Lee Coleman, Group Influences....

1952
Wilkening[32] has reported that the farmers sought for advice on farming problems in North Carolina had a level of adoption close to that of the average farmer in the community. He suggested that these "informal leaders" reflected the traditional values of the community. These informal leaders were therefore unlikely to support a new idea when it did not support the existing social and cultural system or did not meet with group approval.

However, the opposite was found by Lionberger and Hassinger[33] in relatively progressive Missouri neighborhoods. The farmers most frequently talked to about farming had a much higher rate of adoption than the average farmer. On the basis of the contradictory data in North Carolina and Missouri, Marsh and Coleman[34] in Kentucky predicted and confirmed that in areas of high adoption, those from whom other farmers obtained farming information had higher adoption rates than farmers in general; but in areas of low adoption, leaders' adoption rates were similar to the adoption rates of farmers in general.

Suggestive and collaborative data to the above findings of rural sociologists have appeared in researches in social psychology, particularly those concerned with the effects of authoritarianism on

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[32] Eugene A. Wilkening, "Informal Leaders and Innovators in Farm Practices," Rural Sociology, 17:272-275.

[33] Herbert F. Lionberger and Edward Hassinger, "Neighborhoods as a Factor in the Diffusion of Farm Information in a Northeast Missouri Farming Community," Rural Sociology, 19:377-384 (1954).

[34] C. Paul Marsh and A. Lee Coleman, Group Influences....

small groups and individual members.[35] Current social psychological research approaches to group behavior are "interactional"; that is, the characteristics of the group, the individual (personality), and the situation are viewed as interdependent. In every group, it is to be expected that there is a set of interests shared by the members and that these commonalities will influence the attitudes and behavior of members. Yet the personal characteristics of individual members may in turn influence the set of standards for the group.[36]

With these findings as background, a thesis was developed for the present study that in order to be a more efficient predictor, the personality construct used should be analyzed conjointly with determinable group influences upon individuals.

Theoretical Background

The underlying theory of this study presents a view of the human personality as a cognitive system. Basically, it is concerned with the organization of belief and disbelief systems. The belief system represents "all the beliefs, sets, expectancies, or hypotheses, conscious and unconscious, that a person at a given time accepts as true of the world he lives in."[37] On the other hand, the disbelief

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[35] Robert T. Golembiewski, The Small Group: An Analysis of Research Concepts and Operations (Chicago: The University of Chicago Press, 1962), pp. 180-282.

[36] Read, for example: W. Haythorn and others, "The Behavior of Authoritarian and Equalitarian Personalities in Groups," Human Relations 9:57-74 (1956). Also, W. Haythorn and others, "The Effects of Varying Combinations of Authoritarian and Equalitarian Leaders and Followers," Journal of Abnormal and Social Psychology, 53:210-219 (1956).

[37] Rokeach, The Open and Closed..., p. 33. Italics mine.

system consists of all the disbeliefs, sets, expectancies, conscious and unconscious, that a person rejects as false.

A person's total belief system is composed of beliefs that range in importance from the central to the inconsequential beliefs. In a graphic way of describing it, the total belief system may be viewed as a series of four concentric layers or regions. The central region represents the most important beliefs, the primitive beliefs. These are the beliefs that a person has acquired about the nature of the physical as well as the social world he lives in, and also about the nature of his own self. "My name is Juan Jamias," is an example of a primitive belief. This kind of belief is most resistant to change and in fact is rarely, if ever, challenged.

The intermediate belief region represents the authority beliefs or the beliefs a person has in and about the nature of authority and the people representing authority and on whom "he depends to help him form a picture of the world he lives in." "There is only one true Bible," is an example of an authority belief.

The peripheral region covers the peripheral beliefs or the beliefs derived from authority. "I favor birth control," is a peripheral belief. The last region signifies the fringe beliefs, the inconsequential beliefs. "Sweet toilet soap is better than Fresh toilet soap," is an example of an inconsequential belief. In Rokeach's words:

> "These beliefs concern matters of taste; if they are changed, the total system of beliefs is not altered in any significant way. If a person changes his mind about whether the mountains or the seashore are preferable for a vacation, or about the color that is most becoming to him,...the rest of his system of beliefs

> is hardly likely to be affected in any important way." [38]

In recapitulation, a man's belief then is composed of primitive beliefs and non-primitive beliefs. The primitive beliefs are the most important and are most invulnerable to change. On the other hand, change may occur in any of the three other beliefs with the inconsequential beliefs being the most easy to change. The peripheral beliefs, tied as they are with the authority beliefs, will correspondingly change with the alteration of beliefs about the authority.

Structurally, the organization of the cognitive system described by Rokeach consists of interdependent belief and disbelief systems defined on a continuum ranging from "open" at one extreme to "closed" at the other. For this reason, the present writer uses the term "belief system styles." Such usage aims to avoid stressing the extremes of the belief-disbelief continuum which are rarely, if ever, found. Instead it points to the continuous points along the open-closed dimension.

The way a person's belief-disbelief system is organized is asserted to determine how he would assess or interpret persons, ideas, or events. In other words, it would indicate whether he would behave in an "open-minded" or "closed-minded" manner when forming or ordering his view of reality.

Major assumptions of the Rokeach theory posit the differential behavioral characteristics of low dogmatic (open-minded) and high dogmatic (closed-minded) individuals. Dogmatism is defined as (a) a

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[38] Milton Rokeach, The Three Christs of Ypsilanti: A Narrative Study of Three Lost Men (New York: Alfred A. Knopf, 1964) p. 25.

relatively closed cognitive organization of beliefs and disbeliefs about reality, (b) organized around a central set of beliefs about absolute authority which in turn (c) provides a framework for patterns of intolerance and qualified tolerance of others.[39] High dogmatism is further characterized as a high magnitude of rejection of all disbelief systems, an isolation of beliefs, a high discrepancy in degree of differentiation between belief and disbelief systems, and little differentiation within the disbelief system. It is assumed that the more closed the system, the more the world would be perceived as threatening and the greater the belief in absolute authority is.

Absolute reliance on authority by the closed-minded person has a concomitant effect in the utilization of irrational rather than rational modes in making decisions or in evaluating persons, ideas, or events. In the words of Rokeach:

> ...a basic characteristic that defines the extent to which a person's system is open or closed is, namely, the extent to which the person can receive, evaluate, and act on relevant information received from the outside on its own intrinsic merits, unencumbered by irrelevant factors in the situation arising from within the person or from the outside. Examples of irrelevant internal pressures that interfere with the realistic perception of information are unrelated habits, needs for self-aggrandizement, the need to allay anxiety, and so forth. By irrelevant external pressures we have in mind most particularly the pressures of reward and punishment arising from external authority; for example, as exerted by parents, peers, other authority figures, reference groups, social and institutional norms, and cultural norms.

In general, the relevance of the theory of beliefs to the agriculturalists' problem of communication and adoption of innovations

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[39]Milton Rokeach, "The Nature and Meaning of Dogmatism", Psychological Review, 61:194-204 (1954).

(peripheral beliefs, in Rokeach's terminology) derives principally on the following postulated differences that obtain between persons with open and closed belief systems. Persons having different belief system styles differ in the degree of their knowledge or fund of information (of beliefs or disbeliefs); they also differ in the manner in which they assess the information they obtain. It is to be recalled at this point that diffusion studies have established the proposition that adoption is a function of communication. In other words, what and how much a person adopts is determined in great part by his behaviors relating to the receiving and processing of messages or information available from a variety of communication channels.

As a consequence of the definition of closed-mindedness, the generalization can be made that relatively open-minded persons would have access to and exposure to more information (beliefs and disbeliefs) than closed-minded individuals. The isolation of beliefs, low differentiation between beliefs and disbelief systems, and a high magnitude of rejection of all disbeliefs, would constrict the fund of knowledge or information of the closed-minded individual. Rokeach relates these characteristics to the "processing-coding" of information impinging upon the person in detail as follows:

> ...But as a first approximation - and in order to guide empirical research - we will assume that this operation (processing-coding) begins with the person first screening new information for compatibility with the primitive beliefs. The initial screening may lead to the rejection or narrowing out of this information so that nothing further need to be done with it. For example, many people pay no attention to the current work on extrasensory perception because they are not prepared to accept it, no matter how good the evidence.
>
> Even if the new information is compatible with primitive beliefs, it may not be compatible with one's

> intermediate (authority) beliefs. For this reason, people often selectively avoid contact with stimuli, people, events, books, etc., that threaten the validity of their ideology or proselyte for competing ideologies... Cognitive narrowing may be manifested at both the institutional and non-institutional level.[40]

At the non-institutional level, that is, that which is done by the person himself, he may avoid contact with people, books, and ideas and events that would threaten the validity of his beliefs or the 'invalidity' of his disbeliefs. Thus "a person may expose himself only to one point of view in the press, selectively choose his friends and associates solely or primarily on the basis of compatibility with systems, selectively avoid social contact with those who adhere to different systems, and ostracize renegades."[41]

Applied to the agriculturalists' problem, it can be assumed that the amount of information farmers have about new ideas and practices should differ according to their locations on the open-closed continuum.

Closely allied to limited exposure to information, is the characteristic of the closed system to view the world as threatening. This tendency results in making him dependent on absolute authority. The more closed the system, the more other persons or ideas will be evaluated according to "the authorities they line up with, and the more will peripheral beliefs be related to each other by virtue of their common origin in authority, rather than by virtue of intrinsic connections.[42]

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[40] Ibid., pp. 47-48.

[41] Ibid., p. 48.

[42] Ibid., p. 57.

In short, closed-minded persons are suggestible to the recommendation of respected authority figures or authority-based norms of behavior, e.g. traditionalism. It is to be noted that authorities may be individual persons or a group, "an institution or other social collectivity, existent or fictional, which is perceived by the individual as having certain beliefs associated with it such as a church, a cultural ideal or value..."

It does not necessarily mean, however, that the open mind is to be associated with change, the closed-mind with non-change. "A more defensible view is that persons with relatively closed systems may sometimes manifest change and sometimes fixedness for basically the same reasons... Conversely change and non-change in open systems may result equally from a correct appraisal of reality, ...from independence rather than subservience to conformity pressures."[44]

Further, it is not the case that the person low in authoritarianism does not at all rely on authority. The difference lies in the fact that the high authoritarian places absolute reliance on authority while the low authoritarian accepts authority in a tentative and rational manner.

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An important characteristic of the theoretical formulation

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[43] Robert N. Vidulich, An Empirical Analysis of the Belief Referents of Persons with Open and Closed Cognitive Systems. Ph.D. Dissertation. Michigan State University (1958), p. 19.

[44] Rokeach, The Open and Closed..., p. 337.

underlying this study is its applicability to a wide variety of subject matter. This arises because the main concern of the theory is with the structure rather than the content of beliefs.

> "...The relative openness or closedness of a mind cuts across specific content; that is, it is not uniquely restricted to any one particular ideology, or religion, or philosophy, or scientific viewpoint. A person may adhere to communism, existentialism, Freudianism, or the 'new conservatism' in a relatively open or in a relatively closed manner. Thus, a basic requirement is that the concepts to be employed in the description of belief systems must not be tied to any one particular belief system; they must be constructed to apply equally to all belief systems." [45]

This attribute of being "topic-free", Troldahl states, should make consistent predictions across various studies even when the subject matter of the communications differ from one study to another.[46]

In line with this assumption, the theory has been utilized in investigations ranging from political and religious topics to studies of learning, communication, and even aesthetic behavior.

Focused on the effects of dogmatism on school learning, data reported by Ehrlich[47] support the hypothesis that dogmatism is inversely related to the degree of learning (of sociology test items). Data obtained from the same group five years later by the same researcher confirmed this finding.[48] In both studies, learning was

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[45] Ibid., p. 6.

[46] Troldahl, The Communication..., p. 92.

[47] Howard Ehrlich, "Dogmatism and Learning," Journal of Abnormal and Social Psychology, 62:148-149 (1961).

[48] Howard Ehrlich, "Dogmatism and Learning: A Five Year Follow Up," Psychological Reports, 9:283-286 (1961).

found independent of the academic aptitude of the students studied.

Applying the theory to a communication problem, Powell[49] confirmed the major assumption that the more open an individual's belief system, the greater is his ability to distinguish between the content of the message and the source and to judge each on its intrinsic merits.

With the dogmatism scale, Vidulich and Kaiman[50] studied the effects of information source status and dogmatism upon conformity behavior. Data from the autokinetic experiment supported the reserchers' contention that conformity is a function of both the status of the source of information and the authoritarian tendencies of the person being influenced.

Two studies of dogmatism touching on agricultural topics were the previously described study by Rogers and the study by Troldahl on the communication of horticultural information.[51] Troldahl found that persons with different levels of dogmatism were about equally likely to become aware of the new horticultural ideas from media exposure. The low dogmatics had relatively low exposure to magazines and television and, contrary to his predictions, were less likely to change their beliefs due to media exposure than the high dogmatic

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[49] Fredric A. Powell, "Open- and Closed-mindedness and the Ability to Differentiate Source and Message," Journal of Abnormal and Social Psychology, 65:61-64 (1962).

[50] Robert N. Vidulich and I. P. Kaiman, "The Effects of Information Source Status and Dogmatism Upon Conformity Behavior," Journal of Abnormal and Social Psychology, 63:639-642 (1961).

