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Information Development and Flow

**A Study of the Communication
Behavior of Social Scientists in a U.S. Land Grant
and Two Taiwan Universities**

HERBERT F. LIONBERGER, LAVERN A. POPE AND B. ANJI REDDY

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Department of Rural Sociology

CONTENTS

Chapter 1.	INFORMATION DEVELOPMENT AND DISSEMINATION IN MODERN SOCIETY	6
	Introduction	6
	Past Research	7
	Toward an Integrated Model	8
	Objectives of the Study	16
Chapter 2.	THE TWO UNIVERSITIES AND THEIR FACULTIES IN SOCIETY . . .	18
	The Two University Settings	18
	The Faculty Interviewed	21
	Conditions of Appointment	27
	Perceptual Variables	30
Chapter 3.	ACCEPTANCE OF INFORMATION MACRO-SYSTEM CONCEPTS BY THE SOCIAL SCIENCE AND AGRONOMY FACULTIES	42
	Diffusion Issues	42
	The Problem	43
	Q-Methodology	43
	Description of Information Macrosystem Type Universities--Land Grant Style	54
	Acceptance of the Basic Concepts--The Diffusion Issue	55
	Faculty Types	58
Chapter 4.	THE COMMUNICATIVE BEHAVIOR OF THE SOCIAL SCIENCE FACULTY	70
	Communications Orientation of the Faculty	70
	The Measure of Communicative Output	71
	Means of Communication	72
	Magnitude and Direction of Communication	72
	The Question of Why	76
Chapter 5.	EXTENSION COMMUNICATION: A MORE DEFINITIVE LOOK	78
	The Choice of Explanatory Variables	78

	The Choice of Appropriate Statistical Techniques . . .	79
	Research Findings	81
	Comparison with Taiwan Campuses	118
Chapter 6.	COMMUNICATION TO ACADEMIA: A MORE DEFINITIVE LOOK	149
	Introduction	149
	Distribution of Academic Communication Output	150
	Explanation of Academic Communication Output	150
	On the UMC Campus	152
	On the Taiwan Campuses	165
Chapter 7.	DISCUSSION OF RESEARCH FINDINGS	183
	Research Highlights	184
	From the Diffusion Concepts	184
	From Other Conceptual Considerations	187
	From the Communications Output Analysis	188
	Implications	191
BIBLIOGRAPHY	197
APPENDIX A.	VARIABLES USED TO EXPLAIN EXTENSION COMMUNICATION OUTPUT OF THE SOCIAL SCIENCE FACULTY CLASSIFIED BY VARIABLE TYPE, UMC AND TAIWAN CAMPUSES	205
APPENDIX B.	OPERATIONAL MEASURES OF FACULTY COMMUNICATIVE OUTPUT . .	208
APPENDIX C.	APPENDIX TABLES	211- 240

CHAPTER 1

INFORMATION DEVELOPMENT AND DISSEMINATION IN MODERN SOCIETY

Introduction

The recent explosion of scientific information has brought about broad revolutionary changes in our ways and conceptions of life as well as the world in which we live. Our knowledge of the physical, biological, and social sciences has given us unprecedented power and ability to determine the course of our destiny. Perhaps knowledge and expertise have become the most influential factor in the lives of people in modern society (Jencks and Reisman, 1968:92-116).

Today, for almost any specialized endeavor, a continuing supply of updated science based information is needed. Folk knowledge is not good enough anymore. Farmers who once relied on their own devices for becoming informed about farming now seek and obtain a variety of specialty information from industry and from public research and extension agencies. Medical practice, once an apprenticeship matter, has become essentially a science based endeavor. Educators rely on improved methods devised and tested outside of the regular classroom. Industries rely heavily on their own research and development of new information and technology. In fact, in the course of events in a normal day an individual is likely to require specialty information from a variety of sources.

Information is a source of power and prestige to those who possess it (Machlup, 1969; Farris, 1978). It is traded, bought and sold--sometimes at a very high price. It has become a specialized endeavor in many quarters. The development and dissemination of information in the United States as in many other societies is truly a big business. One estimate is that every other dollar earned in the American economy comes from producing and distributing specialty information (Paisley et al., 1976). The National Science Foundation estimated that \$26 billion, or 2.7 percent of the gross national product, was spent on research and development in the United States in 1970. The trend over the years has been for both the dollar amount and percent of the gross national produce spent on research and development to increase. But, aside from such aggregate figures, there are sectors in society, like agriculture and industry, where a continuing supply of updated scientific information is a daily necessity. It is probably the most consumed commodity in modern societies.¹

The process by which this is achieved is designated hereafter as an information macrosystem or as a macrosystem of information development and flow. From the time something in the form of basic science knowledge is generated, translated, tested, disseminated and put to utilitarian use centuries may elapse. It is a long process which involves myriads of scholars, professionals, developers, organizations, and institutional arrangements. Ironically, however, the pursuers of specialty information have paid little attention to the study of the process that makes this very information possible and the conditions under which it occurs.

Until well past the turn of the century, invention and discovery were quite exclusively an individual matter. Folk knowledge and an occasional invention by practitioners virtually constituted operational procedures within the then existing specialties, i.e., the professions and farming alike. During this period, when the development of new knowledge and inventions were left to innovative individuals, achievement was sporadic, unpredictable, uncertain, and basically a local affair. Only one invention in a thousand survived and was accepted by the public (Linton, 1936).

As the need for science based specialty information on a continuing basis increased, such chancy arrangements would no longer suffice. The solution that gradually emerged and became institutionalized has been referred to as information macrosystems (Havelock, 1971, Ch. 10). These macrosystems had the capability of simultaneously extending the frontiers of basic science knowledge, transforming a portion thereof into usable practice, and getting it disseminated to user clienteles. In these systems a continuous flow of science based information was assured. Loss of productive effort and potentially useful innovations was cut to a minimum. In addition, the time required for them to materialize and become institutionalized was greatly reduced. Thus, an information macrosystem avoids most of the difficulties involved in the innovation transformation process.

Witness for example, the different kinds of people--who did what, where, when, and in what order--to develop such things as radio and motion pictures. In these cases, it took (1) basic scientists in many locales exploring the fundamentals of electronics, light and human perception, nearly always with no desire to do anything more than to extend the frontiers of basic science knowledge; (2) applied scientists who were perhaps more interested in the application of such knowledge; (3) innovators who mostly liked to "play with their skills" to see what they could invent (Linton, 1936); and (4) developers and distributors mostly interested in making a profit (DeFleur and Rokeach, 1975:34-64). All of this activity covered at least a century, involved people on at least two continents, duplicated work, resulted in near simultaneous invention, and brought subsequent law suits with endless litigations.

Past Research

A wealth of information has been accumulated about the organization and operation of information macrosystems that hitherto developed somewhat in isolation from one another. Some knowledge inputs have come from early diffusion research (Rogers and Shoemaker, 1971) and, more recently, with the systems that develop and disseminate the information (Rogers, Eveland and Bean, 1978). The National Academy of Sciences compiled a six volume treatise on the uses of social science research in federal and domestic programs together with the views and opinions of eminent scientists in the country (National Research Council of the National Science Foundation 1978-1979). The Committee on Government Operations, 90th Congress, First Session sponsored a similar four volume effort (1969). Several years ago, Havelock and his colleagues (1971) laid the foundation for building a social science of knowledge development, dissemination and utilization by codifying about 4,000 pieces of research work done in the field.

They identified three broad perspectives from the vast array of research they examined; namely, (1) The Social Interaction Perspective, (2) The Research, Development and Diffusion Perspective, and (3) The Problem-Solver Perspective. These three perspectives emphasize three

different aspects of the overall development and diffusion process. The Social Interaction Perspective looks at society as a complex network of social relationships between individuals and groups, among groups themselves, and between groups and the larger social system. An innovation is assumed to proceed through the social system step by step via mass media and interpersonal channels of communication. In this model, basic research and development and modification of the innovation processes are assumed to take place quite independently of the laws of local demand.

In the research, development, and diffusion model, search for new knowledge is assumed to take place mostly for its own sake under the general assumption that if and when something new is developed it will create a market for itself. In this model, there is an elaborate social system which develops processes and modifies science based information and delivers it to the potential users in accord with their presumed needs. While the change process is viewed as starting from the awareness stage of the user in the social interaction model, it is viewed as starting earlier with the processing of "pure" knowledge in an intervening "developmental stage" in the research, development, and dissemination model. This is followed by promotional efforts to create awareness and ultimate adoption. In the absence of interactive feedback from information user clients the process can become essentially a top down elitist kind of operation.

The problem-solver model on the other hand is based on the initiative of the clients. It is akin to psychological theory of need reduction. Development and diffusion of knowledge takes place in collaboration with the client system. Diagnosis of clients' needs is an essential ingredient of this model. Clients are active in this model and are key determinants of what is done. But in the final analysis they too must rely on appropriately equipped and supported research and researchers to get the information needed. Many problems simply cannot be resolved on the basis of existing knowledge. Conversely problems provide the basis for doing much of the research that needs to be done. Furthermore, needs must be anticipated in advance for the research to supply the needed information before the problems arise.

Each of these "so-called" models has advantages and disadvantages. This poses an obvious need for a synthesis to take advantage of their special assets. First, there must be a close linkage between the user who has problems and the scientist for research and development to proceed in the "right" direction as well as for the appropriate utilization of research talent. Interactive feedback specified in the social interaction perspective is necessary to keep research and educational outreach aligned with user needs. The authors accordingly take the position that the so-called problem-solver and social interaction models are only partial models, mostly in the nature of research-user interface arrangements. Both must be included to insure that problems are properly addressed and research is oriented to already existing and potential informational needs.

Toward an Integrated Model

In a very real sense lessons already learned point the way to formulating the integrated model which follows. In point of time it antedates the other two. The problem is mostly a matter of conceptualizing essential features from successes already achieved in the evolution of information macrosystems than from innovative creation of a new one. The model presented already exists. It hopefully provides the basis for

understanding most, if not all, successful macrosystems of information development and flow today (see Figure 1). It is based on an interrelated organizational arrangement with task specifications on one hand (column) and functions to be performed (row) on the other. Both start from the centers of basic science knowledge and proceed to the user level with intermediary subsystems interacting and exchanging useful information with one another, all working in a coordinated manner toward accomplishing the information macrosystem's goal. Such an organizational network cutting across various social system levels is essential for the generation, translation, dissemination, and utilization of scientific information. The emergence and existence of such a model is based on certain (a priori) assumptions; namely, that

- (1) Scientific knowledge is a prerequisite for the progress of any modernizing society.
- (2) Properly supported specialists and organizations external to the user social system are required to develop and deliver specialty information.
- (3) Most usable innovations must ultimately draw heavily on basic science knowledge. This implies the need for a continually expanding body of this type of knowledge.
- (4) The system should be equipped to borrow at feasible levels on the theory to practice continuum, and invent at others.
- (5) Information retrieval from the client system must be provided.
- (6) No information macrosystems has any legitimacy claim unless it has a useful informational product to deliver.
- (7) For a system to operate as a true information macrosystem, it must perform all essential functions.
- (8) Operational specifications are necessary although not sufficient conditions for making the system work.
- (9) Any information macrosystem must be thoroughly adapted to the social setting into which it is introduced if it is to function properly.
- (10) The social setting must include an institutional support structure that makes it possible for ultimate users to put information products to use, i.e., whatever is needed in the nature of outside supplies and services.

Information Macrosystem: Its Tasks and Dimension on the Theory-to-Practice Continuum

This continuum represents a sequence of tasks that transform basic science knowledge into its usable forms, such as radio, television, electricity, high yielding seeds and the like. Depending upon the nature and purpose of the innovative task, a number of individuals either in their individual capacity or as representatives of groups engage themselves in the generation and production of new information or in testing, packaging, and delivering the new product to the potential users.

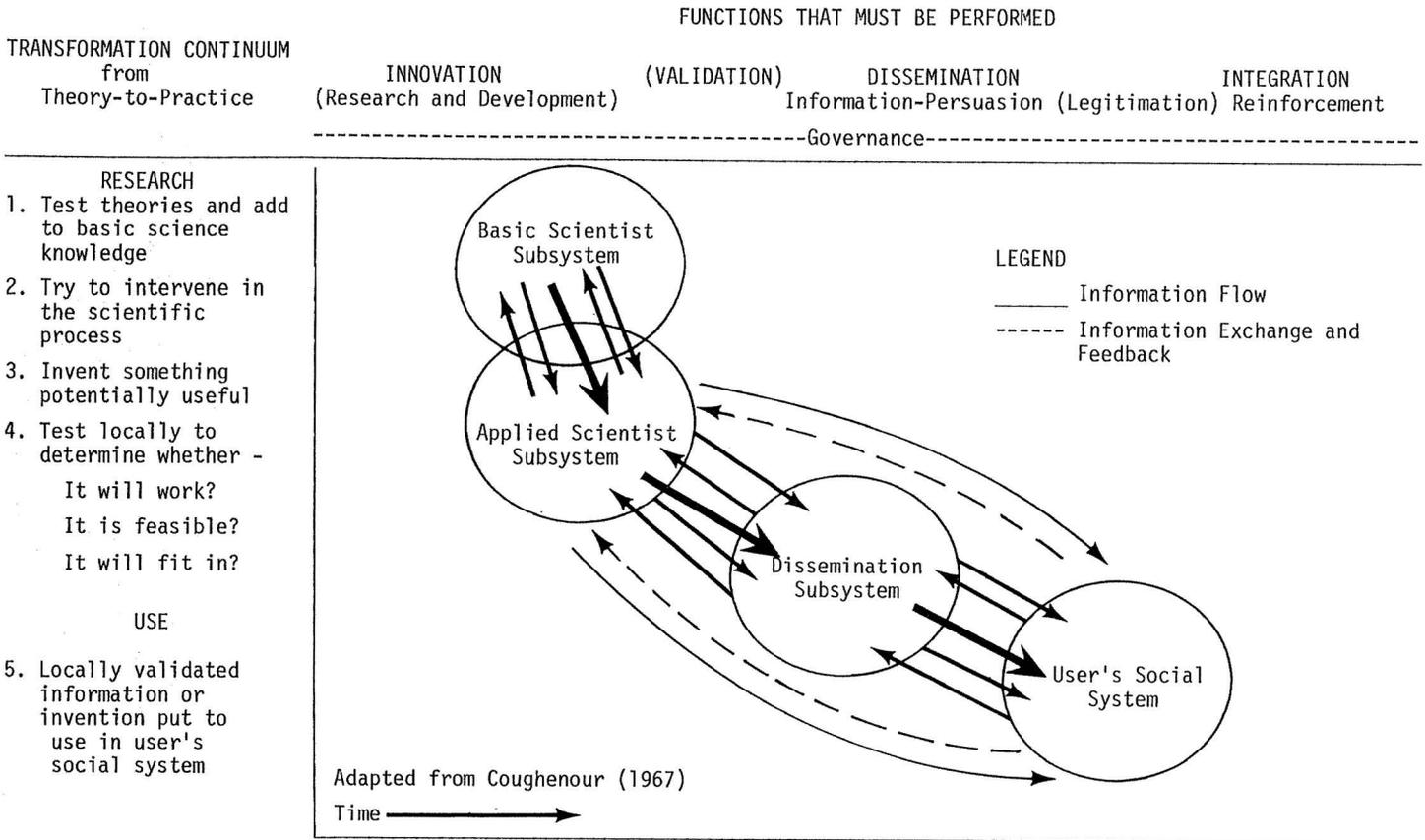


Figure 1. Information Macrosystem Model

In order for the basic scientists to be effective in their specific field of action, a network of interactive delivery and feedback arrangements must be provided between them and the users. In the case of high yielding varieties of wheat, for instance, the basic scientists had to conduct research into the conditions and processes by which plant qualities are inherited. Their primary concern was to extend the frontiers of basic science knowledge. Utilitarian use was secondary. But the basic scientists were closely associated with applied scientists who were interested in producing things that could be used.