[51] Rogers, Personality Correlates..., 267, and Troldahl, The Communication..., pp. 98-104, 110.

persons. Troldahl concluded, "Although the Dogmatism scale seemed to have considerable potential in identifying the persons most likely to adopt new ideas, considerable research will be needed before this theory offers many guidelines to the professional communicator."

Hypotheses

The research findings and theoretical assumptions discussed in the preceeding pages led to the development of the following hypotheses:

H.1. Highly dogmatic farm operators are more likely to "short-circuit" the information-seeking stage of the five-stage adoption process than relatively low dogmatic individuals.

H.2. In stating reasons for adoption, low dogmatic persons will more likely mention "factual" reasons than relatively high dogmatic individuals. The latter will tend to make statements about authority influence.

H.3. The use of personal sources of initial information outside of one's own primary group will be greater among low dogmatic farm operators than among relatively high dogmatic persons.

H.4. The use of personal sources of validating information outside of one's own primary group will be greater among low dogmatic persons than among relatively high dogmatic individuals.

H.5. Low dogmatic farm operators are likely to attend to specialized mediated communication more than relatively high dogmatic persons.

H.6. Highly dogmatic farm operators will have a lower rate of

adoption than less dogmatic persons.

H.7. The strength of the "value for innovativeness" in a social system influences the adoption rate of highly dogmatic farm operators, but has relatively little influence on low dogmatic persons.

Specific Rationale for Hypotheses

The hypothesis of "short-circuiting" or the tendency of closed-minded persons to skip one or more stages of the adoption process more than relatively open-minded individuals rests on assumptions in the belief system theory concerning decision-making and information-seeking behavior.

Open-mindedness, by postulate, involves a willingness to at least consider the possibility of merit in disbeliefs as well as non-beliefs. This involves assessing a given peripheral belief on the basis of its consistency with intermediate (authority) beliefs. Rational analysis would call for the seeking of additional information about a practice, mentally weighing the pros and cons, and trying it on a small scale basis before complete adoption. This behavior would correspond to the stages of adoption concept which implicitly assumes rationality in decision-making.

In contrast, the closed-minded person is expected to be responding to "irrational" stimuli. One such possibility is "party-line" change, in which a person changes a particular belief as a result of some instruction emanating from his authority figure.[52] In the language of diffusion research, a person who is prone to adopt on

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[52] Rokeach, The Open and Closed..., p. 49.

other than rational considerations of a practice would tend to skip particularly the information-seeking stage, wherein knowledge is obtained to form the basis for decision. Diffusion studies have reported that farmers changed or adopted immediately after initial knowledge of an idea and skipped one or more of the stages intervening between awareness and full-scale acceptance.

Belief-system theory also suggests that the nature of information "consumed" by receivers will vary. Hypothesis two specifies the kinds of information that open- and closed-minded persons are apt to consider in adopting. The rational mode of thinking of open minded individuals necessitates "tuning in" to facts about practices such as their merits and disadvantages to one's situation. In place of rational and independent assessment of facts, the closed minded person is likely to substitute the word of his authority figures. In effect, he just waits for what his authorities tell him, or upon becoming aware of an idea, he merely asks his authority figures whether to accept or reject the idea.

With regard to information-seeking behavior, closed-minded persons may be expected to have less need to seek information than open-minded individuals. The former have fairly set ways of considering information. This fact has been described in their postulated tendencies for isolation, low differentiation, and cognitive narrowing of beliefs and/or disbeliefs. On the other hand, open-mindedness involves a tendency to become acquainted with even distant disbelief subsystems along with the belief systems. For example, the open-minded person will want to learn about practices and devices quite different from the one he is now using or has

accepted as desirable or appropriate. Thus, he is more likely to expose himself to many or "all" sources of information.

The effects of dogmatism upon exposure, and thus to the variable use of information sources, seem to suggest typological distinctions such as those propounded in Emery and Oeser's traditional-instrumental "attitude toward knowledge" and other receiver orientation-channel typologies discussed in the review of literature. Common to these conceptions is the influence of cognitive "types" upon what channel is perceived as being most important by the individual. Viewed in this light, hypotheses three to five offer some predictions as to selectivity in channels used.

Given closed minded individuals considerably dependent on such authority figures as peers, relatives, and other persons psychologically close to them, their preferences for sources of information and advice may be predicted in at least these two ways: less use of (1) extended-group members and (2) specialized mediated communication such as agricultural experiment station bulletins than relatively open minded individuals.

The relationship between dogmatism and rate of adoption is described in hypothesis six. This hypothesis is derived from the general overview of the characteristics of the closed and open personality organizations. To recapitulate, assumptions of the belief theory establish the attitudinal set of highly dogmatic persons to systematically restrict their access to and acquisition of information. It would seem that the person who would be openly exposed to "all" kinds and sources of information will have more opportunities for adopting, an assumption that is supported by findings in diffusion

research. More likely to decide through rational and intelligent consideration, the open-minded person would be in a better position to see the arguments for practices recommended by research institutions and agents. Conversely, the closed minded person will tend to reject a practice however meritorious if it does not conform to his well-established or traditional ways of doing things or to the recommendations of his positive authority figures.

However, there may be hidden problems in positing outright the negative relationship between closed mindedness and the rate of adoption. It is possible that, if the adoption of a practice is backed up or is consistent with authority or authority-based norming behavior, closed minded persons will tend to accept the recommendation. Thus, for example, adoption by closed minded farmers may be observed where the "value for innovativeness" in a social system is favorable to the use of new practices. The conforming nature of closed minded persons with those whom they perceive positively will produce such a result. A norm as well as a person can serve as referent to these persons in shaping their behavior. For these reasons, the influence of the social system's value on individual adoption behavior will be investigated in hypothesis seven as a form of authority influence upon closed-minded individuals.

Chapter II

RESEARCH DESIGN

A field study was conducted to obtain evidence on the effects of belief system styles on the communication and adoption of farm practices. Data gathering consisted of personal interviews with dairy farmers in selected Michigan rural communities.

The line of inquiry developed in the interview questionnaire focussed on two specific dairy farming innovations recommended by the extension service. These practices were (1) herd testing, which included the D.H.I.A. and Owner-Sampler programs, and (2) heavy grain feeding. Additional information about the dairy farming enterprise in general was obtained.

The field study was designed to elicit a description of the process of adoption, or the stages of adoption passed through by the subjects, from initial awareness of each of these practices to its adoption, the latter being defined as the decision to continue full-scale use of the innovation.[1] The respondents were first asked about the adoption stage. On herd testing, they were asked whether they were using any particular herd testing or herd improvement program, and if so, to state which one they were using at the present time. On heavy grain feeding, subjects were first asked the basis on which they decided how much grain to feed their milking cows. Respondents

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[1] D.H.I.A. herd testing is relatively old in the area studied as compared with the practice of heavy grain feeding. An association had been organized in Lapeer county as early as 1928. Promotion of this program was intensified by the county extension service in 1957. These practices therefore represented "extremes" in the period of time they diffused in the social systems investigated.

who stated that they varied the amount of grain according to milk production or otherwise were then asked appropriate follow-up questions. In this questioning, the interview was aimed to be as unstructured as possible to avoid suggesting to respondents the particular practice of interest.

In general, the interview schedule consisted of four major topics: (a) the stages of adoption, including the reason for adoption and information level "tests", (b) the sources of information used, (c) the measurement of general innovativeness, and (d) the measurement of dogmatism. Demographic data related to rate of adoption and dogmatism were also obtained.

The Sample

The study was conducted in eight townships in Lapeer county, located in mideastern Michigan. These townships were those selected because of certain theoretical considerations.

The first requirement for the setting of the study was that localities having both the characteristics of low and of high "value for innovativeness" in the social system were needed. A social system's "value for innovativeness" was defined as the degree of receptiveness of farm operators in a delimitable geographic area to practices emanating from the land-grant college agriculture research and extension services. Besides having the value characteristics, these areas were to be comparable in still three other ways: they were to be under the same extension agent, have the same economic base or farming enterprise, and must not have a high incidence of part-time farmers as is true in many of the present agricultural communities in

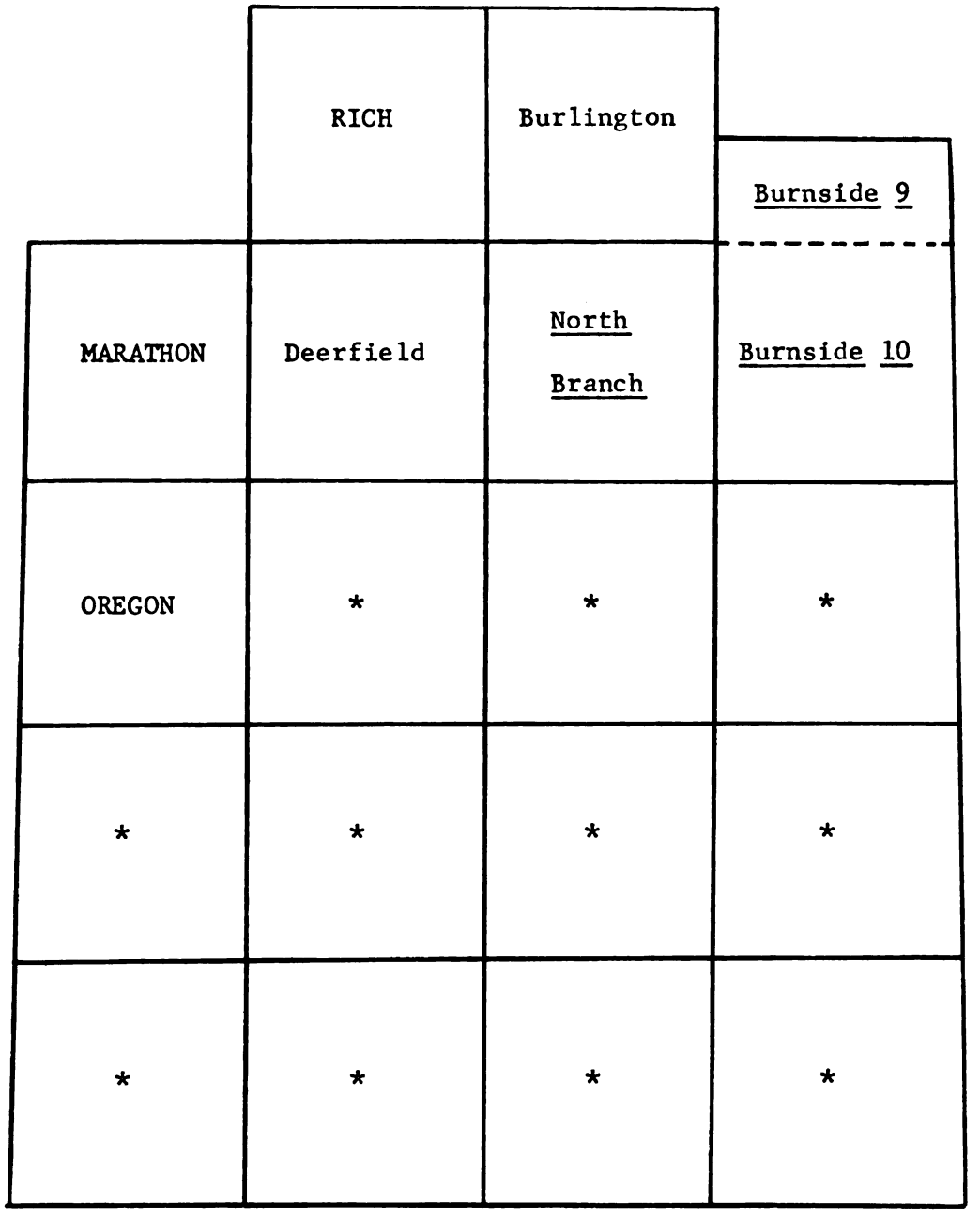
Michigan.

The sample of respondents consisted of dairy farmers keeping a minimum of twenty milking cows, on the average, during the year. Their major source of farm income must come from dairy products and dairy cattle.

Selection of the areas having the differential value characteristics proceeded so as to leave the boundary-establishing functions to local extension personnel. First, six Michigan county extension directors were asked to recommend two localities in their respective sectors which had the desired characteristics. No reason for the discrepancy between low and high value for innovativeness must be apparent to the directors except the perceived attitudinal factor.

Three counties in Michigan -- Lenawee, Sanilac, and Lapeer -- which were singled out by the extension directors as having both of the value type areas, were visited and judged by the author for their appropriateness with regard to the purpose of the study. It was found that Lenawee had a relatively great variety of types of farming enterprises, which included beef cattle and cash crops in addition to dairying. Sanilac had a high incidence of part-time farmers, due principally to the home trailer manufacturing concerns in the vicinity. Of the three counties, Lapeer offered the most exclusively rural outlook. Dairy farming predominated as the source of livelihood. As recommended by the Lapeer county extension director, Mr. Robert S. Lincoln, and the dairy extension agent, Mr. Leo Dorr, the townships of Burnside 9, Burnside 10, and North Branch were designated as the high value for innovativeness social system. (Figure 1) The townships of Rich, Marathon, and Oregon comprised the area having

Figure 1. Map of Lapeer County Showing Townships Studied



Legend

Lower-case letters, underlined: High "Value for Innovativeness" Townships
Capital letters: Low "Value for Innovativeness" Townships
Lower-case letters, not underlined: "Marginal" Townships
* : Area not studied.

a low value for innovativeness.