The applied scientists extended help to and received feedback from the basic scientists in their effort to determine if they could intervene in the inheritance process. This kind of knowledge is necessary to develop a potentially useful product, in this case, a high yielding wheat variety. Of the many varieties produced, only a few prove good enough to be used by farmers. Before they are recommended and delivered to the educational outreach subsystems they need to be tried locally to see if they will produce as they are intended to do without undesirable side effects. Once this is done, the innovation is ready for user trial and ultimate sustained use. A similar process is required for any innovation--contraceptives, vaccines or even new forms of local government.

Functions of the Information Macrosystem

While the various components of information macrosystems are engaged in a series of tasks to transform information from theory to use on one dimension, these components perform a sequence of differentiated functions that ultimately produce a tried and tested product that is delivered to user clienteles. The major functions of the macrosystem as a whole are innovation, dissemination, and integration. Others which are variously assumed by subsystems or left to the individual decisionmaker are validation, information (becoming informed), persuasion or legitimation, and governance.

Specialized Functions of Subsystems. The innovation function addresses the problem of producing a potentially useful product. This requires not only basic and applied research but also adaptive testing to insure that whatever is developed will perform as intended under the local circumstances. All of this is usually done by a single specialized research agency or a properly articulated group of them.

Dissemination of information and new technology is a second functional requisite. This is needed even where adopter clienteles are relatively sophisticated and have a high measure of management ability (Havelock, 1971, Ch. 3; Paisley, 1969; Sundquist, 1978:1). This function, at the same time, requires respecification of the information available and timely presentation of it to adopter clienteles. It requires the use of special educational and promotional technologies and a support system which tends to become a specialized organizational activity frequently referred to as extension. It tends to be closely articulated with and indeed is a part of the information macrosystem organizational arrangement.

The third function which tends to become a unique social system function is integration. This refers to fitting new information or innovations into the lifestyles and behavior patterns of adopters, be they groups or individuals. This requirement has long been known to anthropologists (Linton, 1936:347-366), but generally ignored by early diffusion researchers and change agents. Both have tended to intensify the problem by making "long" assumptions about the adequacy of the information and

innovations recommended to adopter clientele. Even for reasonably capable people and relatively simple things, the integration problem is often very great or even beyond resolution. Two examples are the use of hybrid maize seed by farmers accustomed to using open pollination varieties and the use of boiling water to prevent contagion by people who have contrary views about "cooked" foods. The fitting-in process (integration function) is infinitely more difficult for complicated social inventions such as a new form of local government.

This function tends to be confined quite exclusively in the user's social system and is often left essentially to the ingenuity of the user himself. This, however, does not mean that the more formal system could not or should not also render assistance in the performance of this function. Attempts of this type are represented in the increasing use of "packages of practices" and/or services, mostly in agriculture, and interactive procedures in community development where extension specialists assist local leaders in relating outside resources to their own situation and putting them to use in unique combinations suited to the user's particular needs.

Subsidiary Functions. These are sometimes overlooked and accordingly neglected. Also, variations may occur in regard to responsibility for them, i.e., left to the user or assigned to a specialized agency.

Validation is of this type. Researchers tend to avoid it because it seems so menial and because it provides little opportunity for status achievement in their academic discipline. Extension workers avoid it because they view it as research for which they have no time. Validation requires objective determination of the local utility of an innovation, information, idea or practice for its intended purpose. This requires the exercise of appropriate controls of other variables under conditions approximating those under which the innovations will actually be used. There are three main issues. Will the innovation work for the intended purposes? Is it economically feasible and otherwise adapted to the intended purpose and locale? When validation is completed the innovation ought to be as nearly ready for use by potential users as research can make it. But, that does not mean it will be automatically accepted by adopting individuals. Other functions need to be performed.

To insure that locally validated information and innovations are put to use, two additional functions must be performed by or on behalf of the adopting individual. These have been labeled information and persuasion by Rogers and Shoemaker (1971:99-106).

The information function refers to getting information to adopter clientele. This is central to the process of becoming informed. It is one of the requirements for arriving at "thought out" decisions.

Legitimation or persuasion, another requirement, refers to the subjective process by which individuals finally decide that an innovation is basically all right and good for themselves. Research evidence alone will not usually suffice. Requirements for the performance of this function are individually imposed. For some, research evidence will suffice; for others, the advice of a trusted associate; but for most, evidence of adaptability from local trial is needed.

Governance is a necessary function although it is not a part of the process of information development and dissemination as such. It has to do with the operation of the whole system and for whom it operates. A

degree of direction, control, management, and coordination of the total system is that the system is most responsive to information user needs when users are represented and actively involved in the governance function.

Dynamics of the Proposed Model

Being an interrelated, interdependent system the model's component parts must operate in an interactive continuous manner. The system never rests. It does not assume as some have suggested that the knowledge developed by the research in these macrosystems is the message about which potential users are to be convinced nor does it assume that the development and delivery of a locally usable product (information or technology) unilaterally follows the theory to practice continuum. There is much usable information embodied in the institutional wisdom of society and the folk practice of people generally. People as users indeed develop useful products with little or no understanding of how basic science knowledge is incorporated into what they do. Even more sophisticated applied researchers may not fully understand this type of input nor do they necessarily need to. This however, does not mean that there is none already built in.

Even those products that evolve quite directly via the basic science route also necessarily have inputs from users and others involved in the information development and dissemination process. The interaction that is necessary among parts of the entire system to make it operate on behalf of the user means that informational inputs for producing a useful product can come from any place in the system at any given point in time and that development may move back and forth through the system before it ultimately reaches the user. Action might be initiated by potential users, researchers, extension personnel, even outsiders of some combination of them. This back and forth path of the development has been referred to as an ipsatic model by Meehan and Beal (1977).

There are even times when innovations are put together and tested completely in the users' social system (Hildebrand, 1977; Emrick, 1977). After such an innovation is appropriately tested for local adaptability and found satisfactory it is then fed back into the system for dissemination to potential users elsewhere. In fact, this type of interface arrangement in which users, extension workers, and researchers jointly participate in performing the innovation, dissemination and integration functions may approach the ideal for some kinds of information development and flow. In the final analysis it is not how or where the essential functions--innovation (mostly research and development), validation, dissemination, and integration--are performed. Rather it is that they are performed and that they are properly articulated.

Some social scientists in an integrated model setting operate in what some have referred to as a "knowledge-driven" manner (Weiss, 1978:29-30). This view holds that the existence of potentially usable information is sufficient assurance that it will be used. Social science research is also sometimes used as a tool for innovation conceptualized and carried to completion with continued interaction between the user and the researcher (Weiss, 1978). The integrated research and development model origination in the land grant university setting also provides for an extension activity referred to under a newer label of "knowledge brokers." Although Sundquist (1978:144) suggests this may be an emerging new specialty, it is already an existing reality in the land grant university setting.

Land Grant University Origins

In a sense, institutionalization of specialty information development and delivery originated in land grant universities in the United States. As a part of continuing efforts to achieve democratic ideals in all sectors of society, provision was made through the Morrill Act (1862) to establish state colleges to teach agriculture and mechanic arts to all people who wanted to attend. This was in marked contrast to elitist views that had prevailed, when only the sons of the wealthy and privileged were expected and able to attend colleges and when practical matters were essentially excluded from the curriculum. Also, with a long standing folk knowledge philosophy in farming there was not much agricultural information to teach. So it was, even in many of the professional fields of specialization.

Perhaps the first operable system for developing and delivering science based information emerged out of the attempt by the land grant universities to carry out their legally mandated teaching and educational outreach missions for which grants of land from the public domain were made to help finance their operation.

After struggling for some 25 years without an adequate science based body of information to teach, a publicly supported research component was added to these universities (Hatch Act, 1887). This component was known as Agricultural Experiment Stations. After many years of accumulating science based information much of which was typically produced and written by scientists to communicate with their own colleagues, another component known as the Cooperative Extension Service was added. Its purpose was to disseminate the science based information to potential users, then mostly farmers (Smith-Lever Act, 1914).

The universities were charged with this responsibility as a cooperative venture in which federal, state, and local governments participated. The organizational arrangement to carry out this service was officially lodged in the respective universities with provision for stationing university representatives in counties in the states which chose to cooperate. Thus emerged a social invention (information macro-system) that combined not only resident teaching, research and extension but also had the unique ability to develop, transform and disseminate science based information both to non-student and student users (Kellog and Knapp, 1966). Although this social invention developed and reached perfection in the agricultural sector, it had functional capability for developing and delivering science based information in any specialty area.

Although universities have been traditionally centers of learning and to some extent information disseminating agents, the U.S. land grant universities became unique institutionalized systems for developing, transforming, and disseminating specialty information to users outside of academia. All have educational outreach functions in addition to resident teaching and research. By virtue of the conditions existing in their formative stages and the nature of their continued funding they became and have remained proficient developers and suppliers of agricultural information.

The Entrance of Social Scientists

In the course of their development, land grant universities were charged with additional responsibilities such as farm management,

marketing, credit, cooperatives, home science, family relations, community development, and consumer issues. Social scientists were increasingly attached to agricultural colleges as humanistic concerns became more salient. Added first were agricultural economists and later, in lesser numbers, rural sociologists. Faculty from the other social science disciplines attached to agricultural colleges remain few in number even to this day. Simultaneously, there has been an increasing inclination for other divisions in land grant universities to add social scientists and for them to become involved in applied research and educational outreach activities. But by comparison, these divisions are late comers to the expanded applied research-educational outreach scene. Neither activity has been publicly supported and institutionalized in these divisions to the extent that it has in the agricultural and home economics divisions of land grant universities.

Social scientists in land grant universities were confronted with a number of special problems that limited their capacity to deliver a usable informational product to non-scientist users. First, ability to effectively work in an information macrosystem type university requires a distinctly different conceptual orientation from that of the elitist academic universities of times past which were concerned mostly with teaching students. For the first generation of social scientists assigned to educational outreach in the land grant university setting the supporting concepts were new. Being late comers they themselves became adopter clienteles. Their dilemma in accepting the new roles was rendered no less difficult by the strong academic stance maintained by many of the older more influential departmental colleagues.

Another problem for the social scientist revolves around producing something useful to deliver. Neither the supply of usable social science information nor the method of producing it in the university setting has reached the state of perfection achieved in agriculture. Possible exceptions to informational inadequacy in the social sciences are limited bodies of knowledge that have developed in such areas as farm management, educational strategy, credit, and marketing where consequences of alternative approaches often can be quite definitively assessed. In some degree this relative lack of something to deliver is partly a function of the maturity of the discipline in the applied research-educational outreach setting. But it is more likely a function of the phenomena with which social scientists must deal, problems encountered in accounting and controlling for variables that are pertinent, and the length of time and costs incurred in developing and testing new social technologies for local adaptability. Certainly more definitive conceptualization of problem issues in terms of user needs and more appropriate research methods are needed.

Although social science knowledge is potentially useful, much of it has not been tried and tested for its local adaptability. Also, articulation of social science effort in the theory-to-practice-production-distribution scheme is deficient. Yet it can hardly be argued that the only transferable information from the social sciences is knowledge of and ability to use the problem solving process. This contention is negated by the way bits and pieces of social science information have been successfully incorporated into and put to use in what people do individually and collectively (Weiss, 1978:27; Collins, 1978:145-183).

Quite aside from the adequacy of the research and development model for information development and delivery in the social sciences, some of the social science faculty working in land grant universities have made important contributions to applied concerns of society. Furthermore, all

are quite free to choose what their research and educational outreach orientation will be--i.e., to people or to academia. This may occur even in the absence of official prescription and institutionalized public support for either effort.

Objectives of the Study

This study grew out of a concern about what appeared to be a general failure of social scientists to develop and deliver specialty information to user clienteles with as much proficiency as achieved by agricultural scientists in their land grant university settings, despite a very great need and public demand for social science information in addressing problem issues of the day. Our concern was further enhanced by resistances occasionally encountered in our own departments and among social scientists in well known and prestigious universities to becoming involved in outreach activities; also from helping to introduce information macrosystem type universities into other countries. Those involved in the effort were frequently concerned about the problem of getting faculty and administrators in the host institutions to accept basic university information macrosystem concepts.

This of course poses the question of what the distinctive concepts are and a consequent need for an appropriate methodology for assessing their acceptance. Accordingly, the first objective of the study was to assess the extent of acceptance of the basic concepts in relation to a university's ability to operate as a system for information development and flow across the theory-to-practice continuum. An implicit assumption is that the university's acceptance of those concepts is a prerequisite for the faculty to serve as educational outreach agents and to assume other duties required for specialty information development and flow.

The second concern was with where, along the theory-to-practice continuum, the social science faculty concentrated their communicative effort, i.e., to academic or extension audiences. This involved questions of the relative distribution of communicative output between academic and extension audiences, the magnitude of their output in each of the two areas, and finally an explanation of output directed to each audience type. The content was to be exhaustive in terms of variables likely to influence conflict.

Chapter II is concerned with the societal and university settings in which the study was conducted, and the characteristics of the faculty. Chapter III addresses the distinctive nature of land grant university (information macrosystem) concepts and their diffusion to segments of the social science and agronomy faculties in the two university settings (objective one). Chapter IV is concerned with the communication behavior of the social science faculty and their orientation to academic and non-academic information user (extension) audiences. Chapter V presents an explanation of the magnitude of communication to extension audiences (professionals and lay persons who wanted information), using background, prior socialization, conditions of appointment, perceptual, reference group, and systemic reward variables. Chapter VI does the same for Academic Communication (i.e., that directed to basic and applied scientists) which was regarded as traditional by comparison to extension communication. Thus, Chapters IV through VI are concerned with objective two. Finally in Chapter VII the research findings and their implications are discussed.