Interviews were attempted with every farmer in these townships having the required minimum of twenty cows. Lists of the dairy farm operators meeting this requirement were obtained from the respective township supervisors. The lists yielded less than the number of dairy farmers expected. For this reason, it was decided to extend the interviews to dairy farmers in two adjacent townships, Burlington and Deerfield. These were designated as the "marginal" townships since they abutted both value type areas and could not logically fall under either value type. The data obtained from these townships were incorporated only in the analysis of hypotheses in which the social system's value for innovativeness was not at issue.

Operationalization of Variables

The first hypothesis was addressed to the effect of open- and closed-mindedness on the "short-circuiting" of the five-stage sequence in the adoption process. "Short-circuiting" was defined in this study as the skipping of the second stage in the adoption process, the interest or information-seeking stage. If a person skipped this stage, he should have less "information level" or knowledge about the practice than one who did not. In analyzing this hypothesized relationship, it was proposed to establish: (a) the positional location of the respondents with respect to the different stages in the adoption process other than in the information-seeking stage, and (b) the "information level" which, as the dependent variable, represented the degree of information-seeking done with respect to the practice.

Subjects who were considered as being at the "adopter" stage

were those mentioning present use of the practice on their farms. Subjects, who were not adopters, but who had previously used the practice were differentiated as the "tryers". Persons who had neither adopted nor tried but mentioned having given "much thought" to the practice were considered as being at the "evaluation" stage. Subjects not falling under the above categories but who were aware of the practice as operationally defined were located positionally at the "awareness" stage.

Stages of Adoption

Following are the specific operationalizations of the different conceptual stages in the order they appeared in the questionnaire.

Adoption Stage. The questions referring to the adoption stage were aimed at identifying the users and non-users of each of the particular dairy farming practices studied.

For herd testing, respondents were asked: "Now for some specific questions about your farming operations. First, are you using any particular herd testing or herd improvement program?" If the answer was "Yes", the respondent was asked, "Which one are you using at the present time?" Subjects who replied positively to the first question and who mentioned using either D.H.I.A. or Owner Sampler herd testing were considered as users of the practice. Subjects who replied negatively to the first question or who stated using a practice other than these two programs were considered as non-users.

For heavy grain feeding, the question was: "In addition to herd testing, I would like to talk with you about the feeding of milking cows. First, on what basis do you decide how much grain to

feed your milking cows?" If the reply was "vary according to milk production," the respondent was then asked: "What 'rule of thumb' would best describe your rate of grain feeding...that is...one pound of grain for how many pounds of milk?"

Subjects who stated that they varied the amount of grain fed according to milk production and who, in addition, said that they used the rate of one pound of grain per three pounds or less of milk were accepted as users of the practice. Those who did not base their feeding on milk production, or those who did, but used a higher grain-milk ratio, did not qualify as heavy grain-feeding users.

Awareness Stage. For the awareness stage, respondents were asked to give their meanings for the common names of the two practices studied. Subjects who qualified as "adopters" were assumed to know the meaning of the "stimulus" words and so the awareness stage question was skipped with respect to these individuals. For herd testing, two separate "stimulus" statements were used: (a) "Do you know what D.H.I.A. is?" (b) "What do the words Owner Sampler refer to?" For heavy grain feeding, the question was: "Some dairy farmers talk about something called heavier grain feeding. Could you tell me what the words heavier grain feeding mean to you?"

Three judges, working separately, evaluated the responses for correctness on the basis of set criteria. A correct answer classified the respondent as being "aware" of the practice. In the case of herd testing, a correct answer to either of the two "stimulus" questions was considered as awareness of recommended herd-testing methods. The judges of these items were graduate students in communication who had a background in agricultural information or extension work. In cases

of conflict, the majority opinion decided the answer coded.[2]

Trial Stage. The trial stage question was aimed at identifying the subjects who had previously used the practice, but were not present users. These were designated as the "tryers".

Subjects who were not using either of the herd testing practices were asked: "Since you are not now using either D.H.I.A. or Owner Sampler testing, did you ever try either of these programs for testing your herd?" Non-users of heavy grain feeding were asked: "Have you ever tried heavier grain feeding on your dairy herd?"

Trial stage data with respect to adopters of the practices were not called for in the analysis. However, questions were asked these individuals to "balance" the questions given the non-users. The questions for the users were: (a) Before you decided to adopt D.H.I.A. or Owner Sampler testing, did you use it on a short term trial basis? (b) Before you decided to adopt heavier grain feeding, did you use it either on a short term or a small-scale trial basis?

Evaluation Stage. The evaluation stage was operationally defined as "having given much thought to the matter", that is, "a great deal", or "quite a bit". Users of the herd testing programs were asked: About how much thought did you give to the matter before signing up for either D.H.I.A. or Owner Sampler testing?...a great deal,

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[2] A comparison of the codes assigned by two of the judges to "awareness" of D.H.I.A. indicated that the judges agreed as to the proper code in 91 per cent of the cases. Since the final code assigned was the majority opinion of three judges, the amount of agreement between any given judge and the final code assigned will be even higher than 91 per cent. Since current users of D.H.I.A. were assumed to be "aware" of it, they were not included in this inter-judge agreement index.

quite a bit, just a little, or none at all? Non-users were asked the same question but for a slight change in the wordings, i.e., "...how much thought, if any, have you given the possibility of signing up..." (Not italicized in questionnaire).

Users of heavy grain feeding were also asked how much thought they gave this practice. However, with respect to the non-users, the possibility that they may not even be aware of the innovation was taken into account. These individuals were asked: "Different farmers are likely to have somewhat different meanings for the words heavier grain feeding. For purposes of this study let's say that anytime you give a cow at least one pound of grain for every three pounds of milk she produces, you are using heavier grain feeding. Now...about how much thought, if any, have you given the possibility of using heavier grain feeding...a great deal, quite a bit, just a little, or none at all?"

Information Level

The dependent variable in the first hypothesis, information level, was operationalized as the score obtained in a multiple-choice information test. The construction and administration of the instrument was based on the procedure of Troldahl in measuring the comprehension of published horticultural ideas.[3] There were seven items for herd testing and four items for heavy grain feeding.[4] Each item consisted of one correct and three wrong alternatives. One item on

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[3] Troldahl, The Communication..., pp. 37-42.

[4] The two test pages are presented in the Appendix.

herd testing was as follows:

About how much does Owner Sampler testing cost compared with D.H.I.A.?

_____1/3 as much as D.H.I.A.
_____1/2 as much as D.H.I.A.
_____2/3 as much as D.H.I.A.
_____the same as D.H.I.A.

Subjects indicated their answers by placing an "X" before the answer considered appropriate. They were told to choose only one answer for each item and, if not known, "to go ahead and give (your) opinion anyway." A score of 0 was given to wrong or double answers.

M.S.U. dairy extension specialist Donald Hillman provided the factual content from which the questions used were developed.[5] It was required that the questions deal with information previously communicated for farm extension purposes and which a farmer, expected to be reasonably informed about the practices, would know. The selected questions were later verified by Lapeer county dairy extension agent, Mr. Leo Dorr, as to applicability in that locality.

Dogmatism

The general independent variable, dogmatism, was measured by an abridged version of the Rokeach's Dogmatism Index, Form E. Twenty statements were selected from the original 40 statements on the basis

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[5] Assoc. Prof. Hillman is the author of technical and extension publications on dairying such as "A Progressive Feeding Program for Milk Production," M.S.U. Extension Bulletin E-423 (September, 1963).

of an item analysis conducted by Troldahl.[6] They were the 20 items which correlated highest with the total dogmatism score as measured by the Rokeach instrument, Form E.

Classification of the subjects as being low or high in dogmatism was made by dividing the obtained total scores at the median. On a scale of 0 to 120, persons in the low dogmatism level had a score of 67 or less; individuals scoring 68 or more were considered as high in dogmatism. Where feasible in the statistical analysis, a three-fold grouping was used. Scores of 29-59, 60-74, and 75-115 constituted the low, medium, and high levels respectively. The dogmatism scores of the respondents comprising the sample ranged from 29 to 119. (Table 1). The observed median of 63 was slightly above the theoretical midpoint of 60, suggesting that, on the average, subjects tended to be slightly closed minded.

Table 1

Distribution of Respondents' Dogmatism Scores

Dogmatism Score	% of Respondents
20- 29	1%
30- 39	3
40- 49	7
50- 59	21
60- 69	24
70- 79	20
80- 89	16
90- 99	7
100-109	0
110-119	1
	100%
	N=147

[6]Verling C. Troldahl, Unpublished manuscript, (1963). See William James White, The Effects of Psychic Distance and Dogmatism on the Perceived Credibility of Political Leaders. M. A. Thesis, Michigan State University (1963), p. 12.

Fact vs. Authority Reasons for Adoption

The second hypothesis presented a corollary statement regarding the adoption process, the reason for adoption, which should vary between persons having different belief system styles. To study this type of dogmatism effect, only the "adopters" and the "tryers" were considered. These respondents were asked with respect to each of the two practices studied: "Thinking back to when you decided to use (or try) it, do you remember why you decided to use (or try) it?"

Responses were classified as either "factual" or person-authority reason. The three judges of the awareness-stage questions also decided where each response fitted in this dichotomy.[7] Answers that included proper and common nouns naming persons or institutions were coded as person-authority reasons. Any reason not classifiable as such was considered as "factual". In case of a combination, the response was coded as a person reason.

Subjects not mentioning person-authority influence in the above question were also asked: "When you first decided to use it, did any person's opinions influence you at all? How much influence did this person have on your decision...a great deal, quite a bit, or just a little?" "A great deal" and "quite a bit" were considered as "much influence". "Just a little" and a negative reply comprised the

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[7]Comparison of the codes assigned by the judges to reasons for adopting D.H.I.A. indicated that the judges agreed as to the proper code in 89 per cent of the cases. Since the final code assigned was the majority opinion of three judges, the amount of agreement between any given judge and the final code assigned will be even higher than 89 per cent. The inter-judge agreement index is based only on the responses of Tryers and Adopters, as they were the only respondents asked this question.

opposite coding entry. Persons who mentioned authority-influence in the unstructured question were treated as having received much influence. The structured form of the stimulus statement was added due to the need indicated in pretests of the questionnaire for more concrete terminology.

Use of Primary vs. Extended Group Source of Information

The effect of belief system styles on the selection of communication channels used as sources of information was the problem investigated in the third to the fifth hypotheses. In the third and fourth hypotheses, the dependent variable was the type of information source used, divided into the "primary group" and "extended group" categories. "Primary group" was operationally defined as members of the family or non-members whom the subject asserted as "one of (his) closest friends." "Extended group" was any person not falling under the "primary group" category. Data on the source of information utilized were obtained "developmentally" through a series of questions starting thus: "Could you describe to me some idea in dairy farming which you have learned about during the last six months or so?" Subjects who indicated some knowledge of an idea were then asked: "How did you first learn about it?" Responses to this question were considered as the sources of initial information. Because of the open-ended nature of the question, sources other than personal channels were yielded by the respondents. The obtained responses were classified post hoc as non-person source, personal source other than self, and self. Subjects who mentioned a personal source were asked: "Is this person a member of your family, a neighbor, a relative, someone you work with, or someone else?" If

not family, a further question was asked: "How well do you know this person...would you say he's one of your closest friends...a fairly close friend...a casual acquaintance...or someone you had not met before?"

The source of validating information was obtained from subjects answering "yes" to the question, "After you first learned about it, did you find out more about the idea in any way?" These respondents were then asked how they got "this extra information on the idea." Responses were classified according to the same categories used in defining the three main source types and primary or extended group members.

The fifth hypothesis focused on the use of specialized mediated media. Use of specialized media was operationalized two ways: as readership of the specialized magazine Hoard's Dairyman and of agricultural bulletins. In the first case, the question was asked: "Do you subscribe to or read regularly: Michigan Farmer...Successful Farming...Hoard's Dairyman...Farm Journal?" A yes or no answer was obtained after each title. The three other magazines were included to camouflage the interest in Hoard's Dairyman. In the second case, respondents were asked: "Do you get agricultural bulletins from M.S.U. or other colleges and experiment stations, or the U. S. Department of Agriculture?" Subjects answering positively were then asked: "What was the last one you received or read?" This question was asked to verify the acceptability of the subjects' affirmation of bulletin reading. Thereby it was hoped to counteract the possibility of lying or at least the giving by respondents of socially acceptable answers.

General Innovativeness Index

The sixth hypothesis stipulated the effect of dogmatism on the rate of adoption of recommended agricultural practices. To measure this behavioral phenomenon, a "General Innovativeness Index" was formulated for this study.

Adoption research has historically proceeded as the study of what may be called its major dependent variable, rate of adoption, or more precisely, general innovativeness. Continuing interest in refining its measurement has therefore attended adoption research. The usual method of measuring the magnitude of adoption has been to fit inquiry into the dichotomy of using or not using the stimulus practices.

A rather unique measurement technique has appeared in the work of Bittner, a former student of the M.S.U. agricultural economist James Nielson.[8] Certain of their assumptions guided the construction of the index used presently. A farmer not using a practice as expressed in an adoption questionnaire is not necessarily an ineffective operator deserving a zero score for innovativeness. Corollary to this idea, individual practices studied should allow for sub-practices or alternatives with different degrees of acceptability.

With these assumptions, it was required that the stimulus questions comprising the general innovativeness index be as unstructured or open-ended as possible. Open-ended probing allows the subjects themselves to report what there is in the situational field, and, in their own terms rather than the researcher's. Once obtained,

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[8]Ruford F. Bittner, Farm Practice Adoption as Related to Extension Participation and Importance of Enterprise, M. S. Thesis, Michigan State University (1959).

the data is still open for another improvement -- the increase in the amount of information, in the information-theory sense, that results in the availing of more categorizations, e.g. degrees of innovativeness with each agricultural practice.

In other words, the unstructured method of eliciting information for indexing adoption makes possible as many scoring degrees as desired. This is so because the number of practice alternatives potentially receivable is not antecedently limited. Thus one may divide the observed practice alternatives into those of no, minimum, medium, and maximum acceptability, scored as 0, 1, 2, and 3 respectively. Finally, the unstructured approach reduces the probability that respondents will say they are using what they may "know" is the "most acceptable practice" as far as the extension service is concerned.

The present index was prepared in collaboration with the county extension director and dairy extension agent at Lapeer county. Earlier, consultations were made with M.S.U. dairy extension specialists for suggestions. Items were chosen by the Lapeer county extension personnel so as to include only those practices acknowledged in the local extension program. A few of these items were modified or thrown out of the final scale on the basis of experience in pretest interviews with dairy farmers.

The alternative ways of handling each farm problem were assigned scores of 0, 1, or 2 by the author, in collaboration with Lapeer county extension personnel. A "2" was given to any mentioned practice falling under the criterion "recommended by the extension service." A fairly acceptable, although not particularly recommended,

practice received a "1". One which was neither acceptable nor recommended received a "0". Response types that were anticipated were classified and assigned scores even before the interview. Alternatives becoming known only after the field data were gathered were compiled for and scored by the Lapeer county extension director.

The index consisted of seven practices. These items included the two practices studied in detail, herd testing and heavy grain feeding. The other recommended farming methods studied were individual-cow health-record keeping, minimum tillage, soil testing, top dressing of established hay stands, and date of corn planting.

Value for Innovativeness in a Social System

The seventh and last hypothesis stated that strength of the "value for innovativeness" in a social system would affect the adoption rate of high dogmatics but has relatively little influence on the low dogmatic persons. The operationalization of the variable of innovativeness in the social system was discussed earlier in the section on "Sample". The selection of the two types of areas, the low and high value for innovativeness social systems was done subjectively by the Lapeer county extension personnel. These workers recommended the townships on the basis of their feeling of the general attitude of the people towards extension goals and efforts. For example, attendance at extension meetings was greater in the high value townships than in low value townships.

Data Collection

Interviewing the Subjects

The questionnaire was administered to the subjects individually in or about the premises of their homes. The 21 interviewers, including the author, were all students at Michigan State University and had an agricultural background. Seventeen were graduate students while four were undergraduates.

The interviewers attended a four-hour briefing two days before going to the field. Mimeographed instructions were given them during the briefing session. They also went through the questionnaire with the instructor. After the briefing they were given the names and addresses of the subjects they were to interview the first day.

A total of 147 completed questionnaires provided the data for this study.[9] Most of these questionnaires were completed on November 29 through December 1. After these dates, 10 more interviews were obtained. These later interviews were done to fulfill appointments made in earlier calls on the subjects and to try to gain cooperation from subjects who had previously refused. As many as three separate calls were made on each respondent, if necessary, to complete an interview.

The situational and environmental conditions attending the interviews were extremely varied. Interviews were made starting as early as 7:30 a.m. and as late as 10:30 p.m. The interviewers introduced themselves as Michigan State University persons doing a farm study.

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[9] The success in interviewing is summarized in Chapter III.

The Questionnaire

Identical forms of the questionnaire were administered to all the subjects. The sequence of the questions followed logical positioning considerations rather than topical grouping.

Most of the questions elicited categorical answers which could be coded without any uncertainty as to the category to which the responses belonged. Questions which elicited answers which could be interpreted differently by different persons were submitted to judging by three persons. These questions were the awareness "stimulus" statements, the reasons for adoption given by the respondents, and the method of tillage for preparing the corn field.

The twenty statement dogmatism scale was presented after the questions tapping the dependent variables had all been asked. This phase of the interview was introduced by the transitional statement, "Now I'd like to spend a little time on something that has nothing to do with farming." The twenty statements were verbally read to the respondents. They were asked, first, to respond **either** agree or disagree to the stimulus sentence. Second, they were asked to call out the numbers 1, 2, or 3, to indicate the intensity of their assent or dissent. A visual aid was made available to the respondents during the questioning, a 5 by 8 inch index card containing the six response-alternatives and their significations, i.e. agree a little, agree on the whole, strongly agree, etc.

To get the dogmatism score for each subject, the sum of the scores of the agree responses was added to a constant number, 60, after which the sum of the scores of the disagree responses were

subtracted. The constant was used to avoid dealing with negative numbers in the computation.

Data Analysis

To test the "short-circuit" hypothesis, data from the two information level tests were subjected to separate analyses of variance, using a treatment-by-levels design. The different positional locations of the respondents according to whether they had adopted, tried, evaluated, or were aware of the practice were considered as the treatments. The high and low dogmatism sub-groups were considered as the levels. The eight groups in this cross-classification were compared on their mean information-level.

If high dogmatics "short-circuit" the adoption process, there should be a significant interaction. The difference in the information level was expected at the "evaluated" stage, where the information level of the low dogmatic individuals should be higher than the high dogmatics. This was considered as the crucial point for this reason: It was assumed that at the awareness, trial, and adoption stages, the information level would tend to be equal between the two dogmatism sub-groups. The awareness stage which marks the point of initial knowing about a practice does not lend to expectation of more than cursory information. At the trial and adoption stages actual experience with the practice itself would tend to make the doors knowledgeable about the practice. In sum, the dynamics of the "short-circuit" prediction depended in this study on information level before the practice is actually used.

Since the cell-Ns were neither equal nor proportional, the

"approximate method" of analysis of variance was used.[10] Further, it was not possible to randomize the assignment of subjects on the variables studied, thus limiting somewhat the confidence possible in interpreting the findings.

In diagram form the design was as follows:

Figure 2. Design for Hypothesis 1.

	Subjects who			
	Were Aware	Evaluated	Tried	Adopted
High Dogmatic grp.		Information Level		
Low Dogmatic grp.		As Means		

To test the second through the fifth hypotheses, the chi-square test was employed. In general, the percentages within each dogmatism level of high, medium, and low, were compared across dogmatism groups. As an illustration, the design for the analysis of the reasons for adoption is presented below:

	Low in Dogmatism	Medium in Dogmatism	High in Dogmatism
Factual reason	%	%	%
Person-authority	%	%	%

Hypothesis 6 asserted that there would be a negative correlation between general innovativeness and dogmatism. It was tested

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[10] Helen M. Walker and Joseph Lev, Statistical Inference (New York: Holt, Rinehart and Winston, 1953).

by computing a Pearson product moment correlation between the dogmatism scores and the correlation coefficient was then tested for significance.

Hypothesis 7 was tested by analysis of variance, again using the "approximate method". The treatments were the high and low value for innovativeness in a social system while the levels were the high and low dogmatism sub-groups. The criterion variable was the mean rate of adoption of the individuals assignable to each cell. Hypothesis 7 predicts that the strength of innovativeness in a social system affects high dogmatics, but not low dogmatics. Thus, a significant interaction effect is expected.

Chapter III

FINDINGS

A field study was conducted among dairy farmers in selected townships in Lapeer county, Michigan, to obtain empirical evidence for seven hypotheses derived from Rokeach's belief-systems theory.

Description of the Sample

Interviewing Success

In this study it was sought to interview every farmer having 20 or more milking cows located in six townships recommended by personnel of the extension service as having the characteristics of either the low or high "value for innovativeness". To increase the size of the sample, similar farm operators residing in two nearby townships not falling under these classifications were added. Subjects from these "marginal" townships were included in all analyses except the one in which the social system's "value for innovativeness" was a variable.

In all, interviews were attempted with 187 dairy farmers. (Table 2). Of this number, 35 interviews (18%) were not completed. These were due to refusals, respondents not being contacted, and termination of interviews with those having less than 20 cows.

Interviews were completed with 152 of the dairy farmers. However, five interviews were judged unusable,[1] leaving a net sample size of 147 for analysis.

Of the 147 subjects, 71 were in the high "value for innovative-

[1] For example, a case where father and son joined in answering the interview (also, each was measured on dogmatism) was rejected.

Table 2

Interviewing Success

	Low Value for Innovativeness Townships	High Value for Innovativeness Townships	"Marginal" Townships	Total Sample
Completed usable interviews	70%	85%	83%	79%
Unusable interviews	4	0	7	3
Respondent refused interview	12	8	0	9
Respondent not contacted	4	1	0	2
Interview terminated, subject having less than 20 cows	10	6	7	7
Interviews attempted	100%	100%	100%	100%
	N=73	N=84	N=30	N=187

ness" social system, 51 in the low value, and 25 in the "marginal" townships. The distribution of the respondents by township was as follows:

High Value for Innovativeness Social System

Burnside 9	- 44
Burnside 10	- 12
North Branch	- 15
	71

Low Value for Innovativeness Social System

Rich	- 25
Marathon	- 13
Oregon	- 13
	51

"Marginal" Townships

Burlington	- 15
Deerfield	- 10
	25

In all of the three classes of townships, the low and high dogmatic individuals were about evenly divided. In other words, there was no relationship between the "value for innovativeness" of a social system and the amount of dogmatism shown by members of the social system. The distribution of the low and high dogmatic respondents was as follows:

	High Value Social System	Low Value Social System	"Marginal" Townships
Low Dogmatism grp.	54%	49%	48%
High Dogmatism grp.	46	51	52
	100%	100%	100%
	N=71	N=51	N=25

Description of Dogmatism Groups on Farm Characteristics

The principal variable in this study was dogmatism. For most analyses in this study, respondents were split into two or three groups, then compared. Ideally, the dogmatism groups should be very similar in most other aspects that are known to be related to, or possibly related to, communication behavior and general innovativeness.

Table 3 shows the characteristics of the respondents' farms on which the percentage distributions of the low and high dogmatic groups are compared.

In the sampling, it was decided to study only dairy farmers. To be considered a dairy farmer, the subject must have at least 20 milking cows on the average during the year.

Using the chi-square test, the frequency distributions of the low and high dogmatic respondents with respect to the number of milking cows were compared to find out whether the observed distributions differed from that which could be expected by chance. The differences were not significant.[2] For the sample as a whole, these farmers averaged about 34 milking cows.

In both dogmatism groups, practically all the respondents declared dairying to be their main source of farm income with a slight edge in the high dogmatism group. However, the groups were significantly different on the size of farm in total acres.[3] The low

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[2] Chi-square = 5.28; 3 d.f.; p greater than .05, two-alternative test.

[3] Chi-square = 10.29; 4 d.f.; p less than .05, two-alternative test.

NUMBER
20-2
30-3
40-49
50-99

MAIN SOUR
Dairy
Other 1
Cash cr
Combina
Factory

SIZE OF F
Under 1
100-139
140-179
180-219
220-259
260-499
500-999

STATUS OF
Owned
Rented
Some ow
Operated

Table 3

Characteristics of Respondents' Farms

	Low in Dogmatism (29-67) N=75	High in Dogmatism (68-115) N=72
NUMBER OF MILKING COWS		
20-29 cows	31%	43%
30-39	33	33
40-49	12	11
50-99	24	13
	100%	100%
Average No. of cows (Median) =	35.8	32.1
MAIN SOURCE OF FARM INCOME		
Dairy	93%	98%
Other livestock	3	0
Cash crops	1	0
Combination dairy and cash crops	3	1
Factory, shop	0	1
	100%	100%
SIZE OF FARM IN TOTAL ACRES		
Under 100	5%	7%
100-139	1	17
140-179	16	22
180-219	19	14
220-259	20	15
260-499	34	21
500-999	5	4
	100%	100%
Average No. of acres (Median) =	237.2	192.0
STATUS OF OWNERSHIP		
Owned	54%	61%
Rented	9	10
Some owned, some rented	36	29
Operated by farm manager	1	0
	100%	100%

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dogmatism group as a whole had larger farms than the high dogmatism group. The median for the low dogmatic sub-sample was 237 acres as compared with the median of 192 acres for the high dogmatic operators.

On the status of ownership, the differences between the two dogmatism groups were non-significant.[4] Farm owners comprised a little more than half of the sample. About a third of the operators owned some and rented some of their farms. Renters were relatively few.

Characteristics of Dogmatism Groups on Personal Characteristics

Table 4 describes the low and high dogmatism groups on their personal characteristics including time spent in off-farm work, age, education, information level, and general innovativeness.

In both groups, about two-thirds of the respondents were full-time farmers or farmers who did not engage in other occupations. For those who did work off the farm, most were employed for short periods up to three months. As a whole therefore the economic base of the sample is agricultural. Differences between the two dogmatism groups were non-significant.[5]

As to age, the low dogmatic subjects as a whole tended to be younger than the high dogmatic respondents, the median ages being 42.3 and 47.6 respectively. The product-moment correlation of age and dogmatism was .29. This positive relationship indicated that the

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[4] Chi-square = 1.18; 2 d.f.; p greater than .05, two-alternative test.