Chapter 1 Footnotes

1. The crucial role of information is summed up in the words of the Chairman of the Federal Communications Commission before the Seventh National Symposium of Action for Children's Television at George Washington University:

Information is becoming America's most consumed product. Already, 50 percent of our gross national product is bound up with information activity. Nearly half of our labor force earns its living by creating, transferring, processing or evaluating information. Seventy-five years ago the industrial sector was dominant. But today we have placed our future in the hands of those who own, control, transfer, interpret, analyze and distribute information. (Faris, 1978).

CHAPTER 2

THE TWO UNIVERSITIES AND THEIR FACULTIES IN SOCIETY

The Two University Settings

The main concern in choosing university settings was to provide situations where the communicative output of the social science faculty and their acceptance of information macrosystem concepts could be compared. One was where extension was an officially prescribed activity and the other where it was not and where an academic orientation in teaching and research prevailed.

Such an assessment must necessarily be done with due recognition of the society of which the universities are a part. Universities are a part of the larger society and reflect, to a degree, its expectations. Where individual freedom and private initiative are highly extolled, university faculties are likely to be adamant in their demands for academic freedom. When further supported by a resource base that permits individuals to pursue their own objectives with few social constraints, inclinations toward autonomy are likely to be further enhanced. But when a public welfare expectation is added, the faculty are put in a proverbial bind between pursuit of own ends on the one hand and appropriate contribution to the public interest on the other. The pressures are likely to be intensified when the demands for academic freedom and appropriate scholarly output are reinforced and articulated by the academic reference group on the one hand and pressures to defer to public interests are reinforced by still other reference groups on the other.

In societies of an authoritarian nature, freedom accorded individuals and groups are much more restricted than in democratic societies. Deference to national plans and programming is expected, university faculties are expected to make their contribution. At times these demands are almost certain to be contradictory to what the faculty most want to do. Also, social critic roles are likely to be substantially reduced and government demands increased.

These contrasting conditions existed in the general social settings from which the universities and their faculties were chosen for this study.

The University of Missouri, Columbia Campus--
in the Land Grant Tradition

The University of Missouri at Columbia (UMC) operates in the land grant tradition, but as we shall see in an innovative manner. Initially, information development at the Columbia Campus was associated with agriculture and the mechanic arts. Agricultural research was started in the College of Agriculture of the University in 1888, just one year after passage of the Hatch Act. Agricultural extension actually antedated by at least one decade the passage of the Smith-Lever Act (1914), which established the Cooperative Extension Service. Faculty

members were expected to spend sometime in the field each year. Longwell (1970:82) observes that the exchanges of information, experiences, and recommendations for solving local problems that occurred developed attitudes of mutual respect and support (among levels of government). The "cooperative" designation specified collaboration in financing, program planning, and program execution among the federal, state, and local levels of government. State and local governments contributed financially and strongly to policy formation and program development.

Although the federal government granted states some funds for research and extension, program execution was essentially a joint state and local government responsibility. Land grant universities were designated as the responsible state agencies. Funds for program execution were appropriated then as now, by the state legislature. To insure that local people would be involved in extension planning and programming, local sponsoring groups were required from the beginning. Representatives of the university in the county, then referred to as county agents, had to be approved by the local sponsoring group. Farm experience was also required. County representatives served only as long as they were acceptable to the sponsoring group. When they ceased to be, they were transferred or dismissed. An area or district form of organization was subsequently added. The field staff is further assisted by on-campus specialists attached to academic departments where much of the information to be extended originates.

A well staffed Information Office was developed to provide publications and daily informational releases to newspapers in the state, regular scripts to radio stations, and video tapes to television stations. The university representatives in the field are supplied with periodically updated information guide sheets on most issues on which questions are likely to be raised. This supplements and updates the expertise of the field staff and serves as their resource base. State specialists author the guide sheets and they are edited and published by the professional journalists of the Information Office. Informational and service requests that cannot be handled by telephone or side band radio are serviced by in-field visits. For questions that specialists cannot themselves answer or readily find answers to, there is an informational referral service which searches both on and off campus resources for answers. These are in turn relayed back to those who asked the question.

Extension work in home economics dates back to 1915 and 4-H Club work with youth to 1927. The Cooperative Extension Service has rendered assistance in emergency drought and disaster programs and educational assistance for special programs in such areas as health, nutrition, soil conservation, pest management, youth, credit, and production control. It pioneered the first farm and home unit approach to extension in the United States and was among the first to institute a small farmer program.

In 1962, the University of Missouri pioneered in extending the original land grant university charge to all divisions and departments of the university (Longwell, 1970). This was followed by establishment of a Department of Regional and Community Affairs, another pioneering effort. To this department both on-campus and field specialists in community development, local government, and continuing education were added. More recently, an office of rural development designed to draw on resources of the entire multicampus university in addressing developmental problems that arise in the field has been added. Essentially, development of the state has become an extension mission of all divisions (disciplines) of the university.

In addition to the regular extension activity, educational outreach has become institutionalized in the university's professional schools: education, journalism, business and public administration, engineering, home economics, medicine, nursing, library science, veterinary medicine, forestry, fisheries and wildlife, social work, and agriculture. Most of the social scientists in these professional schools, plus some in the academically oriented College of Arts and Sciences, has been officially accorded opportunities to participate in the expanded university extension service. Others have become more peripherally involved. All have had options of orienting their communicative output to audiences outside of academia.

The University of Missouri-Columbia campus pioneered in the development of the farm and home unit approach to extension education, in its community development program and curriculum for training community development specialists, its extension of the extension activity to all divisions and departments of the university, in its method of organizing to draw on its multi-campus resources to service rural development needs and, most recently, in its Small Farm Family Program. Thus, although the university has operated from its early inception in the land grant tradition it has been quite innovative in the way it has addressed changing educational outreach needs in the state. This suggests that those most responsible for and knowledgeable about its operation are on the forefront of thinking in regard to how a land grant university should operate. It is in this context that basic concepts of what a land grant university should be and do were defined for this study.

The National Taiwan and Chungshing Universities-- in the Academic Tradition

For purposes of this study there was a need to select a university setting tending to the academic tradition and also operating in a society dedicated to national plans and planning in which public universities were expected to contribute to planned developmental objectives. In most such countries, the extension activity operates mainly as a government agency but with linkages to the university resource system for informational and expertise inputs into the education outreach activity.

The National Taiwan and Chungshing universities meet these general requirements. Furthermore, they were assumed to operate internally quite consistently in the tradition of academic excellence. Learning and intellectual excellence have been of central importance in Chinese culture for centuries. Universities have been key instruments in the perpetuation of this tradition. Even today, only intellectually superior students are admitted to them. Attendance is gained by a nationwide examining system. Marks at specified levels are necessary for entry into a hierarchy of universities, colleges, and vocational schools. Universities are under the jurisdiction of the Ministry of Education and are mostly concerned with teaching. In contrast to the United States, Taiwan's agricultural research is the responsibility of state government--through the Provincial Department of Agriculture and Forestry (Lionberger and Chang, 1970). Graduate institutes for research and teaching have been added in many departments but except for an experimental service at Chungshing University there were no university-centered extension programs at the time of this study.

The National Taiwan University, at the top of the prestige hierarchy, dates back historically to 1928 when it was established as Taihoku Imperial University by the Japanese. With the departure of the Japanese in 1945

the university was accorded its present name. It is typically dedicated to teaching and research. For a time, at the request of the Provincial Department of Agriculture and Forestry, it offered a yearly short course for newly employed agricultural extension workers. Also, some of the agricultural faculty made and maintained contacts with agencies concerned with educational outreach. Participation of the College of Agriculture in a contractual arrangement with the University of California and Michigan State University provided opportunities for the diffusion of land grant university concepts and philosophies to the Taiwan agricultural colleges, mainly through faculty exchange and graduate education. Although other divisions in the university interface with public agencies and have exchange arrangements with U.S. land grant universities, the opportunity for the diffusion of the basic concepts to disciplines outside of agriculture was limited partly because land grant concepts were not generally accepted by staff in the non-agricultural divisions in the U.S. universities.

Chungshing University, initially established as a provincial college in 1961, had emerged as a university with 19 departments and nine graduate institutes by 1973. All offered master's degrees. Unlike its more prestigious counterpart, Chungshing University added an agricultural extension function to the College of Agriculture in 1966. Specified departments, including agricultural economics were charged with the responsibility of disseminating available information to off-campus user clienteles. This effort was experimentally supported by the Joint Commission on Rural Reconstruction (Tsiang, 1964).

Taiwan thus provided an opportunity to examine the diffusion of information macrosystem concepts and communicative output in a predominantly academic setting and one in which some effort was being made to institutionalize the educational outreach function. Both universities had agricultural college faculties which provided an opportunity to further assess the role of Taiwan public universities in developing and delivering science-based agricultural information. This was a central concern of an earlier Taiwan study (Lionberger and Chang, 1970).

The Faculty Interviewed

After preliminary explanation and legitimation of the study, all regularly appointed social scientists and agronomists on the three campuses were asked to complete questionnaires concerning their childhood origins, prior socialization, conditions of appointment, perception of own and appropriate university roles in the production and dissemination of scientific information, perceived rewards, and communicative output. They were subsequently asked to complete a Q-sort of concepts about what they thought a public university should be and do.

The 125 social scientists at UMC had appointments in the arts and science, agriculture, home economics, business and public administration, and public and community services divisions of the university. Departments included Agricultural Economics, Economics, Political Science, Regional and Community Affairs, General and Rural Sociology, Psychology, and Anthropology (see Table 1).

The 103 social science faculty from the Taiwan campuses were from the departments of Agricultural Extension, Agricultural Economics, Sociology, Economics, Political Science, Public Health, Anthropology, and

TABLE 1. PERCENT OF THE UNIVERSITY OF MISSOURI AND TAIWAN CAMPUS
SOCIAL SCIENCE FACULTIES CLASSIFIED BY DEPARTMENT

Department	UMC Campus (%) (n=125)	Taiwan (%) (n=103)
Total	100.0	100.0
General or Rural Sociology	22.4	12.6
Agricultural Economics	24.8	28.1
Regional and Community Affairs	9.6	XXX
Political Science	16.0	11.7
Economics	10.4	20.4
Psychology	12.0	6.8
Anthropology	4.8	5.8
Health	XXX	11.7

Psychology. The attempt to include all of the qualifying faculty exceeded 90 percent in both cases. In all cases, interviews were conducted by staff members of the Department of General and Rural Sociology at the University of Missouri, Columbia Campus.

Their Characteristics

Since one major objective of this study was to determine and explain the amount and kind of faculty communication output, an exhaustive list of characteristics was considered. The intent was to be exhaustive in terms of variables likely to be influential. The 64 included were classified as Background, Prior Socialization, Conditions of Appointment, Perceptual, Reference Group Influence, and Perceived Rewards. These are listed in Appendix A and are selectively treated in this section.

The variable categories chosen reflect the conditions or influences to which individuals were probably subjected prior to their university positions. Background variables such as social class (Crane, 1969) and age (Zuckerman and Merton, 1972) have been identified as important aspects of the scientist's career. The university from which a scientist received the Ph.D. has been shown to influence his or her career (Hargens and Hagstrom, 1967; Crane, 1965). Also under prior socialization variables, characteristics like publishing from research as a graduate student (Reskin, 1977) and other types of curricular and extra curricular graduate activities can be included.

Conditions of Appointment provide the organizational constraints under which the scientist works. Having a research appointment, a teaching appointment (Fulton and Trow, 1974), or an extension appointment carries with it a corresponding set of behavior expectations. The percentage of time spent on research, teaching, and administration also has an effect upon the communication output of the scientist (Andrews, 1964). Enabling conditions, such as the receipt of research funds, are linked to the use of large data sets and sophisticated statistics. Both division of time and supply of research funds affect the chances of publication (McCartney, 1970). Government funds have also been found to make social science research more applied and policy relevant (Useem, 1976).

The importance of the scientists' behavioral orientation also makes a difference for research (Fulton and Trow, 1974); the greater the research orientation, the greater the productivity. Since a decrease in research productivity occurs with a decrease in research orientation, one can assume a concomitant increase in orientation toward other activities and an increase in activity with them.

Reference groups are a major factor in influencing an individual's orientation (Merton, 1957). Babchuk and Bates (1962) have shown that higher academic producers in Sociology are more oriented to the profession. Indeed, they found those who are engaged predominantly in teaching or extension could be expected to defer to students or the general public. There is also the question of the role of reference groups; some are a source of professional advancement and others are a source of satisfaction.

Within each category an attempt was made to be as exhaustive as possible. The number of variables in each category ranged from six in background characteristics to 25 in perceptual variables. This section provides a description of how the faculty were classified in terms of each of the component variables.

Background

This group of variables included place (rural, urban) and location of longest childhood residence, whether they came from an economically disadvantaged group, source of financial assistance as a graduate student, father's occupation and finally, age. Although subsequent life experiences might be expected to mitigate or obliterate early background influences in explaining human behavior, there are instances where they do not. Aside from this possibility the matter of social origins continues to be of interest in its own right.

As might be expected, most of the Columbia campus faculty came from the North Central (46.4%) and Western part (31.2%) of the United States (see Table 2). To most people in Missouri, Columbia is more western and rural than eastern and urban. Consistent with the generally rural character of the region, the longest period of childhood residence of the faculty was on farms, the open country, or the smaller urban places (less than 100,000).

About 45 percent of the Taiwan social scientists spent most of their early childhood in Taiwan. Most of the remaining social scientists were from the Northwest and coastal provinces of Mainland China where the major universities are located. There are also the areas most subject to outside cultural influences. Like the Columbia campus faculty, the Taiwan faculty interviewed came disproportionately from the country (36.9%) and small cities (27.2%).

Considerably more of the Taiwan faculty (45.6%) than of the UMC (23.2%) thought of themselves as coming from an economically disadvantaged group. Relatively more on the Missouri than Taiwan campuses had fathers who were farmers, engaged in (skilled and unskilled) trades and clerical work. The contrast was particularly great for occupations at the lower end of the occupational scale. Upward mobility from father to offspring was much greater among the Missouri than the Taiwan social scientists. The last were disproportionately from professional parental backgrounds.