[5] Chi-square = 2.72; 2 d.f.; p greater than .05, two-alternative test.

Table 4

Characteristics of Respondents

	Low in Dogmatism (29-67) N=75	High in Dogmatism (68-115) N=72
TIME SPENT IN OFF-FARM WORK		
0 days	70%	69%
1 -99	24	18
100-199	3	7
200 or more	3	6
	100%	100%
AGE		
Under 25 years	4%	0%
25-34 years	17	10
35-44 years	38	30
45-54 years	26	38
55-64 years	15	21
65 or more years	0	1
	100%	100%
	Median = 42.3	Median = 47.6
EDUCATION		
Less than 8 years	4%	7%
Completed 8th grade	30	39
Attended high school but didn't graduate	15	19
Graduated from high school	44	31
Attended college	4	4
Graduated from college	3	0
	100%	100%
INFORMATION LEVEL: (Herd Testing)		
Score of 7	0%	0%
6	4	0
5	8	7
4	33	29
3	22	24
2	23	19
1	5	10
0	5	11
	100%	100%
	$\bar{X}$=3.12	$\bar{X}$=2.71

Table 4 (continued)

	Low in Dogmatism (29-67) N=75	High in Dogmatism (68-115) N=72
INFORMATION LEVEL: (Heavy Grain Feeding)		
Score of 4	1%	0%
3	19	14
2	40	36
1	29	37
0	11	13
	100%	100%
	$\bar{X}$=1.71	$\bar{X}$=1.51
GENERAL INNOVATIVENESS:		
Score of 14	0%	0%
13	0	1
12	1	3
11	7	1
10	8	1
9	11	6
8	13	10
7	13	22
6	14	11
5	11	17
4	12	7
3	7	14
2	1	6
1	1	1
0	1	0
	100%	100%
	$\bar{X}$=6.61	$\bar{X}$=5.96

older the subject was, the higher the dogmatism level. This coefficient was significant at the .05 level, two-tailed test, but was not high. (Table 5). This trend corresponded with the correlation of .20 reported by Troldahl for suburban Boston respondents.[6] He investigated an agricultural extension problem, the flow of information to non-farm users of improved gardening practices.

The correlation found between dogmatism and education was -.22, which was significant but again not high. This correlation is much lower than that found by Troldahl in Boston (-.46), but closely matched that of Powell who studied a general-population sample of Lansing, Michigan, residents.[7] Powell reported a correlation of -.25.

Dogmatism was negatively correlated with information level on herd testing. The coefficient of -.22 found was significant. The mean information level of the respondents on the seven-item test on D.H.I.A. and Owner Sampler herd testing was 3.12 for the low dogmatic group and 2.71 for the high dogmatic group. On the four-item heavy grain feeding test, the mean was 1.71 for the low dogmatic group and 1.51 for the high dogmatic individuals. The correlation between dogmatism and heavy grain feeding information level was -.10, which was not significant. In general, the results suggest that the more highly dogmatic individual is a little less likely to be knowledgeable about farming information.

Dogmatism was likewise negatively correlated with general innovativeness. General innovativeness was operationalized as the ratings

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[6] Troldahl, The Communication..., p. 96.

[7] Ibid., p. 97.

Table 5

The Matrix of Intercorrelations Between Variables
(Relative to Dogmatism and General Innovativeness Scores)

N=147

A	1	2	3	4	5	6	7
1. Dogmatism	1.00	-.235*	.292*	-.217*	-.284*	-.218*	-.100
2. General Innovativeness			-.164*	.309*	.159*	.273*	.039
3. Age				-.414*	-.144	-.170*	-.012
4. Education					.249	.200	-.110
5. Size of Farm						.292	-.040
6. Info. level: herd testing							.189*
7. Info. level: heavy grain feeding							1.00

A - Numbers above each column refer to the variables listed in the left-hand column.

* - These product moment correlation coefficients are significant at .05, two-tailed test.

given practices which respondents reported they were using currently. The ratings were based on their acceptability from the point of view of extension-service recommendations. The correlation coefficient of -.24 was significant but is not high. The mean general innovativeness or adoption score was 6.61 in the low dogmatic group and 5.96 in the high dogmatic group. Possible scores varied from 00 to 14. The observed scores ranged from 0 to 13.

Tests of Hypotheses

Dogmatism and "Short-circuiting" of Stages in the Adoption Process

Diffusion research has shown that farmers in general go through five stages when adopting a farm practice. First, they learn about it. Then they seek more information about it. Thirdly, they mentally evaluate the new idea or practice to their own situation. After this, they try it on a short-term or small-scale basis. Finally, they decide to use the practice fully and continuously. However, findings have also shown that some farmers "short-circuited" the five-stage sequence, that is, they skipped one or more of the stages between initial awareness and final adoption.

Hypothesis 1 asserted that highly dogmatic farm operators were more likely to "short-circuit" the five-stage sequence than relatively low dogmatic individuals. "Short-circuiting" was defined in this study as the skipping of the second stage, the information-seeking stage. If a person who has considered or used a practice skipped this stage, then he should have less information about the practice than one who went through this stage. The amount of information or "information level" of the subjects was measured by their scores in

two multiple-choice tests, one for each of the herd-testing and heavy-grain-feeding practices.

In the analysis, the information levels of low and high dogmatic individuals located at each of four stages in the adoption process were compared, namely (a) those subjects who had adopted the practice; (b) those, not being adopters, had however tried it; (c) those, not being adopters or tryers, had evaluated; and (d) those who were only aware of the practice. Specifically, it was predicted that the information level of low dogmatic individuals would increase from the awareness stage to the evaluation stage but that this would not tend to occur for high dogmatic individuals. The information-seeking stage was represented in the analysis as the statistic on which the subjects were compared, their information level.

The mean information levels were subjected to analysis of variance tests. An interaction effect in these tests would mean that the information level of high and low dogmatic individuals differed in the pattern of change from stage to stage. The big difference in pattern was expected at the "evaluation" stage.

Checking information level on herd testing, the mean information level did not increase from "awareness" to the "evaluation" stage for either group. (Table 6). On heavy grain feeding, the low dogmatic group did increase in information level from awareness to the evaluation stage, as predicted, and the high dogmatics did not. But overall differences were not significant. (Table 7). Therefore, the hypothesis asserting "short-circuiting" by high dogmatic individuals was not confirmed in this study.

Table 6

Average (Mean) Information Level of Respondents
At Different Stages of Adoption, By Dogmatism Groups

Farm Practice: Herd Testing

	Were Aware	Had Evaluated	Had Tried	Had Adopted
Low Dogmatism grp.	3.6	2.9	3.0	3.3
High Dogmatism grp.	3.2	2.6	2.6	2.6
Sample Size:				
Low Dogmatism grp.	16	12	19	22
High Dogmatism grp.	29	7	17	18

Analysis of Variance

Summary:

Source of Variation	S.S.	d.f.	M.S.	F	$F_{.95}$
Between adoption stages	.5997	3	.1999	1.57	2.67
Between dogmatism grps.	.4109	1	.4109	3.24	3.91
Interaction: Stages x Dog.	.0340	3	.0113	.09	2.67
Within groups		132	.1267		

Table 7

Average (Mean) Information Level of Respondents
At Different Stages of Adoption, By Dogmatism Groups

Farm Practice: Heavy Grain Feeding

	Were Aware	Had Evaluated	Had Tried	Had Adopted
Low Dogmatism grp.	1.8	2.5	1.7	1.6
High Dogmatism grp.	1.6	1.2	1.5	1.7
Sample Size:				
Low Dogmatism grp.	15	4	23	26
High Dogmatism grp.	19	5	24	19

Analysis of Variance

Summary:

Source of Variation	S.S.	d.f.	M.S.	F	$F_{.95}$
Between adoption stages	.0695	3	.0232	2.09	2.67
Between dogmatism grps.	.3370	1	.3370	3.04	3.91
Interaction: Stages x Dog.	.5846	3	.1949	1.76	2.67
Within groups		127	.1109		

With the exception of the "adopted" stage group in the grain feeding analysis, a consistently higher information level for the low dogmatic individuals was observed. However, the variation between the dogmatism groups was not statistically significant.

Dogmatism and Reasons for Adoption

Hypothesis 2 asserted that, in stating reasons for adoption, low dogmatic persons would more likely mention "factual" reasons than relatively high dogmatic individuals. The latter would tend to report authority influence. This hypothesis was derived from the assumption in the belief systems theory that open-minded persons tended to decide on factual grounds on the merits of each case. In contrast, closed-minded persons were prone to decide on the basis of "irrelevant" pressures such as those coming from peers or social and institutional norms. These pressures were called person-authority influence by the present author.

Analysis of this hypothesis was done with respect to adopters and tryers of either D.H.I.A. or Owner Sampler herd testing, on the one hand, and heavy grain feeding on the other. Respondents who mentioned using the practice "at the present time" or those who reported having tried it before were asked <u>why</u> they decided to try it or adopt it, as the case may be. Responses were classified as either "factual" or "person-authority" reasons. The latter included the mention of proper names or common nouns denoting persons or institutions. Responses not falling under the person category were coded as "factual" reasons. If the reply included "factual" as well as person reasons, the answer was coded as personal influence.

Of the farm operators who said they were using or had tried the recommended herd-testing programs, more high dogmatics than low dogmatics mentioned "factual" reasons. The opposite was observed with respect to person-authority reasons. (Table 8). These findings were not in the predicted direction. For this reason, the data was not subjected to statistical analysis. In this analysis, data on reasons for adoption were available from 72 adopters and tryers.

For heavy grain feeding, data on reasons for adoption were available from 87 of the subjects who mentioned having adopted or tried the practice. In order to be an "adopter", the farm operator must be feeding the rate of at least one pound of grain for every three pounds of milk produced. The percentages of those mentioning either "factual" or person-authority reasons were compared across the three dogmatism groups by the chi-square test. The obtained data were in the predicted direction. However, the differences were not significant.[8]

A second approach addressed to the same hypothesis was made to supplement the first analysis with a more directly worded question. Subjects not mentioning person influence in the first instance were asked: "When you first decided to use it, did any person's opinions about it influence you at all?" If the answer was "Yes", the respondents were asked: "How much influence did this person have on your decision...a great deal, quite a bit, or just a little?" A "no" answer or "just a little", were considered as

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[8] Chi-square = 1.16; 2 d.f.; p greater than .05, one-alternative test.

Table 8

Reasons for Adoption of Innovations

	Low in Dogmatism	Medium in Dogmatism	High in Dogmatism
Innovation: Herd Testing			
Factual reason	65%	88%	75%
Person authority	35	12	25
	100%	100%	100%
	N=26	N=26	N=20
Innovation: Heavy Grain Feeding			
Factual reason	83%	80%	71%
Person authority	17	20	29
	100%	100%	100%
	N=29	N=30	N=28

"little influence", i.e., not person-authority. "A great deal" or "quite a bit" was classified as "much influence". Adopters and tryers who earlier attributed personal influence when asked why they decided to use or try the practice, were added to the "much influence" category in the coding. (Table 9). The percentages pertaining to each degree of influence category were compared across the dogmatism groups by chi-square test.

On herd testing the data were in the predicted direction but the differences were not significant.[9] On heavy grain feeding, the findings were not in the predicted direction.

Dogmatism and Source of Initial Information

In the third hypothesis, it was advanced that the use of personal sources of initial information outside of one's primary group would be greater among low dogmatic farm operators than relatively high dogmatic persons. All subjects were asked to describe some idea in dairy farming which they have learned about during the last six months or so. Those who were able to show knowledge of such idea were then asked how they first learned about it. Responses yielded three main categories of sources namely, non-person source, person other than self, and self. Those mentioning the "third person" source were then asked whether this person was a member of the family, a neighbor, relative, someone they worked with, or someone else. If not a family member, the source was then classified by the respondents either as "one of his closest friends" or not one of his closest

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[9] Chi-square = 3.83; 2 d.f.; p greater than .05, one-alternative test.

Table 9

How Much Influence Attributed to Person Authority

	Low in Dogmatism	Medium in Dogmatism	High in Dogmatism
Innovation: Herd Testing			
Much Influence	24%	39%	53%
None or little	76	61	47
	100%	100%	100%
	N=25	N=23	N=19
Innovation: Heavy Grain Feeding			
Much Influence	31%	43%	38%
None or little	69	57	62
	100%	100%	100%
	N=26	N=28	N=24

friends. Non-family members reported as "closest friend", and family members were considered as "primary group" sources. "Extended group" sources were any persons outside of one's family not considered as one of their closest friends.

Seventy-eight subjects (53%) reported having learned about an idea in dairy farming during the past six months. (Table 10). Their responses to the question on how they first learned about it were their sources of initial information. Twenty-five per cent of the low dogmatic respondents mentioned an extended-group source while 19 per cent of the high dogmatics cited this type of source. These figures for the extended-group source were in the predicted direction. Using the chi-square test, the difference between these percentages for the two dogmatism groups was not significant.[10]

Examination of the figures for the other kinds of information sources shows that the low dogmatic persons tended to use non-person sources more than relatively high dogmatic individuals. This type of source included magazines and other mass media. On the other hand, the high dogmatic farm operators were more likely to attribute their first awareness of an idea to their own selves. The "self" as source comprised assertions such as experimenting or "just knowing" by oneself. However, these observed differences were not found to be significant.[11]

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[10] Chi-square = .41; 1 d.f.; p greater than .05, one-alternative test.

[11] An overall chi-square test (using Yates' correction) yielded a value of 4.62 at 3 d.f., p greater than .05, two-alternative test.

Table 10

Sources of Information

	Low in Dogmatism	High in Dogmatism
Type of Information: Initial		
Non-person source	42%	21%
Self	25	47
Primary group member	8	13
Extended group member	25	19
	100%	100%
	N=40	N=38
Type of Information: Validating		
Non-person source	45%	20%
Self	12	20
Primary group member	12	7
Extended group member	31	53
	100%	100%
	N=26	N=15

Dogmatism and Source of Validating Information

The fourth hypothesis likewise stated that the low dogmatic individuals would use the extended group as source of validating information more than relatively high dogmatic persons. The same subjects studied with respect to the third hypothesis, that is, those who mentioned having learned about a dairy farming idea, were asked: "After you first learned about it, did you find out more about the idea in any way?" Subjects who gave positive answers to this question were then asked how they got this extra information about it. The responses, were classified in the same way as in the preceeding analysis. (Table 10).

As the table shows, the number of respondents who reported seeking validating information was so small that a fair test of hypothesis 4 is not possible. Only 41 of the subjects showing awareness of an idea said they obtained more information about it. Nevertheless, contrary to what was predicted, fewer low-dogmatic individuals mentioned the extended group as source of validating information than high dogmatics. Examination of the figures again shows greater use of non-person by low dogmatic individuals than for high dogmatics. Also, more mentions of the "self" were made by high dogmatic individuals, as was found in studying initial sources of information. However, again the differences were not significant.[12]

From these findings, it may be concluded that the open- or closed-mindedness of individuals has no appreciable relationship with the use of extended group sources of information used by farm operators.

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[12] An overall chi-square test (using Yates' correction) yielded a value of 1.93 at 3 d.f., p greater than .05, two-alternative test.

Dogmatism and Use of Specialized Mediated Communication

Hypothesis 5 was also concerned with the effects of belief system styles on the communication behavior of farm operators. It stated that low dogmatic farm operators were likely to attend to specialized mediated communication more than relatively high dogmatic persons.

"Specialized mediated communication" was operationally defined in two ways: First, as the use of the specialized dairy farming magazine Hoard's Dairyman: and secondly, as the receiving of agricultural bulletins published by public agricultural-service agencies.

In the case of Hoard's Dairyman, all subjects were asked whether they subscribed to or read regularly each of four journals named by the interviewer, including Hoard's Dairyman. The three other farm magazines, Michigan Farmer, Successful Farming, and Farm Journal, which are not considered as specialized dairying media, were included in the question to make the interest in Hoard's Dairyman more covert.

About equal numbers of subjects reported subscribing to or reading this dairymen's periodical within each group of high, medium, and low dogmatism.[13] (Table 11) The hypothesis was therefore not supported. A total of 110 respondents or 75 per cent of the total sample reported reading Hoard's Dairyman.

In the case of agricultural bulletins, all subjects were asked: "Do you get agricultural bulletins from M.S.U. or other colleges and experiment stations, or the U. S. Department of Agriculture?"

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[13] Chi-square = .31; 2 d.f.; p greater than .05, two-alternative test.

Table 11

Use of Specialized Media

	Low in Dogmatism	Medium in Dogmatism	High in Dogmatism
Type: Hoard's Dairyman			
Read and/or subscribe	27%	22%	26%
Don't read and/or subscribe	73	78	74
	100%	100%	100%
	N=48	N=49	N=50
Type: Agricultural bulletin			
Receive	40%	29%	18%
Don't receive	60	71	82
	100%	100%	100%
	N=48	N=49	N=50

If the answer was "yes", the respondents were then asked to name or describe the last one received or read, thus, "What was the last one you received or read?" Respondents who could not satisfactorily answer this recall question were coded as non-users.

A significant difference was obtained in the chi-square test of the percentages across the high, medium, and low dogmatic respondents, confirming the hypothesis.[14] Table 11 shows the distribution of the respondents. About a fifth of the total sample reported receiving agricultural bulletins, and could name one they had received.

Dogmatism and Rate of Adoption

Hypothesis 6 predicted that the highly dogmatic farm operators would have a lower rate of adoption than less dogmatic persons. In this analysis, a "General Innovativeness Index" was constructed. This instrument measured the magnitude of acceptance of farming practices recommended by the extension service in the areas studied. Seven practices related to the dairy farming enterprise constituted the adoption scale. Each practice allowed for any sub-practices or alternatives that respondents mentioned using at the present. These alternatives represented the different degrees of acceptability of the farming practices being used, in the light of the extension service's recommendations for the area. The alternatives reported by the interviewees were assigned scores of 0, 1, and 2 corresponding to "not recommended", "not recommended but fairly acceptable", and

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[14] Chi-square = 5.55; 2 d.f.; p less than .05, one-alternative test.

"recommended". The highest possible general-innovativeness score for each respondent was 14.[15]

The general innovativeness scores were correlated with the dogmatism scores. The total sample of 147 respondents was studied in this analysis. A Pearson product-moment correlation of -.235 was obtained, which was statistically significant.[16] It indicated that the lower the dogmatism score, the higher is the rate of adoption, and vice versa. The hypothesis is therefore supported.

"Value for Innovativeness" and Rate of Adoption

Hypothesis 7 asserted that the strength of the "value for innovativeness" in a social system influenced the adoption rate of highly dogmatic farm operators, but had relatively little influence on low dogmatic persons. In this hypothesis, it was proposed to regard the social system -- or, operationally, its "value for innovativeness" -- as a type of authority influence. This influence is postulated to be an important determinant of the behavior of highly dogmatic individuals. Consequently, in studying adoption behavior in relation to dogmatism, the concept of authority is also to be taken into account. In the present study, it was advanced that a social system high in the "value for innovativeness" would operate as a positive authority having determinable influence on the high dogmatics.

"Value for innovativeness" was operationally defined as the perceived general receptiveness of farm operators in a delimitable

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[15] See Table 4 on page 60 for the distribution of the general innovativeness scores of the subjects in the low and high dogmatism groups.

[16] $t = 2.908$; 145 d.f.; p less than .01, one-alternative test.

geographic area to practices recommended by the extension service. Comparable areas having the low and high value characteristics were selected in cooperation with personnel of the extension service. On the basis of evaluation by Lapeer county extension director, Mr. Robert S. Lincoln, and dairy extension agent, Mr. Leo Dorr, three townships were designated as the "high value" townships and three other townships as the "low value" townships.

Results confirmed the hypothesis. A significant interaction was obtained in the analysis of variance test conducted with the mean innovativeness scores as the criterion variable. Table 12 summarizes the data and the results of the analysis of variance.

Examination of the mean innovativeness scores shows the occurrence of the "significant interaction" in the analysis of variance. The rate of adoption of high dogmatic individuals was greater in the high than in the low value for innovativeness social system.[17] On the other hand, the rate of adoption of low dogmatic individuals did not differ significantly between the two value systems.[18]

It is to be noted that the sixth and seventh hypotheses involved the same variables. For this reason, the hypotheses are presently discussed together.

If, as asserted in the sixth hypothesis, low dogmatic individuals have a higher rate of adoption than relatively high dogmatic farm operators, a main dogmatism effect should have been observed in

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[17] $t = 2.83$; 120 d.f.; p less than .05, two-alternative test.

[18] $t = 1.69$; 120 d.f.; p greater than .05, two-alternative test.

Table 12

Average (Mean) Rate of Adoption of Respondents
In Different Social Systems, By Dogmatism Groups

	Low Value S.S.	High Value S.S.
Low Dogmatism grp.	7.32	6.18
High Dogmatism grp.	4.88	6.76
Sample Size:		
Low Dogmatism grp.	25	38
High Dogmatism grp.	26	33

Analysis of Variance

Summary:

Source of Variation	S.S.	d.f.	M.S.	F	$F_{.95}$
Between social systems	.1359	1	.1359	.61	3.92
Between dogmatism grps.	.8668	1	.8668	3.90	3.92
Interaction S.S. x Dog.	2.2632	1	2.2632	10.19*	3.92
Within groups	.2221	118	.2221		

* - Significant at .01 level.

the analysis of variance. However, the finding for the source of variation between the dogmatism groups was non-significant at the .05 level. This finding may seem inconsistent with the result found in the correlational analysis (which supported the significant negative relation of dogmatism to rate of adoption) used in conforming hypothesis six. However, the apparent contradiction can be explained.

First, a bigger sample was used in the correlational analysis; all 147 subjects were studied. In the analysis of variance, only 122 subjects were included because of the classification of the respondents as belonging to either the low or high value for innovativeness social system. To use the analysis of variance instead of the correlational analysis for studying the relationship of dogmatism to adoption would be throwing away information that is relevant to testing hypothesis six.

Secondly, even though the sample was smaller in the analysis of variance, the "between groups" data missed the .05 level of significance only by a small difference. The observed F for the dogmatism groups was 3.90 as compared with 3.92 needed for significance.

Third, in the analysis of variance, a continuous variable -- dogmatism -- was collapsed into two categories, again throwing away considerable information. The product-moment correlation coefficient is a better statistic for testing hypothesis six because of the precision it maintains in considering all values of the dogmatism variable instead of merely a dichotomy.

Other Findings

Pearson product-moment correlations were obtained between dogmatism and several other variables. The results obtained were reported earlier, in the description of the sample. While most of the obtained correlations exceeded the .05 level of significance, none of them was high.

Correlates of General Innovativeness

"General innovativeness" scores were available from 147 rural respondents. The scores were based on a scale of 0 to 14. The highest correlate of general innovativeness was found to be education (+.31). The coefficient was significant. This finding indicates that as one's educational level goes up, he tends to use new and improved practices more.

The correlation between information level on each of the two practices studied and general innovativeness was also computed. The correlation was .27 for herd testing, which was significant, and for heavy grain feeding a coefficient of .04 was obtained. The positive direction reveals that adoption of the farm practices tended to go hand in hand with awareness of the factual information about them, but not very strongly. The better showing in the herd testing data may be attributed to the larger number of items included in this test (7) as compared with the four items in the heavy grain feeding test. In a limited way, the positive correlation of information level and general innovativeness tends to point toward the direction of the general findings in diffusion research that adoption is partly a function of

"knowledgeability" or communication.

Age was negatively correlated with general innovativeness. This finding corresponds to the general finding in diffusion research that younger farmers tend to be more receptive to new ideas and practices and are more willing to try them earlier than older farm operators. For age, the correlation was -.24, which was significant.

A significant, but very small, correlation of .16 was obtained between size of farm and general innovativeness. This trend is also in agreement with the finding in past diffusion studies that farmers with larger farms had greater innovativeness than the operators with smaller farms.

As reported earlier, dogmatism had a negative relationship with general innovativeness (-.24).

Adopters of Herd Testing Programs and Heavy Grain Feeding

Perhaps of interest especially to extension workers were the data with respect to the number of adopters and tryers of the two practices studied. The farm operators who reported using either D.H.I.A. or Owner Sampler testing programs in their farms totalled 27 per cent of the whole sample of 147 subjects. Similarly, 24 per cent declared they had used either of these programs before, but were not using them now. These, then, are cases of what Rogers has called "discontinuance" of a practice or rejection of an innovation after adoption.[19] In "unofficial" talks by the author with the farmers who had previously used the programs, the most frequently cited cause of stopping use of the method was that "it costs". It seems that farmers

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[19] Rogers, Diffusion..., pp. 88-93.

felt they were paying for nothing. The returns from adopting the practice are intangibles which can be made to bring profit through still other farming techniques such as culling of the inefficient milk producers. One farmer did in fact declare that the reason he quit D.H.I.A. was that the association field man had advised him to cull all his cows.

For heavy grain feeding, 31% of the respondents reported current use of the practice, as operationally defined. To be considered heavy grain feeding, the subject must be feeding his cows the rate of one pound of grain for every three or less pounds of milk. In addition, 32 per cent said they had tried feeding at this rate before, but are not now using it. The next lower level of grain feeding, as defined in this study, was one pound of grain for 3.1 to 3.5 pounds of milk. Only 4% of the respondents mentioned using this rate. Another 65% of the respondents revealed they fed their cows at the rate of one pound of grain to every 3.6 or more pounds of milk or did not vary their feeding rate at all according to milk production. Replies not considered varied feeding included, "Give cows all they can eat", "Give them all they can eat while at the milking parlor", "Depends on how much corn silage I got", or "According to the cow's size, health", or "some basic amount of feed (he) always used".

Chapter IV

DISCUSSION

This concluding chapter summarizes and discusses the findings and presents their implications to agricultural communication and extension work.

Summary

In this study, Rokeach's social-psychological theory of systems of belief was utilized as a means of explaining certain communication processes and the adoption of farm practices. Seven theoretic hypotheses were derived from belief-systems theory and tested in a field study.

First, highly dogmatic farm operators were expected to "short-circuit" the five stage sequence in the adoption process; relatively low dogmatic individuals were not. In general, the high dogmatic farm operators were expected to skip the "interest" or information-seeking stage which is one of the stages between initial awareness and full-scale use of an innovation. This hypothesis was not confirmed.

Low dogmatic persons were expected to be more likely to state "factual" reasons for adopting farming innovations than relatively high dogmatic individuals were. High dogmatics were expected to make statements about authority influence instead. Again, this hypothesis was not statistically confirmed.