Nearly all of the faculty in both campus settings had received some kind of financial assistance to support their graduate education. This came heavily from non-academic sources, particularly for the UMC faculty. A few more on the Taiwan campuses than on the UMC campus supported themselves. In both cases the faculty were heavily concentrated in the 30-59 age range: 65.6 percent on the UMC campus and 70.0 on the Taiwan campuses.

Prior Socialization

Probably most socialization relevant to performance as a faculty member occurs during graduate school or during employment prior to their faculty assignments. The 10 variables included in this category focused heavily on graduate school experiences.

Two qualities held in very high esteem in academia are the doctorate degree and the institution from which it was obtained. Such degrees or their equivalent were nearly universal among the UMC campus faculty but generally lacking among the Taiwan faculty. Approximately 70 percent did not have the Ph.D. degree (see Table 3). Most of those who had advanced degrees obtained them from western universities (61.1%). Others took their degrees from oriental universities, mostly in Japan and mainland China. More of the Columbia campus social scientists got their degrees

TABLE 2. PERCENT OF UMC AND TAIWAN SOCIAL SCIENCE FACULTY
CLASSIFIED BY SELECTED BACKGROUND CHARACTERISTICS

Background Characteristics*	UMC Campus (n=125) (%)	Taiwan (n=103) (%)
Age		
Under 30	7.2	0.8
30-39	34.4	35.9
40-49	31.2	35.0
50-59	14.4	18.4
60 and over	12.0	9.7
Whether from Economically Disadvantaged Group		
Yes	23.2	45.6
No	73.6	50.5
Place of Longest Childhood Residence		
Farm or open country	37.6	36.9
Town (under 2,500)	11.2	5.8
Small city (2,500-99,999)	24.0	27.2
Large city (100,000 and over)	20.0	26.2
Suburban	4.8	1.9
Region of Longest Childhood Residence		
Taiwan	XX	44.7
Central western China	XX	19.5
Coastal provinces China	XX	35.0
North central states U.S.	46.4	XX
East and northeast U.S.	10.4	XX
Western states U.S.	31.2	XX
South U.S.	4.8	XX
Father's Occupation		
Farmer	35.2	30.1
Proprietor	16.0	33.0
Professional	17.6	27.2
Clerical skilled and unskilled	29.6	8.7
Source of Assistance as a Graduate Student		
Teaching or graduate assistant	13.6	12.6
Research assistant	12.8	10.7
Fellowship	5.6	32.0
Non-Academic	10.4	28.2
Combination of academic and non-academic	56.0	9.7
None or self	1.6	6.8

*Unknowns under each category are not reported.

TABLE 3. PERCENT OF THE UMC AND TAIWAN CAMPUS SOCIAL SCIENCE FACULTIES CLASSIFIED BY PRIOR SOCIALIZATION EXPERIENCES

Prior Socialization Experiences*	UMC Campus (%) (n=125)	Taiwan (%) (n=103)
Degree Status		
Ph.D.	86.4	30.1
No Ph.D.	13.6	69.9
Where Ph.D. degree was Obtained		
(Taiwan)		
No Ph.D. degree	X	69.9
Taiwan	X	1.9
Western university	X	18.4
Oriental university	X	8.8
(UMC)		
Land grant university	41.6	X
Other public university	20.8	X
Private university	17.6	X
Other		
Graduate Student Activities		
Basic research	48.8	33.0
Published from basic research	34.4	25.2
Applied research	53.6	36.9
Published from applied research	38.4	29.1
Participated in social service work	15.2	21.4
church work	29.6	8.7
social reform activist	11.2	4.9
Previous Employment		
Academic professional only	12.8	39.8
Non-academic only	48.0	30.1
Both	13.6	14.6
None	23.2	15.5

*Unknown cases not reported in the respective categories.

from a land grant university (41.6%) than from any other. About 20.8 percent got them from a non-land grant type public university. Only a very few had Ph.D. degrees from a university outside the U.S. In this sense, they were an indigenous group.

About half of the UMC campus social scientists engaged in basic research during graduate school. Of these 68.8 percent had published. Over half of the faculty (53%) did applied research, from which 72.5 percent of them published their results. Table 3 shows that the percentages for the Taiwan faculty were consistently smaller for all of these experiences. However, of those who were involved in each type of research a relatively high proportion published from their work.

There is an additional matter of participating in extra curricular activities. Participation in church work was the most frequently reported activity. Whether this inclination was developed in graduate school or already possessed when they came remains an open question. The last seems more likely. Next in order was involvement in social service work. This was the activity most frequently reported by the Taiwan faculty. Relatively few faculty, by comparison to other activities, but more on the UMC campus than the Taiwan campuses, were involved in social protest or social reform activities. However, most of the faculty were in graduate school at a time when "social protest" was less in style than in recent years and perhaps even dangerous to own self interest.

Quite in line with their more humble beginnings, many more faculty members on the UMC campus than on the Taiwan campuses had had occupational experiences of a non-academic nature (48.0% non-academic only and 13.6% both). Also, more had had no prior occupational experience at all. Many more Taiwan campus faculty than those on the UMC campus had had only academic employment prior to their present faculty positions. Higher education in Taiwan is more geared to competitive selection in terms of academic ability than in the United States.

Conditions of Appointment

This group of variables was comprised of 11 conditions including academic rank, salary, assigned responsibilities, and receipt of research support. Academic rank in both cases was much the same with a high concentration at the full professor level (roughly 42%). (See Table 4.) A few more Missouri than Taiwan faculty had 9 month appointments. But in both cases the 11 month appointment was more prevalent. Nearly all of the Taiwan faculty had teaching appointments. Although this applied to only 73.6 percent of the Columbia campus faculty, nearly all did some teaching. In Taiwan official research assignments were more prevalent than on the UMC campus. Percentages were 74.8 and 44.0 percent, respectively. About half as many on the Taiwan campuses as on the UMC campus (12.6%) had extension appointments. Only Chungshing University had an official extension program and it was an experimental one. In terms of percentage of time assigned, the commitment to research was more universal on the Taiwan campuses than on the UMC campus. The percentages of time assigned to teaching on the two campuses were not greatly different. But the percentage of time assigned to administration on the Taiwan campuses was much less.

Any direct salary comparison between the two settings is almost meaningless because of differences in what the currency would buy in the

TABLE 4. PERCENT OF THE UMC AND TAIWAN CAMPUS SOCIAL SCIENCE FACULTIES CLASSIFIED BY CONDITIONS OF APPOINTMENT

Conditions of Appointment	UMC Campus (%) (n=125)	Taiwan (%) (n=103)
Academic Rank		
Professor	41.6	42.7
Associate Professor	32.8	36.9
Assistant Professor*	20.8	0.0
Instructor*	4.8	19.4
Whether Appointment Provides for		
Teaching	73.6	98.1
Research	44.0	74.8
Extension	28.0	12.6
Receipt of Research Funds		
Continuing	20.8	8.7
Temporary	21.6	64.1
Both	52.8	24.3
Percent of Time Assigned to Research		
None	11.2	2.9
1-24 percent	36.8	13.6
25-49	39.2	43.7
50 or more	10.4	39.8
Percent of Time Assigned to Teaching		
None	4.0	1.0
1-24 percent	20.8	11.7
25-49	48.8	52.4
50 or more	4.0	1.0
Percent of Time Assigned to Administration and Extra-Curricular Activities		
None	20.8	42.7
1-24 percent	48.8	30.1
25-49	17.6	20.4
50 or more	12.0	6.8
Type of Appointment		
9 months	36.8	20.4
11 months	61.6	78.6

TABLE 4 (Continued)

Conditions of Appointment	UMC Campus (%) (n=125)	Taiwan (%) (n=103)
Basic Salary		
(Taiwan)		
Less than 50,000 NT dollars	XXX	35.0
50,000-79,999	XXX	51.5
80,000 and over	XXX	12.6
(UMC)		
Less than \$15,000	28.8	XXX
\$15,000-\$19,000	36.8	XXX
\$20,000 and over	33.6	XXX
Income from Other Professional Sources		
(Taiwan)		
Less than 30,000 NT dollars	XXX	53.4
30,000-49,999	XXX	23.3
50,000 and over	XXX	14.6
(UMC)		
Less than \$500	76.0	XXX
\$500-999	7.2	XXX
\$1,000-1,499	4.0	XXX
\$1,500 and over	12.0	XXX

*Assistant Professor is roughly equivalent to instructor on the Taiwan campuses and is subsequently treated under the Assistant Professorship designation.

two countries. However, since relative income within own university was assumed to have a bearing on explaining faculty communication output, it was included as a variable. Most of the faculty in both settings had professional incomes from other sources even though sometimes it was very nominal. This was particularly true for the UMC campus faculty.

Perceptual Variables

In an atmosphere of academic freedom where faculty insist on a high degree of autonomy, perceptual variables are likely to be very important determinants of faculty behavior and their communicative output. Also, what they perceive as appropriate roles for a public university and for themselves has an important bearing on a university's capability to operate at all levels of information development and delivery from theory to practice. Perceptual variables are perhaps most of all the product of graduate school socialization and subsequent in-position experiences. The ones considered here relate mostly to what the faculty believe appropriate for a public university, what they think they themselves should and should not do, their perception of what is expected of them in their respective positions, their perception of the university reward system, the rewards they think accrue to them for engaging in a variety of activities, and the constraints they see to becoming involved in doing applied research.

Another kind of perceptual influence centers on how much the faculty think reference groups within and outside of academia have on their own work. However, perceived reference group influence is treated as a separate set of variables. Faculty types based upon perceptual-attitudinal reactions to what a university should be and do is included in yet another section concerned mostly with faculty acceptance of university information macrosystem concepts.

What They Think a Public University Should Do

The faculty in both countries saw a public university as being mainly a teaching institution heavily oriented to undergraduate instruction. Yet, in both cases, one-fourth or more felt that the greatest emphasis should be placed on doing basic research and publishing (see Table 5). On the UMC campus less than 5 percent would put any information macrosystem activity in first place. A little over 7 percent would give applied research second emphasis. Otherwise, less than 5 percent would emphasize information macrosystem activities even second most. Both faculties rated teaching graduate students in third order as a primary emphasis. With teaching undergraduates rated first and teaching graduate students also rated high, the prime view of the university as a teaching institution is well documented.

The faculty of the Taiwan campuses tended to be a little more favorable than their counterparts to applied research as a first consideration and other information macrosystem activities necessary for information development and flow. This held true for both first and second emphasis. The faculty on both campuses rated "working with off-campus people to improve their living" as the activity that should be stressed least. The UMC campus faculty were stronger in this conviction than the Taiwanese. Also unlike the Taiwan faculty, 13.6 percent of the UMC faculty said basic research and publication should be stressed least.

TABLE 5. PERCENT OF UMC AND TAIWAN CAMPUS SOCIAL SCIENCE FACULTY CLASSIFIED BY HOW MUCH THEY THINK A PUBLIC UNIVERSITY SHOULD EMPHASIZE SELECTED INFORMATION MACROSYSTEM AND CONVENTIONAL TEACHING ACTIVITIES

University-Faculty Activities	UMC Campus Faculty			Taiwan Campus Faculty		
	Most %	2nd Most %	Least %	Most %	2nd Most %	Least %
Information Macrosystem from Theory-to-Practice						
Do basic research and publish	24.8	16.0	13.6	28.2	26.2	5.8
Do applied research	4.0	7.2	8.8	8.7	3.9	11.7
Teach students outside own discipline	1.6	3.2	3.2	2.9	6.8	9.7
Publish for outsiders (professionals)	0.8	4.8	6.4	4.9	5.8	13.6
Test innovations for local adaptability	4.0	2.4	10.4	6.8	10.7	2.9
Consult with outsiders (professionals)	2.4	5.6	4.0	0.0	2.9	19.4
Work with off-campus people to improve living conditions	4.0	2.4	43.2	1.9	3.9	31.1
Conventional Teaching						
Teaching undergraduate students	39.2	14.4	3.2	38.8	10.7	3.9
Teach graduate students	16.0	41.6	1.6	7.8	29.1	1.9

What They Think They Should Do as Faculty Members

The pattern of what the Taiwan faculty thought they should do coincided very closely with what they thought a public university should do. The coincidence was also high for the Columbia campus faculty except for teaching (see Table 6). Over 39 percent thought teaching undergraduates should be emphasized most but only 24 percent put it in first place themselves. Conversely, the proportion saying that they emphasize graduate teaching most was higher than their placement of this activity as a university emphasis (20.8 and 16.0 respectively). Also, a few more thought they ought to be emphasizing basic research and publication more than they prescribed as an ideal for the university. Thus, the compulsion to do research and publish was more evident on the UMC than the Taiwan campus.

The relative emphasis placed on activities tells only a part of the story of what the faculty thought should be done at a public university. For example, they may feel that an activity deserves neither first nor second emphasis but still hold that a great deal of effort should be put into it. The faculty were accordingly asked how much--not at all, little, some, much or very much--they thought each of seven activities necessary for a university to operate as an information macrosystem should be stressed. The proportions responding "much or very much" to each activity for each of the faculties are reported in Figure 2. The figures show a sharp decline in recommended emphasis across the theory-to-practice continuum. Although the proportion declined consistently across the continuum, at no level did less than a fourth of the faculty specify much emphasis.

The Taiwan faculty were more supportive of all information macrosystem activities than those on the UMC campus, particularly the testing of innovations for local adaptability. This is very important because testing of innovations for local adaptability tends to be neglected. Researchers don't want to be bothered because findings from this kind of research will not ordinarily provide material for academic journal articles. Extension people concerned with educating user clients and assisting them in the adoption of new practices don't want to be bothered with an activity that looks like research.

We note, however, that the UMC campus social scientists see writing for professionals, i.e., intermediaries, as the most acceptable information macrosystem activity other than the cherished basic research and publication emphasis. Thus "writing" for professionals was rated over "doing" (action) on behalf of either professionals or the public.

There are still other perceptual variables that are likely to influence the performance of the faculty in servicing information macrosystem needs. These include perceived rewards for engaging in various university related activities, perceived utility of own academic specialty for understanding and addressing problems of the day, plus the constraints that operate in the system.