For their source of initial information about new ideas and practices, the low dogmatic farm operators were expected to use extended group members more than relatively high dogmatic persons. Although the findings were in the right direction, they were not

statistically significant. Therefore, this hypothesis was not confirmed.

For their source of validating information, the same pattern was predicted. That is, the low dogmatic farm persons will tend to depend more on extended-group members than relatively high dogmatic individuals. The direction of the observed data was the opposite of that expected.

The hypothesis that low dogmatic farm operators are more likely to attend to specialized mediated communication than high dogmatic persons was not supported with respect to readership of the magazine Hoard's Dairyman, but was supported in the case of sending for or receiving agricultural bulletins.

In hypothesis 6, it was asserted that the high dogmatic farm operators would have a lower rate of adoption than low dogmatic persons. The results supported this hypothesis.

In the final hypothesis high dogmatic individuals were expected to be influenced by the strength of the "value for innovativeness" of the social system in which they live. On the other hand, this value for innovativeness was expected to have little influence on low dogmatic individuals. The hypothesis was confirmed.

In addition, the relationship between several variables was determined from the survey data. General innovativeness was found to be negatively correlated with dogmatism and with age. Positively correlated with general innovativeness were education, size of farm, and information level on herd-testing, which all yielded correlations significant at the .05 level, two-tailed test.

The significant correlates of dogmatism were general innovativeness, age, education, and size of farm. Information level on herd testing was negatively related with dogmatism.

Discussion

The results of the study show that the derived hypotheses from the systems of belief theory were not generally supported in the predictions regarding communication behavior per se, but were supported for the predictions on adoption of innovations. Adoption of innovations, of course, can be viewed as the end-product of a communication process.

Communication behavior was first investigated with information level as a criterion variable in order to determine whether closed-mindedness was related to "short-circuiting" of the stages of adoption. The decision-making pattern expected of these individuals was not supported by the data.

What might have led to this negative result? An examination of the mean information-level at each stage of the adoption process for high and low dogmatics, suggests little promise that this hypothesis would have been confirmed with more precise methodology. With regard to herd testing, the difference in information level for the high and low dogmatism groups was about the same at every stage of the adoption process. With regard to heavy grain feeding, the pattern of means was more in keeping with the hypothesis, but the mean information level at the "evaluation stage" was based on the information level of so few persons that the estimates are unreliable. In other words, there is little promise that the communication

behavior predicted by belief-system theory in this case would be found in future tests of the hypothesis.

However, there are two possible weaknesses in the methodology which might have led to the negative findings. If the hypothesis is tested again, these potential weaknesses should be kept in mind. First, a practice which has been introduced fairly recently should be studied. In the present study, so few persons were at the "evaluation" stage in adopting either practice that the sample size was very small where the hypothesized effect was expected. For example, for heavy grain feeding, only 9 out of the 135 persons studied were at the evaluation stage. Second, since the practices studied had been introduced at least three years ago, persons may have learned much information prior to "evaluating" the innovation, but could have forgotten the information long before they were interviewed in this study.

Reported reasons for adopting innovations was the next communication behavior studied. As derived from postulates of belief-systems theory, the communication content "consumed" by low dogmatic individuals should be different from that of the high dogmatic individuals, i.e., "factual" vs. "person-authority" information. However, the data failed to support this contention. The small sample size available for testing this hypothesis permitted a fairly weak test of this hypothesis. It is to be recalled that only the "adopters" and "tryers" could be included in this analysis. Thus, only about half of the subjects could be used in testing this hypothesis. Also, this investigation was limited procedurally by the difficulty of framing an indirect question that would convey the intended meaning of the researcher without giving away the purpose of the inquiry.

Nevertheless, the evidence for the hypothesis was very weak. Two of the four tests of the hypothesis were in the wrong direction.

The use of different types of information sources by high and low dogmatics was also investigated. It was hypothesized that low dogmatic individuals would use extended-group sources more than high dogmatic persons for initial awareness of an innovation. The reported sources of initial information were classified as self, primary group, extended group, and non-person sources.

Failure to find confirmation for the expected use of extended group sources was due to the relatively infrequent use of such sources by either the high or low dogmatic respondents. Instead of extended group sources, low dogmatics seemed to rely heavily on "non-person" sources. High dogmatics, on the other hand, tended to report themselves as the source of new ideas they claimed to have "learned about" during the last six months. That the high dogmatic individuals presented themselves as their sources of information rather frequently suggests that there may be a tendency of closed-minded individuals to shut off recognition of the influence of the "outside world" on them even though, actually, this influence plays a significant role in shaping their actions or decisions. Or, contrary to what the theory suggests, it may be that extremely dogmatic persons are so resistant to persuasion that they "shut off" authority figures as well as other information sources. Since the "over-all test" of significance was not significant, however, these findings can only be interpreted as ideas worthy of further research.

When testing whether low dogmatics were more likely to use

extended group sources in seeking validating information than high dogmatics, the findings were about the same as indicated for hypothesis 3 above. The hypothesis was not confirmed, primarily because few extended sources were sought by either high or low dogmatic respondents.

Greater use of specialized media was predicted for low dogmatic individuals than for relatively high dogmatic persons. This prediction was not confirmed in the case of Hoard's Dairyman, but was supported in the case of seeking agricultural bulletins. The difference in the results may be attributed to the following reasons:

The first medium is characterized by regularity of publication. Its content is apt to vary within each and between issues. On the other hand, agricultural bulletins are usually obtained because of a particular current problem encountered by the requester. Perhaps dogmatism will predict only the seeking of specific information, not periodical publications.

The procedure for asking questions about each medium varied. With respect to agricultural bulletins, users verified their assertion by stating the name or describing the publication last received. With Hoard's Dairyman, the respondents were required to answer merely "yes" or "no" when the magazine title was stated. It is possible that the question on agricultural bulletins was better because recall of a publication's name was required.

Assuming for a moment that the methodology of the study did not lead to a general lack of support for these communication-oriented hypotheses, a scrutiny of belief-system theory is in order. With the generally disconfirming results found, the question of the usefulness

of the theory in predicting communication effects is raised. It is to be noted that Troldahl also did not find the theory useful for predicting communication behavior in the Massachusetts study.[1] Without making a judgment on the theory, the lack of success by researchers in applying the theory in the investigation of communication effects in general population studies in a natural setting raises questions as to whether the theory does suitably reflect the concerns in the field of communication.

Nevertheless, while results were negative in the communication aspect of diffusion studied, the findings supported the predictions regarding the acceptance or adoption of a farm practice. The stage of adoption finalizes the initial exposure to and comprehension of messages or beliefs to actual change in beliefs. In other words, the analysis of communication behavior is the study of the pathways to a final destination. And the final destination is the act of adoption. Therefore, it seems that the theory should predict communication behavior. This suggests that methodological weaknesses may have been the prime reason for not obtaining significant findings.

Results in the sixth hypothesis were significant confirming that adoption was positively related to open-mindedness. This relationship was asserted because the attitudinal predispositions characterizing low dogmatic persons make them open to information, such as one suggesting an alteration of existing modes of conduct or belief. The willingness to accommodate varied and new cognitions renders the open minded individual vulnerable to change. For, although he may

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[1] Troldahl, The Communication..., pp. 110-111.

decide the contrary, he is at least exposed to the facts or arguments supporting the contrary. On the other hand, the closed minded person is apt to reject anything he considers outside the venue of his beliefs. Thus, he is unable to take or leave the new beliefs on their merits, which the open-minded person does. Since there is a strong presumption that scientific farming ideas are concededly more meritorious than the more "traditional" ones they would tend to be more accessible to the open-minded individuals as compared with the closed-minded individuals.

However, tradition is only a sense of time or history. It does not exist save in the way persons hold it to be. Old traditions make way for new ones which in turn become the ways that are acceptable. They become the new "authorities" which have imperceptible but nonetheless powerful impact on suggestible individuals. So in a social system where the modern improved techniques have predominantly supplanted the old established ways of doing things such a value (we call it progressive, in our times) becomes in effect an authority influence.

The seventh and last hypothesis addressed to this proposition was supported by the data obtained at Lapeer county. Results showed that the strength of the value for innovativeness in a social system affected the general innovativeness of high dogmatics but not the low dogmatics. This finding pointed to the tendency that where the positive authority, i.e., the currently accepted value in a social system, was oriented towards the extension-service "culture", then the high dogmatics will become highly innovative. The interpretation of social system norming favoring the adoption of farm practices as a

positive authority influence has its basis on the general findings in diffusion research reported under the "group influence" section in the review of the literature.

In view of these results, it may be concluded that, in order to account for the effect of dogmatism on the adoption of innovations, this personality predisposition should be considered together with the prevailing "value for innovativeness" of the social system. Some people, the high dogmatic individuals, will change their ways if given social support from positive authority figures. On the other hand, the low dogmatic individuals, it would seem, act pretty much independent of this social support.

Furthermore, the above results must be considered with knowledge of the study design. Because of the objective to get a sample of farmers as homogeneous as possible in the type of farming enterprise and in their exposure to an extension program and physical environment, the high and low value for innovativeness areas were not as different from each other as one may find had they been more distant from each other. If the areas were more different, the findings should be even more striking.

Summing up, the success of the design demonstrates that non-person or institutional forms of authority figures can be empirically defined and their effects on human behavior investigated.

Implications to Agricultural Communication and Extension Work

The findings on the investigation of the rates of adoption of farm operators suggest that one way of viewing the audience of communications advocating the acceptance of recommended practices is as

a population consisting of open- and closed-minded individuals. It is interesting to note that about equal numbers of low and high dogmatic individuals showed up in the high and low "value for innovativeness" social systems studied.

Results of the study demonstrated that closed minded individuals are affected by non-person authority influence. First, this finding would imply that these highly dogmatic persons can be changed through the mechanism of this authority influence. Since this influence was a group norm, the idea is suggested that additional attention should be paid to extension programs designed for groups such as neighborhoods. The present focus of extension is on changing individual persons, an approach which would seem to work better with low dogmatic than with high dogmatic persons.

In agricultural extension work, agents could extend their influence by seeking out the likely respected authority figures in the target community. It would seem that, for the more dogmatically predisposed, working through these key figures would be the most efficient way of inducing adoption of new practices among this relatively "slow to adopt" audience. Obviously, the situation would be much better when the authority figures are seen as practicing the innovations themselves. In any case, the point is that more conversions will be likely if the authority figures in the social system are first engaged in order to reach the closed minded persons. Working through these key figures seems most important in social systems (e.g. townships) which seem to have a low "value for innovativeness".

Happily for agricultural extension work, the recruitment of

first adopters would itself also result in the speeding up of adoption. With high innovativeness as the norm in a social system, the closed minded people in the community tend to behave in conformity with the trend. Furthermore, the prevailing value for innovativeness in the social system is also likely to become an authority influence. Although it is non-personal in form, social system norming has been found significantly related to the rate of adoption of the innovations studied.

No finding suggested what could be done in speeding up change among relatively open minded individuals. At most, the postulate of the belief systems theory that they tend to act rationally on the merits of the object of judgment could be assumed. From an educational philosophy viewpoint, changes effected through this process would be more desirable than the changes occuring with regards to closed minded individuals. It would preclude overadoption which could well occur among closed minded persons.[2]

The content of communications has to be varied so as to allow also for such information that would appeal more to closed minded individuals. It would seem that content indicating social support for the recommended practices would be attended to more by the highly dogmatic receivers than content treating exclusively of the rational reasons based on the practices themselves. Agricultural publications from public agencies often report the bare facts of scientific findings. It is not surprising then that, in this study, open minded individuals were significantly greater users of agricultural bulletins

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[2]For a discussion of the topic overadoption, see Rogers, Diffusion..., pp. 142-145.

than relatively closed minded farm operators. Certainly, public information agencies would be the last to desire exclusiveness of their clientele. But in order to avoid this, they may perhaps have to change their established ways of writing and editing publications somewhat.

In recapitulation, the findings here focused on the possibilities of effecting change with respect to closed minded members of the agricultural communication and extension audience. In this discussion, it was held that the traditional beliefs in the profession tended to be based on exclusively rational receiver tendencies. The demonstration of another type of predisposition to persuasive communications, and which concomitantly requires a differential communication approach has been stressed.

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Appendix

The Questionnaire

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*******************************************
* DO NOT WRITE IN THIS SPACE              *
*                                         *
* Project Number   523             (1-3) *
*                                         *
* Phase Number 1                    (4)   *
*                                         *
* Township & Subject Number ____    (5-7) *
*******************************************
```

Respondent:

DISPOSITION OF INTERVIEW	1_____	2_____	3_____	4_____

Good day, sir. I'm_____from Michigan State University. We're doing a study on a few farming topics. I would appreciate very much if you could share some of your time with me.

Time Interview Began: _____a.m. _____p.m.

8. First, could you tell me the size of your farm in <u>total</u> acres?

0 - Under 50
1 - 50-69
2 - 70-99
3 - 100-139
4 - 140-179
5 - 180-219
6 - 220-259
7 - 260-499
8 - 500-999
9 - 1,000-or more acres

9. ...in <u>tillable</u> acres?

0 - Under 50
1 - 50-69
2 - 70-99
3 - 100-139
4 - 140-179
5 - 180-219
6 - 220-259
7 - 260-499
8 - 500-999
9 - 1,000-or more acres

10. Do you own your farm...rent it...or do you own some and rent some?

1 - own
2 - rent
3 - own some and rent some
4 - other (please state)_____

11. What is your main source of farm income...dairy...other livestock ...cash crops...or something else?

1 - dairy
2 - other livestock
3 - cash crops
4 - other (please state)_____

12. How many cows on...the average...are you milking during the year?

6 - 200 or more
5 - 100-199
4 - 50-99
3 - 40-49
2 - 30-39
1 - 20-29
0 - Less than 20 cows

IF LESS THAN 20, SKIP TO QUESTION 44, PAGE 14

13. Now for some specific questions about your farming operations. First, are you using any particular herd testing or herd improvement program?

0 - No - Yes

If YES, ask: Which one are you using at the present time?

2 - D.H.I.A. testing
2 - Owner Sampler testing
1 - Herd Improvement Registry
1 - Keep (my) own record
1 - Son keeps FFA milk production record project
- Other (please state)_____

IF D.H.I.A. or OWNER SAMPLER, GO TO BLUE PAGE (Page 3)

IF NOT, GO TO PINK PAGE (Page 4)

If D.H.I.A. or OWNER SAMPLER user, ask:

14. - 1

15. - 1

16. When did you first sign up your dairy herd for D.H.I.A. or Owner Sampler testing...about what year?_____

17. About how much thought did you give to the matter before signing up for either D.H.I.A. or Owner Sampler testing? ...a great deal, quite a bit, just a little, or none at all?

    3 - a great deal
    2 - quite a bit
    1 - just a little
    0 - none at all

18. Before you decided to adopt D.H.I.A. or Owner Sampler testing, did you use it on a short term trial basis?

    0 - No 1 - Yes

19. Thinking back to when you made the change to either D.H.I.A. or Owner Sampler testing, do you remember why you decided to use it?

PROBE:

IF NO PERSON IS MENTIONED ASK:

20. When you first decided to use it, did any person's opinions about it influence you at all?

    0 - No - Yes If YES, ask: How much influence did this person have on your decision... a great deal, quite a bit, or just a little?

    3 - a great deal
    2 - quite a bit
    1 - just a little

SKIP TO TOP OF PAGE 5

Now I'm going to give you a sheet of paper with some questions on it. I'd like you to read each question carefully...then place an "X" in the blank in front of the answer you consider most appropriate. Please choose only one answer for each item. If you don't know...go ahead and give your opinion anyway.

HAND RESPONDENT PAGE 15

TAKE BACK PAGE 15

21. In addition to herd testing, I would like to talk with you about the feeding of milking cows. First, on what basis do you decide how much grain to feed your milking cows?

_____

PROBE: _____

_____

If ACCORDING TO MILK PRODUCTION, ask:

22. What "rule of thumb" would best describe your rate of grain feeding...that is...one pound of grain for how many pounds of milk?

_____pounds of milk per 1 pound of grain

If 3 POUNDS OR LESS,
GO TO YELLOW PAGE (Page 7)

OTHER WISE GO TO GREEN PAGE (Page 6)

23. Some dairy farmers talk about something called heavier grain feeding. Could you tell me what the words heavier grain feeding mean to you?

PROBE:

24. - 1

25. Different farmers are likely to have somewhat different meanings for the words heavier grain feeding. For purposes of this study let's say that anytime you give a cow at least one pound of grain for every three pounds of milk she produces, you are using heavier grain feeding. Now...about how much thought, if any, have you given the possibility of using heavier grain feeding...a great deal, quite a bit, just a little, or none at all?

3 - a great deal
2 - quite a bit
1 - just a little
0 - none at all

26. Have you ever tried heavier grain feeding on your dairy herd?

0 - No 1 - Yes

If YES, ask: 27. Thinking back to when you decided to try it, do you remember why you decided to use it?

PROBE:

If NO PERSON IS MENTIONED, ask:

28. When you first decided to use it, did any person's opinions about it influence you at all?

0 - No - Yes If YES, ask: How much influence did this person have on your decision...a great deal, quite a bit, or just a little?

3 - a great deal
2 - quite a bit
1 - just a little

SKIP TO TOP OF PAGE 8

Again, I'm going to give you a sheet of paper with some questions on it. Please read the questions and put an "X" in the blank in front of the answer you consider most appropriate. Choose only one answer for each item. If you don't know...go ahead and give your opinion anyway.

HAND RESPONDENT PAGE 16

TAKE BACK PAGE 16

29. Could you describe to me some idea in dairy farming which you have learned about during the last six months or so?

_____

_____

_____

If NO, SKIP TO QUESTION 37, Page 11

30. How did you first learn about it?

_____

_____

_____

If NON-PERSON SOURCE NAMED
SKIP TO QUESTION 33, Page 9.

If PERSON NAMED: 31. Is this person a member of your family, a neighbor, a relative, someone you work with, or someone else?

1 - family
2 - neighbor
3 - relative
4 - someone...work with
5 - someone else (Describe:)_____
0 - skipped

_____

_____

_____

If NOT FAMILY:

32. How well do you know this person...would you say he's one of your closest friends...a fairly close friend...a casual acquaintance...or someone you had not met before?

1 - one of closest friends
2 - a fairly close friend
3 - a casual acquaintance
4 - someone not met before (Who?)_____
0 - skipped

_____

_____

_____

33. After you first learned about it, did you find out more about the idea in any way?

0 - No 1 - Yes

If YES, ask:

34. How did you get this extra information on the idea?

_____

_____

_____

If NON-PERSON source named
SKIP TO QUESTION 37, Page 11

If PERSON named:

35. Is this person, a member of your family, a neighbor, a relative, someone you work with, or someone else?

1 - family
2 - neighbor
3 - relative
4 - someone...work with
5 - someone else (Describe:)
0 - skipped

_____

_____

_____

_____

If NOT FAMILY:

36. How well do you know this person...would you say he's one of your closest friends ...a fairly close friend...a casual acquaintance...or someone you had not met before?

1 - one of closest friends
2 - a fairly close friend
3 - a casual acquaintance
4 - someone not met before (WHO)
0 - skipped

_____

_____

_____

_____

Now, I'd like to know how you handle some of your other farming activities.

37. Do you keep an individual health record for each cow?

0 - No - Yes

If YES, ask: What method do you use?

_____

38. In preparing your fields for corn, what method of tillage do you follow?

_____

39. What practice do you use for deciding the amount of fertilizer to use in your cropping program?

2 - by having soil tested
1 - follow what the elevator man recommends
0 - follow what my neighbor uses
0 - follow what I have always used
- other (please state)_____

40. Of your fertilizer practices, do you top dress your established hay stands?

0 - No - Yes

If YES, ask: What rate do you use...how many pounds per acre?

2 - over 300 pounds
2 - 200-300 pounds
1 - less than 200 pounds

41. By what date do you normally prefer to have your corn planting completed?

2 - by May 15
1 - May 16 - June 1
0 - After June 1

42. Do you subscribe to or read regularly: Michigan Farmer...Successful Farming...Hoard's Dairyman...Farm Journal?

- Yes	- No	Michigan Farmer
- Yes	- No	Successful Farming
2 - Yes	0 - No	Hoard's Dairyman
- Yes	- No	Farm Journal

43. Do you get agricultural bulletins from M.S.U. or other colleges and experiment stations, or the U. S. Department of Agriculture?

0 - No - Yes

If YES, ask: What was the last one you received or read?

_____

Project Number 523 (1-3) Township & Subject Number_____(5-7)
Phase Number 1

Now I'd like to spend a little time on something that has nothing to do with farming. I'm going to read some statements people have made as their opinion on a variety of topics. You may find yourself agreeing strongly with some of the statements...disagreeing just as strongly with others...and perhaps uncertain about others. Whether you agree or disagree with any statement, you can be sure that many people feel the same as you do.

HAND RESPONDENT CARD A

We want your personal opinion on each statement. When I read each one, first tell me whether...in general...you agree or disagree with it...then tell me a number...one, two, or three...that indicates how strongly you agree or disagree with it.

____ ____ 8. There are two kinds of people in this world; those who are for the truth and those who are against the truth.

____ ____ 9. Most people just don't know what's good for them.

____ ____ 10. The highest form of government is a democracy and the highest form of democracy is a government run by those who are most intelligent.

____ ____ 11. Most of the ideas which get printed nowadays aren't worth the paper they are printed on.

____ ____ 12. In the long run the best way to live is to pick friends and associates whose tastes and beliefs are the same as one's own.

____ ____ 13. The present is all too often full of unhappiness. It is only the future that counts.

____ ____ 14. To compromise with our political opponents is dangerous because it usually leads to betrayal of our own side.

____ ____ 15. The main thing in life is for a person to want to do something important.

____ ____ 16. Even though freedom of speech is a worthwhile goal, it is unfortunately necessary to restrict the freedom of certain political groups.

____ ____ 17. Most people just don't give a "damn" for others.

____ ____ 18. It is only natural for a person to be rather fearful of the future.

___ ___ 19. When it comes to differences of opinion in religion we must be careful not to compromise with those who believe differently from the way we do.

___ ___ 20. Unfortunately, a good many people with whom I have discussed important social and moral problems don't really understand what's going on.

___ ___ 21. A group which tolerates too much differences of opinion among its own members cannot exist for long.

___ ___ 22. In this complicated world of ours the only way we can know what's going on is to rely on leaders or experts who can be trusted.

___ ___ 23. My blood boils whenever a person stubbornly refuses to admit he's wrong.

___ ___ 24. Of all the different philosophies which exist in the world there is probably only one which is correct.

___ ___ 25. It is only when a person devotes himself to an ideal or cause that life becomes meaningful.

___ ___ 26. In times like these it is often necessary to be more on guard against ideas put out by people or groups in one's own camp than by those in the opposing camp.

___ ___ 27. In a discussion I often find it necessary to repeat myself several times to make sure I am being understood.

TURN TO NEXT PAGE

TO CODER:

END OF CARD TWO 80) 2

Now I would like just a little information about yourself.

44. How old are you?

1 - Under 25 years
2 - 25-34 years
3 - 35-44 years
4 - 45-54 years
5 - 55-64 years
6 - 65 or more years
7 - Estimated

45. What was the last grade of school you completed?

1 - Less than 8 years
2 - Completed 8th grade
3 - Attended high school but didn't graduate
4 - Graduated from high school
5 - Attended college
6 - Graduated from college

46. About how many days, if any, did you work away from your farm in 1962?

0 - 0 days
1 - 1-99 days
2 - 100-199 days
3 - 200 or more days

47. About how much does Owner Sampler testing cost compared with D.H.I.A.?

_____1/3 as much as D.H.I.A.
_____1/2 as much as D.H.I.A.
_____2/3 as much as D.H.I.A.
_____the same as D.H.I.A.

48. The cost of D.H.I.A. testing for a 30-cow herd in Lapeer County would be about how much per month?

_____$ 9
_____$12
_____$15
_____$18

49. Who sets the cost of D.H.I.A. testing?

_____the county extension director
_____the local D.H.I.A. board of directors
_____members of the association
_____the U. S. Department of Agriculture

50. About how high was the average milk production of cows on D.H.I.A. and Owner Sampler testing programs in Lapeer County last year (1962)?

_____ 7,000 pounds of milk per cow
_____ 9,000 pounds of milk per cow
_____11,000 pounds of milk per cow
_____13,000 pounds of milk per cow

51. About how much was the average milk production for all cows in Michigan in 1962?

_____ 8,000 pounds of milk per cow
_____10,000 pounds of milk per cow
_____12,000 pounds of milk per cow
_____14,000 pounds of milk per cow

52. Which of the following types of information will you find on D.H.I.A. records that you do NOT find on Owner Sampler records?

_____amount and cost of feeding
_____lactation records
_____monthly and yearly herd averages
_____calving dates for all cows in milk

53. What percentage of your herd could you voluntarily cull each year to improve the breeding and still maintain herd size?

_____ 5%
_____10%
_____15%
_____20%

54. Dairy farmers have to allow the dairy cows some time to prove that it pays to feed them more grain. To test the profitability of heavier grain feeding, milk production should be observed for a period of:

_____10 to 30 days
_____30 to 60 days
_____60 to 90 days
_____90 to 120 days

55. When grain is fed in a milking parlor, how much grain would an average cow eat if kept there 20 minutes per day?

_____ 6 pounds
_____12 pounds
_____18 pounds
_____24 pounds

56. Dairy farmers hear many things in connection with heavier grain feeding. Which of the following statements do you disagree with most?

_____Grain is relatively cheap compared to the price of milk.
_____Cows fed grain only in the milking parlor seldom have time to eat enough grain.
_____More grain will cause mastitis, swollen udders, or "burn up" the cow.
_____To reach their potential production, today's better bred cows need more grain than most dairymen are accustomed to feeding.

57. Which of the following feeding practices would you follow to get the maximum peak of production for each cow and establish her potential rate of production?

_____Feed according to thumb rule, that is, 1 pound grain for 3 to 3 1/2 pounds of milk.
_____Feed every cow the same but never more than 18 to 20 pounds per day.
_____Feed all cows as much grain as they can eat at all times or throughout lactation.
_____Three weeks before and through freshening increase grain until cow reaches peak of production or appetite. Then adjust grain to about 1 pound to 2 1/2 or 3 pounds of milk.

TO CODER:

END OF CARD ONE 80) 1