The Matter of Rewards

Faculty members were asked to rank the six activities listed in Table 7--first in terms of the self satisfaction they obtained from doing the activities and second in terms of the relative contribution they thought each provided for professional advancement. Note that the first five activities are those required for a university to operate as an

TABLE 6. PERCENT OF UMC AND TAIWAN CAMPUS SOCIAL SCIENCE FACULTY CLASSIFIED BY HOW MUCH THEY THINK SELF SHOULD EMPHASIZE DESIGNATED INFORMATION MACROSYSTEM AND CONVENTIONAL TEACHING ACTIVITIES

University-Faculty Activities	UMC Campus Faculty			Taiwan Campus Faculty		
	Most %	2nd Most %	Least %	Most %	2nd Most %	Least %
Information Macrosystem from Theory-to-Practice						
Do basic research and publish	29.6	16.0	15.2	29.1	25.2	2.9
Do applied research	6.4	7.2	6.4	8.7	7.8	9.7
Teach students outside own discipline	0.8	3.2	1.6	1.9	6.8	5.8
Publish for outsiders (professionals)	2.4	8.8	4.8	3.9	7.8	10.7
Test innovations for local adaptability	4.8	1.6	8.8	2.9	8.7	7.8
Consult with outsiders (professionals)	2.4	8.8	4.8	2.9	1.0	20.4
Work with off-campus people to improve living conditions	8.0	4.0	44.8	1.0	4.9	33.0
Conventional Teaching						
Teach undergraduate students	24.0	16.8	4.0	38.8	15.5	3.9
Teach graduate students	20.8	31.2	4.0	10.7	22.3	5.8

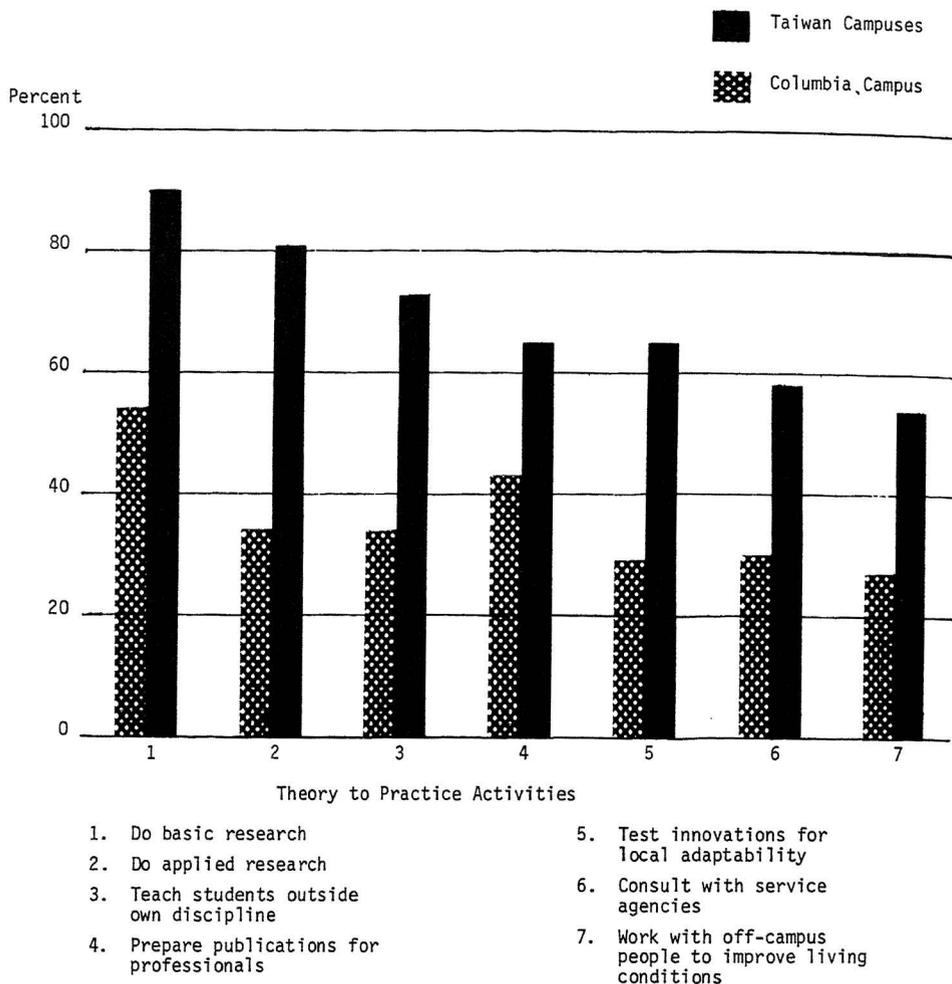


Figure 2. Percent of the social science faculty on the Taiwan and UMC campuses who thought the university should be involved much or very much in designated theory-to-practice activities.

TABLE 7. AVERAGE SELF SATISFACTION RANK ASSIGNED TO SIX DESIGNATED ACTIVITIES COMPARED TO RANK ASSIGNED FOR PROFESSIONAL ADVANCEMENT BY SOCIAL SCIENCE FACULTY ON THE UMC AND TAIWAN CAMPUSES

Professional Activities	UMC Campus		Taiwan	
	Self Satisfaction Rank	Rank for Professional Advancement	Self Satisfaction Rank	Rank for Professional Advancement
Doing creative research	2.6	1.3	2.4	1.9
Doing research on current people's problems	3.3	2.9	3.1	3.0
Writing for non-academics who can use what is known	4.0	3.8	4.3	4.0
Helping intermediaries who help people solve their problems	4.0	4.4	4.1	4.5
Helping people solve their problems	4.2	4.7	4.7	5.1
Teaching students	2.4	2.7	2.3	2.3

information macrosystem and that they are arranged in theory-to-practice order. From the average ranks assigned (low scores represent high ratings) it can be seen that teaching students occupied first position as a source of personal satisfaction but by a very narrow margin over "doing creative research." No other activity was even a near contender to first position in either campus setting.

But for professional advancement, doing creative research took a distinct first place position. This shift was most pronounced for the faculty on the Columbia campus. Thus, it would appear that in the minds of the faculty there is no doubt what counts most for professional advancement.

Third in line for both self satisfaction and prospects for professional advancement was doing research on current people problems. Beyond the research position on the theory-to-practice continuum ratings were quite generally low for both self satisfaction and prospects for professional advancement. One exception was a somewhat enhanced view of prospects for professional advancement from writing for professionals as seen by the Columbia campus faculty. The second was the very low rating assigned by the Taiwan faculty to becoming involved in helping people solve their problems. Actually this activity was lowest on the list for both self satisfaction and perceived utility for professional advancement on both campuses.

In response to a direct question as to whether each regarded their research, teaching and extension activities as properly rewarded the proportion on both campuses was highest for research but notoriously low for the Taiwan faculty for both research and teaching (see Table 8). These are activities in which the faculty were quite universally involved. In contrast on both campuses most of the faculty neither had extension appointments nor perceived themselves as being involved in extension work. The majority of the Taiwan campus faculty with extension appointments thought their effort was not properly rewarded. This was in contrast to the situation on the Columbia campus where "yes" answers exceeded the "no's" by more than two to one. This favorable ratio was lower than for research but higher than for teaching.

Other Views

A distinct majority in both campus settings thought their own academic specialty had much to offer for understanding problem issues of the day (68-71%). But the percentage fell substantially for finding solutions. Few thought their specialties had little to offer either for understanding or helping resolve problem issues.

Finally, in response to how much they thought 17 organizational constraint, personnel support, finance, colleague relationships, own skill, and professional norm variables operated as barriers to doing applied research, only two of these were mentioned as very serious by as many as 16 percent of the respondents in either university setting. Lack of operational funds was regarded by the Taiwan faculty as far the most serious. For the faculty on the UMC campus "other demands on time" headed the list by a very substantial margin. The seriousness with which the faculty on each of the Taiwan and Missouri campuses viewed these barriers is indicated in Figures 3 and 4. From these, both the contrast between the two settings and the seriousness with which they were regarded is apparent.

TABLE 8. PERCENT OF UMC CAMPUS AND TAIWAN SOCIAL SCIENCE FACULTY CLASSIFIED BY SELECTED PERCEPTUAL VARIABLES

Perceptual Variables	UMC Campus (%) (n=125)	Taiwan (%) (n=103)
Perceived Utility of Own Specialty for Understanding Problem Issues of the Day		
Little	3.2	2.9
Some	24.8	25.2
Much	68.0	70.9
Perceived Utility of Own Specialty for Solving Problem Issues of the Day		
Little	7.2	6.8
Some	36.8	41.7
Much	51.2	49.5
Whether Own Research Effort is Properly Rewarded		
Yes	61.6	37.9
No	18.4	51.5
Not applicable or other	20.0	10.7
Whether Own Extension Work is Properly Rewarded		
Yes	25.6	6.8
No	9.6	7.8
Not applicable or other	64.8	85.4
Whether Own Teaching Effort is Properly Rewarded		
Yes	52.6	34.0
No	33.6	65.0
Not applicable or other	12.8	1.0
Greatest Constraint on Doing Applied Research		
Time	44.0	1.9
Money	10.4	54.4
What colleagues think	13.6	3.9
Support services	14.4	29.1

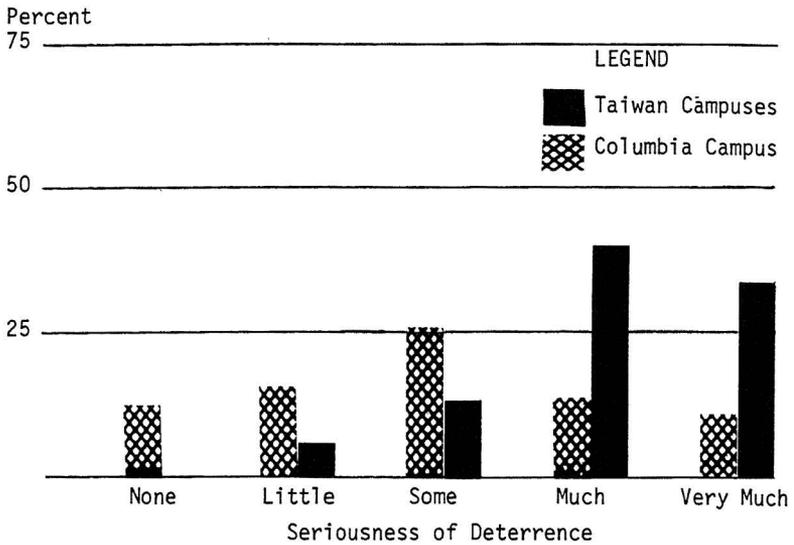


Figure 3. Relative seriousness with which the social science faculty in the two campus settings interested in doing applied research regarded shortage of operational funds as a deterrent for doing applied research. The constraint was seen as most important by the Taiwan university faculty.

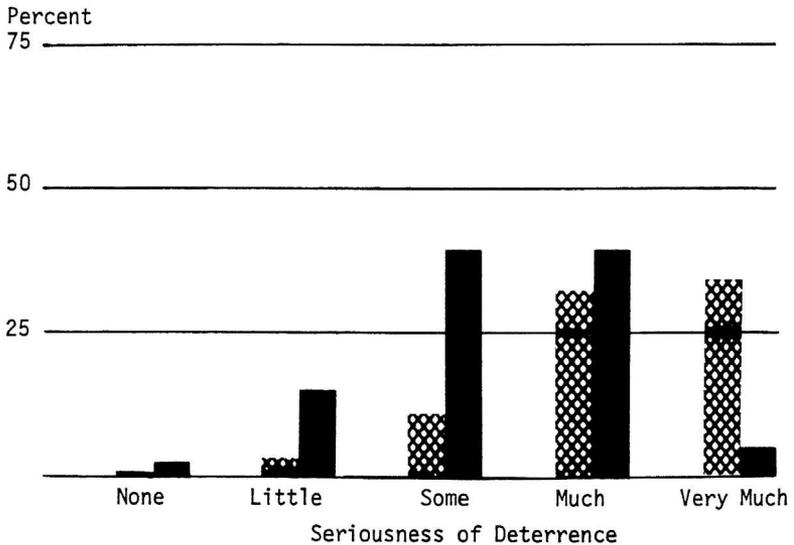


Figure 4. Relative seriousness with which the social science faculty in the two campus settings interested in doing applied research regarded lack of time as a deterrent for doing applied research. The constraint was seen as most important by the University of Missouri-Columbia (UMC) campus faculty.

All of this is not to suggest that perceived barriers to doing applied research are likely to be that simple. Once the money is available, lack of support staff or of computer facilities might come to the fore as they might also if the time pressures on the Missouri campus faculty were to be removed. These two barriers are nevertheless seen by the faculty as being most salient.

Reference Group Influence

In a very real sense this is another type of perceptual variable. A person does not have to participate in a social group to be influenced by it. He merely thinks of himself as belonging which carries a degree of compulsion to conform. Faculty, just as others, have their own reference groups to which they identify and defer in what they think and do. The most usual of these are listed in Tables 9 and 10. The tables also indicate the proportions of the faculty in each setting who felt their work was influenced none, little, some, much, or very much by each of the group.

Noting the combined percentages for much and very much, highest influence was exercised by own departmental colleagues (53.8%) for the UMC campus faculty. The category of colleagues in own academic discipline was a close second (51.2%). This was followed by graduate students (36.8%) and undergraduates (33.6%), in that order. All other groups ranked much lower. Those for which very low influence was reported were funding agencies, the general public, and the university administration in ascending order of influence from the lower position.

For the Taiwan faculty, funding agencies received the highest percentage of much or very much influence mentions (48.6%) and own departmental colleagues a close second (47.6%). Next in order of much or very much influence for them was undergraduate students (39.0%). In general, reference groups outside of academia took on more importance than for the UMC campus faculty. But similar to their Missouri counterparts, Taiwan faculties assigned the highest percentage of little or no influence to the general public (42.8%) and to the university administration (45.6%). Probably many of the 40.8 percent who did not answer the "general public" reference group question should be added to the low influence figure for the general public.

TABLE 9. PERCENT OF UMC CAMPUS SOCIAL SCIENCE FACULTY CLASSIFIED BY THE AMOUNT OF INFLUENCE THE DESIGNATED REFERENCE GROUPS HAVE ON WHAT THEY DO AND HOW THEY DO IT

Reference Groups	Total	None or Little %	Some %	Much or Very Much %	Not Determined %
Departmental colleagues	100.0	7.2	39.2	52.8	0.8
Colleagues in own academic discipline	100.0	14.4	23.2	51.2	11.2
University colleagues	100.0	35.2	51.2	13.6	0.0
University administration	100.0	50.4	30.4	18.4	0.8
Colleagues in government and industry	100.0	45.6	41.6	11.2	1.6
Professionals and agencies that use social science information	100.0	38.4	40.0	16.0	5.6
Funding agencies	100.0	56.8	27.2	13.6	2.4
The general public	100.0	51.2	32.8	8.0	8.0
Graduate students	100.0	13.6	42.4	36.8	7.2
Undergraduate students	100.0	30.4	36.0	23.2	10.4

TABLE 10. PERCENT OF TAIWAN CAMPUSES' SOCIAL SCIENCE FACULTIES CLASSIFIED BY THE AMOUNT OF INFLUENCE THEY PERCEIVE THAT DESIGNATED REFERENCE GROUPS HAVE ON WHAT THEY DO AND HOW THEY DO IT

Reference Groups	Total	None or Little %	Some %	Much or Very Much %	Not Determined %
Departmental colleagues	100.0	15.6	35.0	47.6	1.9
Colleagues in own academic discipline	100.0	30.1	21.4	25.2	23.3
University colleagues	100.0	43.7	39.8	15.5	1.0
University administration	100.0	45.7	26.2	22.3	5.8
Colleagues in government and industry	100.0	36.9	39.8	22.3	1.0
Professionals and agencies that use social science information	100.0	34.0	15.5	23.3	27.2
Funding agencies	100.0	22.4	22.3	48.5	6.8
The general public	100.0	42.7	6.8	9.7	40.8
Graduate students	100.0	25.3	25.2	23.3	26.2
Undergraduate students	100.0	32.0	25.2	34.0	8.8

CHAPTER 3

ACCEPTANCE OF INFORMATION MACROSYSTEM CONCEPTS BY
THE SOCIAL SCIENCE AND AGRONOMY FACULTIESDiffusion Issues

This chapter addresses the issue of what is unique about information macrosystem (land grant) type universities. It also summarizes a study of concepts of such systems by the social science faculties on the campuses of a land grant university (University of Missouri-Columbia--UMC) and two more traditional universities (in Taiwan). This we have noted constitutes the first objective of the study. As specified earlier, diffusion issues are conceptualized, analyzed, and interpreted in terms of a frame of reference indicative of ability of a university to operate as a macrosystem for science-based information development and flow along the postulated theory to practice continuum. To refer to them as distinctive is to invite the criticisms of those who are personally ill-disposed to them, those who think there is nothing unique about land grant universities, and those who pick various single traits as the only thing distinctively different, e.g., the way they are funded. To refer to them as informational macrosystems invites the criticism of still others who impugn the terminology. The authors are inclined to the information macrosystem designation because it is more descriptive of a university that is capable of translating theoretical knowledge into usable practice. They are also inclined to face pragmatically the question of whether there is anything unique about them, and if so, what.

However, those who have worked as agents for establishing land grant information macrosystem type universities in new social settings or those who have worked with staff charged with educational outreach responsibilities are convinced that the information macrosystem is different and that certain new concepts are central to their operation as agents for developing and disseminating information. Many of the faculty who are involved in the diffusion effort have been heard to say "we ought to be diffusing land grant university concepts." Diffusion issues of this kind are relevant to implanting new university functions in any social setting. Potential adopters of the concepts are often just down the hall in the same department or division of the same university. Not all faculty find information macrosystem concepts equally acceptable and perhaps fewer still are willing to do some of the things required to make universities work in that capacity. They may hold positions in this type of university but never become involved in educational outreach work or even accept the idea.

Getting a social invention (e.g., a new kind of university) adopted in a new social setting poses some special problems in addition to those that are common to the adoption of any innovation. In regard to the problems that are unique, the adoption of concepts occurs only in the minds of those who accept them. There are no behavioral manifestations. Also, for a social invention like an information macrosystem type university, the distinctive concepts exist in an interrelated configuration. They must be accepted more or less in that fashion. But, in an ever-changing situation, they remain in a given set of relationships only momentarily. Being new by comparison to the way universities have operated traditionally the new concepts must be integrated into a body of already

existing beliefs. Thus, acceptance of specific conceptual elements is necessarily relative to both (1) other elements in the new configuration and (2) the already existing ideas about what a public university should be and do. Even that which is new turns out to be mostly a combination of the old. Complete acceptance is assumed only when the new concepts are integrated into the old social setting in a manner that represents the ideal for which the social invention was intended.

The integration problem is common to all innovation adoptions. Even so it has been almost uniformly neglected by diffusion researchers and by many professionals involved in the diffusion effort.² While integration of new elements of an innovation into the user's social system is essential to the adoption of such behavioral innovations as hybrid corn or getting vaccinated for smallpox, neglect of them in the adoption of a complex social invention, like a land grant university, may be more serious. Farmers have demonstrated that they can struggle through difficult integration problems and still achieve almost 100 percent adoption and successful use of a new practice, even though in the case of hybrid seed corn it took relatively sophisticated farmers in the heart of the corn country twelve years to do it (Ryan and Gross, 1950).

Diffusion of (land grant) information macrosystem universities into new social settings has not fared so well. Both failures and partial successes have occurred (Roger, Eveland and Bean, 1976; Glaser and Backer, 1975; Backer and Glaser, 1974; Doctors, 1971; Ruttan, 1968; Sieber and others, 1972). Failures have occurred in situations where alternative information development and delivery arrangements might have been more suitable, as well as where information macrosystem type universities were appropriate. In these cases diffusion mistakes rather than appropriateness of the innovation seem to have been mostly at issue. Basic operational concepts were not properly presented and understood. Often, they were not properly conceptualized and verbalized. Also, more attention was given to tangible organizational features than to the underlying conceptual underpinnings.

The Problem

The position taken here is that identification and acceptance of the basic concepts by its faculty is essential for a university to operate as a macrosystem of information development and flow. A central premise is that many of the essential concepts have not been accepted by the social science faculty and that this in turn has hampered the development and dissemination of utilitarian social science information.

This is a problem we face at a time when the social science faculty are badly needed in applied research and educational outreach efforts (Consultative Group on International Agriculture Research, 1976; Subcommittee on Science and Technology and the Subcommittee on the Domestic and International Scientific Planning and Analysis, 1976; Lynn, 1978).

Q-Methodology

Q-methodology was regarded as a method particularly suited to addressing all of the diffusion issues noted in the preceding paragraph (Kerlinger, 1967; Stephenson, 1957). This method first and foremost requires collection of the greatest possible diversity of views or

opinions about the subject under investigation, in this case, about what a public university should be and do. It assumes that a properly drawn sample from the universe of views will represent the idea content about what a public university should be and do. This sample of necessity includes both the new and the old concepts.

Once the sample of diverse views is selected, respondents are asked to rate them along a most-to-least agree continuum in which only a few items are permitted at each extreme and progressively more toward the middle, neutral position. Such a rating results in an approximately normal distribution of views (see Figure 5). Item positions in the array are accordingly standard scores that can be compared directly. This normal distribution of views represents the importance-unimportance structure that people assign to views about a particular subject.

The middle position in the array is regarded as neutral, those to the right represent increasing degrees of importance or agreement, those to the left increasing degrees of unimportance or disagreement. The plus-minus deviations from the neutral (zero) zone may be converted to an all positive scale to facilitate interpretation. In this case the range was 1 to 13 with 7 as the neutral point. The way a faculty member rates the ideas or concepts in importance, one in relation to another in a Q distribution, is assumed to indicate his composite view about what a public university should be and do.

An item sort in terms of the land grant university ideal (information macrosystem requirements) by those most knowledgeable about their unique nature and operation provides the ideal construct. Item placements by the knowledgeable within the Q-sort establish points of reference for making judgments about the nature and extent of adoption for others who rate the items in the Q-sort as they see them characterizing an existing university. The ideal sort also establishes the configurational nature of distinctive land grant concepts, one in relation to the other and the new ones in relation to all others.

Furthermore, the Q-sample of items can facilitate the treatment of the subject matter in its multiple dimensions or levels. These dimensions may be of theoretical or practical significance. In the present study, a theory-to-practice continuum was used as one dimension and kinds of activities necessary for a public university to operate as a macrosystem of information flow as another (see Table 11). This classification made it possible to assess the degree to which ideas and concepts necessary for a public university to operate as an information macrosystem were actually accepted by the faculty and the consequences of different acceptance patterns for a university to operate in that manner.

Operationalizing the Method

Implementing Q-methodology in this diffusion setting required:

1. Specification of the idea universe into which the new ideas were to be diffused and integrated;
2. Identification of the concepts that distinguish land grant universities from other universities;
3. Definition of the land grant university (information macrosystem) ideal construct which specifies how each distinctive concept is rated in importance in regard to:

TABLE 11
BALANCED BLOCK DESIGN OF THE STATEMENT SAMPLE

Kinds of Activities	Theory to Practice Continuum				Total (N)
	Theory (N)	Applied (N)	Intermediary (N)	User (N)	
Ivory Tower*	3	3	3	3	12
Governance	3	3	3	3	12
Education	3	3	3	3	12
Change Agent	3	3	3	3	12
Information System Service	3	3	3	3	12
Total	18	18	18	18	72

*Academic enhancement

- a. each other, and
 - b. The other things that a public university should be and do; and
4. Specification of how relative acceptance is to be determined.

Definition of the Concept Universe. The idea or concept universe about what a public university should and should not be and do provided the social setting (view context) into which the newer and distinctive land grant university (information macrosystem) had to diffuse--all, of course, in the minds of the accepting individuals.

The most salient requirement was to identify the greatest diversity of views about the organization and operation of a public university. This was accomplished through an extensive examination of written documents on university roles and functions, in-depth interviews with students, faculty, and administrators involved in efforts to disseminate land grant type universities to other countries, the authors' own personal experience in this effort, and reports of critics and policy committees on university role and function, both in the United States and abroad.³

To facilitate appropriate interpretation of the "diffusion findings" in terms of the land grant university conceptual ideal, the ideas collected were sampled in a balanced book design (Kerlinger, 1967:581-599; Reddy and Lionberger, 1975). This involves two dimensions. The first refers to activities in which a university and its faculty ordinarily become involved (see Table 11). These were categorized as academic enhancement (mostly theoretical research), governance, education (teaching), change agent (dissemination), information macrosystem (information development and outreach), and service (to the public). The second dimension refers to levels of performance in each of the activities. These were labeled theoretical, applied, intermediary and user. Both represent requirements for a university to operate as a macrosystem of information development and flow (Havelock, 1971, Ch. 3).

This cross-referenced, two-dimensional model provided 24 cells for which representative statements were needed. These were selected and/or formulated to provide an approximate positive-negative balance within each cell in regard to the operation of a land grant university in the intended service-oriented manner. The balance of plus-minus items drawn for the cross-referenced cells produced a 72-item sample which was used for the Q-sorting process.⁴ This is referred to as a concourse of items by the method's originator and chief proponent (Stephenson, 1967). (For a complete listing of these views see Appendix C, Table 1.)

First, the distinctive features of land grant universities had to be identified. Second, they had to be ordered in the context of what such a university ideally should and should not be and do.

Identification of Distinctive Concepts. For identifying and defining the distinctive concepts, options were limited. An historical approach would require examination of documents setting forth the original change and subsequent directives in the evolvement of the system. But this would miss the ideas and concepts that emerged and were subsequently built in without official prescription, and in turn were transmitted informally from one generation of the faculty to the next.

A second option would depend on the writings of those who extoll and/or critique such universities. But this suffers from a general inclination of writers to assume rather than define what the concepts are except for those having to do with obvious organizational matters and the often cited "people orientation" philosophy.

Third, reliance could be placed on insights of knowledgeable administrators and academicians currently associated with land grant universities who have been socialized into the system ways of thinking and who occupy positions that require serious thought concerning how these universities should be organized and operate. This approach--the one chosen--assumes that the concepts exist mostly in the minds of knowledgeable who have been socialized into land grant university ways of thinking and acting.

It is assumed that knowledgeable could identify the basic concepts from the 72-item sample of views and could add others if needed. Since several persons of the Columbia campus were regarded as authorities on land grant universities and most of them had also been involved in helping to implant this type of university into other social settings, the authors felt no need to look beyond the campus for definers.⁵

Even though potential definers were sufficiently well known to the researchers for them to make a judicious selection of them, a more guarded procedure was used: reliance on the persons who were highly knowledgeable about these universities. They were asked to name three persons on campus who best exemplified the land grant way of thinking and philosophy. The eight persons named three or more times were selected as definers. These persons specified the 16 concepts from the 72 as central to the organization and operation of land grant universities (see Table 12). They suggested no additional concepts, indicating that the initial selection was relatively complete as intended. Although designation of a view by a majority of the definers was regarded as sufficient, most of the items that were finally selected as distinctive were so designated with near complete consensus.

Definition of the Ideal Construct. For this, the eight definers were asked to sort--in Q-Sort style--the 72 items, including the 16 items labeled as distinctive to land grant universities, in terms of what they thought a land grant university ideally should and should not be and do. The term land grant university was used instead of the information macrosystem designation because it was more familiar to the respondents. The placement in the Q-sort of the views that were labeled as distinctive then became the constructed configuration from which relative acceptance of land grant university concepts by the social science faculty was assessed. The approximate placement of these items is diagrammatically illustrated in Figure 5 and their standard score averages in Table 12.

An Operational Measure of Diffusion. For this, two options were possible, one a little more indirect than the other. The more indirect option was to factor analyze a P-matrix of individual Q-sorts from diverse faculty members to identify types of views and then to see what extent the placement of concepts in each factored type approximated the land grant university ideal type. It would then be possible to determine how many of the faculty fell into each of the type categories. This can be done for each faculty member either by highest correlation of his own Q-sort with the respective types, or the way he rated highly discriminatory items, or both (Lionberger and Reddy, 1975).

TABLE 12. AVERAGE Q-SORT RATINGS ASSIGNED TO INFORMATION MACROSYSTEM CONCEPTS BY THE SOCIAL SCIENCE FACULTY WITH AND WITHOUT SERVICE OBLIGATED APPOINTMENTS AND DEVIATION OF THEIR RATINGS FROM THE LAND GRANT UNIVERSITY IDEAL SORT

Information Macrosystem (land grant university) Concepts (Type and Specifics)	People University Ideal Rating Average (N=8)	Social Science Faculty - Midwestern USA Campus			
		With Service Obligations Average (N=59)	Without Service Obligations Average (N=66)	With Service Obligations Deviation (N=59)	Without Service Obligations Deviation (N=66)
PEOPLE VIEWS					
Be committed to the proposition that there are extraordinary possibilities in ordinary people. (34)	11.1*	10.0	9.2	-1.1	-1.9
Be concerned only with highly competent students, academically. It is a waste of resources to try to educate the less capable students in a university. (6)	2.8	3.9	4.5	1.1	1.7
PUBLIC SERVICE VIEWS					
Should not provide continuing education for adults outside the university. This should be left to other agencies. (48)	2.8	4.0	5.4	1.2	2.6
Create an understanding of the change forces and conditions that are operating in our society and the consequences of what we seem to be inadvertently becoming. (58)	10.6	10.3	10.6	-0.3	0.0

TABLE 12. (CONTINUED)

Information Macrosystem (land grant university) Concepts (Type and Specifics)	People University Ideal Rating Average (N=8)	Social Science Faculty - Midwestern USA Campus			
		With Service Obligations Average (N=59)	Without Service Obligations Average (N=66)	With Service Obligations Deviation (N=59)	Without Service Obligations Deviation (N=66)
Information derived from its research should be freely accessible to all. Limited access agreements have no place in a university. (63)	10.3	10.4	10.4	0.1	0.1
Find solution to the major economic, social and political problems of the day and provide guidance for future policies and action. (50)	10.1	9.6	8.8	-0.5	-1.3
Participate with state and federal agencies in helping communities improve their economic and social conditions. (56)	9.9	9.6	8.8	-0.3	-1.1
Has a special obligation to extend its knowledge and services to economically disadvantaged areas and people in the state. (65)	9.6	9.5	8.3	-0.1	-1.3
Scholars in a university should be expected to work on research projects of applied concern even though the needed research is not what challenges them most. (10)	7.4	6.6	5.1	-0.8	-2.3

TABLE 12. (CONTINUED)

Information Macrosystem (land grant university) Concepts (Type and Specifics)	People University Ideal Rating Average (N=8)	Social Science Faculty - Midwestern USA Campus			
		With Service Obligations Average (N=59)	Without Service Obligations Average (N=66)	With Service Obligations Deviation (N=59)	Without Service Obligations Deviation (N=66)
SYSTEM VIEWS					
The university should be a sanctuary for the greatest diversity of thought, the freest exchange of ideas, the most painstaking search for truth and thus a repository of scientific knowledge second to none. (3)	12.1	11.1	12.7	-1.0	0.6
Provide two-way traffic of ideas and influence between the university and the people of the state largely through contacts with them both direct and indirect. (39)	10.9	10.3	9.1	-0.6	-1.8
Provide for integrated research, resident teaching and extension programs that supplement and draw upon each other. (37)	10.9	10.7	9.4	-0.2	-1.5
Universities must be a true knowledge system, in which highly abstract information developed in the university is transformed and flows downward to all points of practical concern to people. (42)	10.5	9.8	9.6	-0.7	-0.9

TABLE 12. (CONTINUED)

Information Macrosystem (land grant university) Concepts (Type and Specifics)	People University Ideal Rating Average (N=8)	Social Science Faculty - Midwestern USA Campus			
		With Service Obligations Average (N=59)	Without Service Obligations Average (N=66)	With Service Obligations Deviation (N=59)	Without Service Obligations Deviation (N=66)
Participate in creating a system of communication and idea exchange among basic scientists throughout the world. It is at this level of knowledge and theory that cross-cultural transfer of ideas is most possible. (45)	10.3	9.9	10.7	-0.4	0.4
Extension, research and resident teaching must be organizationally a part of the university and under its control. (44)	10.3	9.4	8.5	-0.9	-1.8
Leave testing of innovations for local adaptability to persons and agencies. It is a waste of university faculty time to be concerned with such matters. (40)	4.8	5.0	6.1	0.2	1.3
Total item deviation from ideal	XX	XX	XX	9.5	20.6

*For convenience in computation and comparison, positive and negative scores were converted to standard positive scores ranging from 1-13 with 7.0 representing the original neutral zero point.

A second and more direct method is to simply compare the placement of distinctive land grant university views (concepts) by the faculty in the Q-sort to those in the ideal type sort. This involves comparison of (1) the distinctive views in relation to the ideal, and (2) distinct land grant university concepts with other highly rated views not designated as distinctive by the definers.

A total of deviations of the faculty ratings from the ideal on all distinctive concepts provides a general measure of fit (acceptance in accord with the ideal pattern). Deviation of items from their placement in the ideal sort permits an assessment of their relative acceptance. A zero deviation indicates a perfect fit. Placement of one concept in relation to others in the forced choice situation provides an indication of the relative importance assigned to each. This method was chosen as most appropriate for the study. Nevertheless the faculty were typologized in terms of their factor analyzed views of what a public university should be and do, mostly for other reasons. One was to determine whether, in fact, there were those who closely typified the land grant type as opposed to the more academic orientation. The other was to determine whether orientations that were found were significantly related to the extension communication output of the faculty.

Hypotheses and Rationale

Four general hypotheses were posed in regard to the acceptance of university information macrosystem concepts, namely that:

- (1) Land grant university concepts at the theory end of a macrosystem of information development and flow would be more accepted by social science faculty in terms of the ideal system than those at the service end of the theory-to-practice continuum.
- (2) Acceptance of the distinctively land grant university concepts would be greater among the faculty members with service (to the public) obligated appointments than among those with strictly academic appointments.
- (3) Agronomists on the UMC campus would be more receptive to the distinctive concepts in terms of the ideal than the social science faculty.
- (4) The Columbia campus social science faculty would be more receptive to the distinctive concepts than those on the Taiwan campuses.

The rationale for the first hypothesis is the documented evidence that university faculties tend to defer to own academic colleagues (Havelock, 1971, Ch. 3; Reiff, 1961) and accordingly to theoretical research and writing that can be published in the "best" academic journals. Conversely they are less tolerant of activities of an applied nature, particularly those requiring deference to off-campus people and their problems.

The rationale for the second hypothesis is based on the premise that faculty who hold service obligated appointments would, either by prior commitment or subsequent socialization, become more acceptable of information macrosystem concepts than those who had no such obligation, particularly concepts of a service oriented nature. There is in this case

the additional question of how supportive they were of the theory-research related activities from which much of the ultimately usable information flows.

Hypotheses 3 and 4 are based upon a premise that the closer people are to the source of an innovation the greater their rate of adoption is likely to be. This of course is only tenable if the people are exposed to the innovation and the conditions for its adoption are favorable. Although both are tenuous assumptions, the social science faculty members at UMC are in this sense closer to the faculty who are involved in applied research and university outreach activities. Faculty on the Taiwan campuses had less opportunity for such exposure, but some of them were exposed to land grant university campuses through faculty exchanges with United States universities and through contacts with faculty associated with an experimental extension program on the Chungshing University campus. Moreover, participation in educational outreach activities was probably expected of the Taiwan social science faculty as a part of national planning and programming efforts.

Description of Information Macrosystem Type Universities--Land Grant Style

The constructed ideal type was obtained by having the eight knowledgeable definers rate the 72 concepts in terms of how much they thought each should be emphasized or deemphasized in terms of their view of the land grant university ideal.

From Table 12 we see that they assigned the highest priority to the university serving as a sanctuary for the greatest diversity of thought, the freest exchange of ideas, the most painstaking search for truth, and thus a repository of scientific knowledge second to none (3); second, that a public university should provide continuing education for off-campus adults (48).⁶

These two concepts were closely followed by a strong egalitarian philosophy among the eight knowledgeable land grant university system definers, reflected in a highly emphasized view that there are extraordinary possibilities in ordinary people and their disdain for an elitist view that a university should cater only to highly competent students (34, 6). The people orientation was further exemplified by a very high emphasis on maintaining two-way traffic of ideas and influence between the university and the people in the state (39), and a feeling that information from research done at the university should be freely accessible to all (63).

To achieve these public service obligations, the definers of land grant concepts saw a need for integrated research, resident teaching, and extension programs that supplement and draw upon each other with all three an organizational part of the university and under its control (44). This, of course, would make it possible for abstract knowledge to be transformed and to flow outward--after local adaptive testing--to all points of practical concern to the people (42).

To facilitate knowledge accrual at the basic science level, the definers recommended a system of idea exchange among basic scientists throughout the world (45). They also held that land grant universities should create an understanding of the nature and consequences of change forces and conditions operating in society (58), the objective being to

find solutions to the major economic, social and political problems of the day, and to serve ultimately as guides to policy and action (50). They further recognized a special obligation to the economically disadvantaged areas and people of the state, but in a somewhat lower order of priority (65).

Acceptance of the Basic Concepts--The Diffusion Issue

The measure of relative acceptance as described earlier is how closely the views of respondents approximated that of the land grant university information macrosystem ideal Q-sort. Inferences are drawn both from how much specific items and aggregate score deviated from the ideal.⁷

In Regard to the Theory-to-Practice Continuum

The first general hypothesis was that acceptance of the land grant university concepts at the theory end of the continuum would be closer to the ideal than acceptance of those at the practice end. Nine of the 16 distinctive (information macrosystem) concepts fit neatly on the theory-to-practice continuum. Figure 6 shows how the social science faculty on the Columbia campus felt each of the views should be stressed in relation to the ideal. Except for faculty participation in creating a world system of communication among scientists (45) which was rated in accord with the ideal, all other views deviated from the ideal in the "less emphasis" direction. As hypothesized, deviations became distinctly greater from the theory to the practice end of the continuum. Deviations were greatest concerning the provision of continuing education for adults outside of the university (48).

Although the total deviation of 14.2 for all 16 distinctive concepts or an average of .9 per item was small, the way it occurred had important implications for what the faculty is likely to do. Despite substantial deviations of some item ratings from the land grant university ideal, the general tendency of the faculty was to favor the land grant university concepts (see Table 12). The smallest deviations occurred for extending the frontiers of basic science knowledge and insisting on much autonomy in the pursuit of academic matters. Lowest scores, but still positive, were assigned to direct services to the public and maintaining two-way communication with them. Furthermore, they emphasized the functional integration of research, resident teaching and extension over the organizational inclusion and control of them. This was an important distinction in that the faculty emphasized a centrally important intrinsic quality for which there were no alternatives over an extrinsic one for which there were many (Barnett, 1953; Coughenour, 1968).

Service Obligation on the UMC Campus

Fifty-nine of the 125 UMC campus faculty (47 percent) interviewed had service obligated appointments. The 59 included all of the College of Agriculture faculty, irrespective of whether they were primarily in research, resident teaching, or extension; all of those in the Department of Community and Regional Affairs; and all with extension appointments in other departments and divisions. Most of the faculty without service obligations were in the College of Arts and Science. An implicit assumption for including all faculty in the College of Agriculture and the Department of Regional and Community Affairs in the service obligated

category is that there is a generally understood expectation that all who have such appointments do, in fact, assume an obligation of service to society. This is often quite in contrast to obligations of the Arts and Science Faculty who generally have no such generalized expectation unless they have official extension appointments.

Looking first at the aggregate deviation of view ratings from the definers' ideal, a vast difference was evident: 9.5 for the faculty with service obligations and 20.6 for those faculty without service obligated appointments (see Table 12). Thus, support for the second general hypothesis was clearly evident. Additionally, for the service obligated there was a much better balance of relative acceptance across the theory-to-practice continuum (see Figure 6). Those with no service obligations were inclined to emphasize the theory-academia oriented concepts more than the ideal (3 and 45) and much more strongly downgrade those of an educational outreach nature.

Both were close to the ideal in their relative emphasis on creating an understanding of change forces and conditions operating in society (58). For matters of knowledge application and helping people, deviations in relative acceptance for the two differed only in relative emphasis. Except for testing of innovations for local adaptability which the service obligated faculty rated close to the ideal the inclination for both was to emphasize all "knowledge application" and "help people" concepts as less important than the ideal and for deviations to consistently increase along the theory-to-practice continuum. Within this general context the major difference between the service and non-service obligated faculty at UMC was that deviations in the "emphasize less" direction were generally at least twice as great for the service obligated faculty.

Agronomists vs. Social Scientists in the Two Campus Settings

Agronomists were only very slightly more ready to accept university information macrosystems concepts than the social science faculty. Total deviation from the land grant university norm was 12.2 for agronomists and 14.2 for social scientists. But there are important qualitative differences that lend support to the third hypothesis. By virtue of their own academic commitment, agronomists would be expected to be less supportive of such things as creating an understanding of change forces and conditions in society (58) and to finding solutions to and providing guidance for solving major economic, social, and political problems of the day (50). On these two items alone, which reflected a social science bias, they collected a 3.00 point deviation. They acquired an additional 5 points by stressing land grant university concepts more than the ideal. Thus, agronomists on the UMC campus were either more in accord with or favorable to the 16 distinctive land grant university concepts than the social scientists.

On the Taiwan campuses, the views of agronomists deviated more from the land grant university ideal than those of the social scientists. Like their social science colleagues they registered their greatest deviation on lack of faith in the potential of ordinary people (34) and the feeling of any need to interact with them outside of the university (39). The ideas that a university should operate as an instrument to develop and disseminate information (42) and that a university has a special obligation to disadvantaged people in the state (65) were also greatly downgraded by comparison to the ideal. Also, as was expected, the Taiwan agronomists had less sympathy than their social science

colleagues with any obligation to create an understanding of change forces operating in society (58) and to helping communities improve their economic and social conditions (56).

On the other hand, the Taiwan agronomists were deviant by 1.2 points toward the positive side on the concept of requiring the faculty to work on research projects of practical concern even though this is not what interests them most (10). They were less committed than the ideal to the university being a sanctuary for the greatest diversity of thought and a repository for accumulated knowledge second to none (3). These views suggest an even stronger subserviency to the state by the Taiwan agronomists than by their social science counterparts. This was in marked contrast to both agronomist and social science faculty on the UMC campus.

UMC Campus vs. Taiwan Campuses

As stated in hypothesis 5, UMC campus social scientists were much more receptive to land grant university concepts than those on the Taiwan campuses. Aggregate deviations from the constructed ideal were 14.2 and 24.0, respectively (see Table 13).

As we have already noted the UMC social scientists were quite in accord with the ideal on matters central to knowledge development, these having to do mostly with the unhampered pursuit of knowledge. The Taiwan faculty, while favorable to these activities generally, did not stress them as much as the land grant university ideal. Their sharpest deviation from the ideal was registered in their faith in the potential of ordinary people, be they students (6) or off campus adults (34); also deviating sharply from the ideal was their view toward the utility of providing a two-way traffic of ideas and influence between them and the university (39) and, consequently, the need for providing continuing off-campus education for them (48). Score deviations on these four people-oriented items provided 10.1 of the 24.0 deviation total. This surely suggests a strong feeling of intellectual elitism on the part of the Taiwan social science faculty. However, they didn't seem to mind using their knowledge to help find solutions to and guidance for major economic, social, and political problems of society (50). They were less supportive than the ideal to the notion of universities helping to create an understanding of change forces and conditions in society and their likely consequences (58), as well as helping state, federal, and local agencies improve local living conditions (56).

Perhaps the most salient feature of the Columbia campus social scientists' view pattern was their inclination to support knowledge development at the theoretical level nearly equal to the ideal followed by a progressive decline of support along the theory-to-practice continuum (see Figure 6).

Faculty Types

In view of the long standing land grant tradition prevailing on the UMC campus, graduate study in a land grant university on the part of many of the faculty, and subsequent employment in a land grant university, it was expected that many of the UMC faculty would become quite thoroughly socialized into the land grant university way of thinking. It was reasoned that this should find reflection in a faculty type very similar to the land grant university ideal type. This, of course, was not

TABLE 13

DEVIATION FROM THE LAND GRANT (INFORMATION MACROSYSTEM) UNIVERSITY IDEAL OF Q-SORT RATINGS ASSIGNED TO VIEWS BY THE SOCIAL SCIENCE AND AGRONOMY FACULTIES ON THE UMC AND TWO TAIWAN CAMPUSES

Land Grant University View or Concepts	Land Grant University Ideal Rating Average (N=8)	Midwestern USA Campus		Two Taiwan Campuses	
		Social Science Faculty Deviation (N=125)	Agronomy Faculty Deviation (N=29)	Social Science Faculty Deviation (N=103)	Agronomy Faculty Deviation (N=18)
ALL VIEW AVERAGE	XX	- 0.9	- 0.8	- 1.5	- 1.7
PEOPLE VIEWS					
Be committed to the proposition that there are extraordinary possibilities in ordinary people. (34)	11.1	- 1.5	- 1.0	- 3.1	- 3.2
Be concerned only with highly competent students, academically. It is a waste of resources to try to educate the less capable students in a university. (6)	2.8	1.4	1.1	2.6	1.8
PUBLIC SCIENCE VIEWS					
Should not provide continuing education for adults outside the university. This should be left to other agencies. (48)	2.8	1.9	1.4	2.1	1.8
Create an understanding of the change forces and conditions that are operating in our society and the consequences of what we seem to be inadvertently becoming. (58)	10.6	- 0.1	- 1.4	- 1.6	- 2.2

TABLE 13. (CONTINUED)

Land Grant University View or Concepts	Land Grant University Ideal Rating Average (N=8)	Midwestern USA Campus		Two Taiwan Campuses	
		Social Science Faculty Deviation (N=125)	Agronomy Faculty Deviation (N=29)	Social Science Faculty Deviation (N=103)	Agronomy Faculty Deviation (N=18)
Information derived from its research should be freely accessible to all. Limited access agreements have no place in a university. (63)	10.3	0.1	- 0.5	- 1.7	- 1.8
Find solutions to the major economic, social and political problems of the day and provide guidance for future policies and action. (50)	10.1	- 0.9	- 1.6	- 0.5	- 1.4
Participate with state and federal agencies in helping communities improve their economic and social conditions. (56)	9.9	- 0.7	- 0.6	- 1.6	- 2.2
Has a special obligation to extend its knowledge and services to economically disadvantaged areas and people in the state. (65)	9.6	- 0.7	- 0.9	- 1.9	- 2.3
Scholars in a university should be expected to work on research projects of applied concern even though the needed research is not what challenges them most. (10)	7.4	- 1.6	- 0.1	0.5	1.2

TABLE 13. (CONTINUED)

Land Grant University View or Concepts	Land Grant University Ideal Rating Average (N=8)	Midwestern USA Campus		Two Taiwan Campuses	
		Social Science Faculty Deviation (N=125)	Agronomy Faculty Deviation (N=29)	Social Science Faculty Deviation (N=103)	Agronomy Faculty Deviation (N=18)
INFORMATION MACROSYSTEM VIEWS					
The university should be a sanctuary for the greatest diversity of thought, the freest exchange of ideas, the most painstaking search for truth and thus a repository of scientific knowledge second to none. (3)	12.1	- 0.2	- 1.4	- 1.4	- 1.8
Provide two-way traffic of ideas and influence between the university and the people of the state largely through contacts with them, both direct and indirect. (39)	10.9	- 1.2	0.0	- 2.3	- 2.7
Provide for integrated research, resident teaching and extension programs that supplement and draw upon each other. (37)	10.9	- 0.9	0.5	- 0.8	0.2
Universities must be a true knowledge system, in which highly abstract information developed in the university is transformed and flows downward to all points of practical concern to people. (42)	10.5	- 0.8	- 0.4	- 1.6	- 2.3

TABLE 13. (CONTINUED)

Land Grant University View or Concepts	Land Grant University Ideal Rating Average (N=8)	Midwestern USA Campus		Two Taiwan Campuses	
		Social Science Faculty Deviation (N=125)	Agronomy Faculty Deviation (N=29)	Social Science Faculty Deviation (N=103)	Agronomy Faculty Deviation (N=18)
Participate in creating a system of communication and idea exchange among basic scientists throughout the world. It is at this level of knowledge and theory that cross-cultural transfer of ideas is most possible. (45)	10.3	0.0	0.2	- 0.5	- 0.7
Extension, research and resident teaching must be organizationally a part of the university and under its control. (44)	10.3	- 1.4	- 0.5	- 1.4	- 1.0
Leave testing of innovations for local adaptability to persons and agencies. It is a waste of university faculty time to be concerned with such matters. (40)	4.8	0.8	0.6	- 0.4	- 0.4
Total Deviation from the Ideal	XX	14.2	12.2	24.0	27.0

expected among the Taiwan faculty who presumably were socialized more into the academic tradition.

To insure identification of such types as did exist, it was necessary to pick a campus sample that reflected the greatest diversity of views possibly about what a public university should be and do. A diverse sample of 60 students, faculty members, and administrators were asked to do the 72 item Q-sort. Their responses were subjected to principal axis factor analysis and subsequent hand rotation to clarify loading of individuals on factors. This produced three distinctive types for the Missouri faculty. These were descriptively labeled Academic Elites, Society Servants, and Land Grant University Traditionalizers. On the Taiwan campuses a similar procedure yielded types descriptively referred to as Subservient Servants (of society), Autonomous Critics, and Critical Servants (of Society).

Once these types were determined, the faculty on each of the campuses were classified into the types on the basis of highest correlation of own Q-sort with the faculty types. In cases of doubt, the way respondents rated key items that discriminated one type from another was considered.

By general inspection one could then determine if any of the constructed types approximated the ideal. A more definitive approach would be to determine how closely ratings on the 16 distinctive items approximated their placement in the ideal sort. The former was regarded as sufficient in this case. With the faculty classified into types it would then be possible to determine how many, if any, exemplified the land grant point of view.

On the UMC Campus

In a factor analysis to determine types, there are always views upon which there is general agreement. These are known as consensus items. In general, there was more agreement than disagreement among the UMC faculty.

All UMC faculty members tended to agree that a public university should operate as a theory-to-practice knowledge system, that close interaction should be maintained between the faculty and people in the state, and that scientists should work at establishing and maintaining contacts with each other on a world-wide basis. These were information macrosystem views upon which all shared a strong pro feeling. They also strongly felt that social scientists should participate in creating an understanding of change forces and conditions occurring in society and of their possible consequences.

With somewhat less conviction they generally felt that a public university should provide for integrated research, teaching, and extension programs that supplement and draw upon each other and that there are indeed extraordinary possibilities in ordinary people.

Although mildly favorable to assisting state and federal agencies in community improvement efforts and to providing continuing education, they were strongly opposed to such things as promoting government plans, national unity, and exercising parental type control over students.

Academic Elites. Academic elites were most distinguished by their very high emphasis on a university being a sanctuary for innovative thought, diversity of views, free exchange of ideas, and painstaking

search for truth, all leading to creating a repository of knowledge second to none. They were negative to a major emphasis on such things as "now happenings," "real life experiences," and the like. Although they shared with others the view that the university should have a capability for translating theoretical knowledge into usable practice and in having integrated research, resident teaching, and extension programs, they regarded these as distinctly secondary to such scholarly pursuits as bold experimentation in human relationships, theory testing, and understanding change forces occurring in society. Although unrestrained pursuit of truth with a critical stance toward the existing institutional arrangements for them were requirements, they were not anti-establishment in the "new left" sense. For them critical inquiry was a priority consideration.

Society Servants. Society servants proposed a "down to earth," "here and now" orientation which favored sending professors to the field periodically for educational updating. They registered a strong negative stance to protecting radicals within the university and favored protecting the faculty from reactionary forces from sources within and outside of the university.

They were opposed to the "open university" idea, assuming special educational obligations to the economically disadvantaged, and to lowering standards that would enable the less academically qualified to survive in the system. In general, to them, meritocracy prevailed over humanitarian considerations and a critical stance toward existing social institutions.

Land Grant University Traditionalizers. They held that all faculty should be involved in research, teaching, and extension activities and that, organizationally, these should be under the control of the university. This was rated above the functional integration of resident teaching, research, and extension. Although not adamant, they were favorable to the faculty spending some time in the field for educational direction and orientation.

They, with all others, agreed that universities must first of all be free to exercise the greatest diversity of thought and inquiry looking to knowledge accumulation second to none. Even though they were distinctly opposed to the society critic role, thus making them distinct in this respect, they favored bold experimentation in the field of human relations. Yet they were neither subservient servants to society nor inclined to hide behind a shield of insularity in cases when public disfavor was incurred. Clearly, they preferred to follow a sufficiently cautious course of action to make use of such an escape unnecessary.

On the Taiwan Campuses

Strong positive or negative consensus views were fewer on the Taiwan campuses than on the Missouri campus. On the whole theirs were more diverse. Yet they, as their UMC campus counterparts, strongly felt that a university should be a sanctuary for the greatest diversity of thought, the freest exchange of ideas, and the most painstaking search for truth and, accordingly, a repository for scientific knowledge second to none. On the negative side they felt that the university is not at its best when it is indulgent and amused, seeking to know but not to moralize, and somehow vague rather than ready with absolute answers, or like an industrial firm with students as customers and degrees for sale. They, with their American counterparts, were generally opposed to universities serving as staging areas for revolution and revolutionaries although the critical servants

were barely so. But unlike their American counterparts, none were particularly impressed with the idea that there are extraordinary possibilities in ordinary people. Otherwise consensus was mostly on matters for which strong feelings were not held either way.

Subservient Society Servants. This type strongly felt that universities should promote a sense of national unity and consciousness and that research done by the faculty should be mainly determined by the social, political, and economic needs of the state. A somewhat less strongly held positive view was that the university should help preserve and communicate the basic values of the society--religious, moral, social, economic, and political.

A kind of utilitarianism was indicated by a favorability to teaching now-happenings and real life experiences, and to simultaneously being a teacher, researcher, and extension worker. Also, they, with the Autonomous Critics, felt that the university should have integrated research, teaching, and extension programs that mutually support and draw upon each other. They thought that the three should be organizationally a part of and under control of the university. The last view was not shared by any other group. They favored university participation in creating a system of communication and idea exchange among basic scientists throughout the world.

Quite in line with an extension philosophy they were favorable to continuing education for adults outside of the university. Their subservient stance was further manifest in their negative reaction to protecting radicals on campus and to their tolerance of professional schools on campus. Strangely, they more than any other group were against using resources to educate less capable students in the university setting.

Autonomous Critics. Autonomous critics were strongly committed to creating an understanding of the change forces and conditions operating in their society and the consequences of what society seems to be inadvertently becoming. They were also committed to experimenting boldly in the whole area of human relations, presumably to provide guidance for future policies and action. To them a university should become a true knowledge system in which the highly abstract information is developed in the university and is transformed and set flowing downward to all points of practical concern to people. This information, they believe should also be operationalized through integrated research, resident teaching, and extension programs.

Critical Society Servants. They were perhaps most distinguished by a feeling that a university should participate with state and federal agencies in helping communities improve their economic and social conditions. They shared with others the view that a university should be a sanctuary for the greatest diversity of thought and thus a repository of knowledge second to none but for a utilitarian purpose, i.e., creating an understanding of the change forces and conditions that operate in society and (with Type One respondents) finding solutions to the economic, social and political problems of the day. This, they held, should be done through integrated research, extension and resident teaching programs with local adaptive testing also included as a legitimate university activity. An egalitarian position in regard to both staff and students was suggested by more than average opposition to the contention that the faculty should remember they are university employees and should be guided accordingly and with Type Two to exercise control over the personal lives of students somewhat comparable to what parents would expect.

In general, Type Three respondents had a commitment to society service basically through intellectual inquiry, objective criticism and addressing problems and issues of the day. This they would insist on doing in the context of unrestrained development of a university as a knowledge center second to none.

In Relation to the Land Grant University Ideal

Only the category of Land Grant University Traditionalizers on the UMC campus approximated the land grant university ideal type. There were only ten (see Table 14) faculty members in this category.

Although "luke warm" and a bit traditional in their views on how a land grant university should operate, Land Grant University Traditionalizers were nevertheless most consistent in accepting concepts necessary for making it possible for a university to simultaneously extend the frontiers of scientific knowledge, and transform and deliver a portion of it after adaptive testing to non-scientific users, with social and economic betterment in view. Yet, commitment to such propositions as "extraordinary possibilities in ordinary people," concern for other than the most capable students, and concern for providing continuing education to persons outside of the university was far less emphasized than in the ideal. In fact, the commitment seemed to be mostly to the university system with elitist views emphasized over egalitarianism.

With Academic Elites the most predominant faculty type on the Missouri campus, there can be little claim for thorough socialization of the social science faculty into the land grant way of thinking. Although the concepts necessary for a university to operate as a macro-system of information development and flow were generally rated favorably, faculty autonomy was rated higher, with research and development (the innovation function) greatly favored over educational outreach (the dissemination function).

In accord with the limited potential for exposure to the land grant philosophy, the diffusion and/or acceptance of the basic concepts were even less manifest on the Taiwan campuses, even though the Critical Servant (Type Three) again approximated the ideal somewhat. Forty-two of the 103 faculty tended to be this type (see Table 14). Critical Servants were favorable to the functional inclusion and organizational control of research, extension, and resident teaching and to maintaining interactive contact with people in the state but deviated greatly in confidence expressed in the potential of ordinary people and students of less than top level intellectual ability. Critical Servants, like the land grant university ideal, were favorable but less dedicated than the ideal to understanding the change forces and conditions operating in society. But the Critical Servants were negative rather than positive in providing adult education outside of the university system.

On these campuses the Subservient Servants predominated. They were perhaps most characterized by a strong feeling that the university should promote a sense of natural unity and consciousness and that the research done by the faculty should be mainly determined by the social, political, and economic needs of the state. Thus, the land grant university ideal was approximated only among the Critical Servants. The general conclusion is that no view type emerged that closely approximated the land grant university idealized way of thinking, despite rather pervasive concerns of the faculty for problems and issues of societal concern.

TABLE 14

UMC CAMPUS AND TAIWAN SOCIAL SCIENCE FACULTY
CLASSIFIED BY VIEW TYPES

Faculty View Types	Columbia Campus	Taiwan Campuses
Academic Elites (scholarly critics)	103	X
Society Servants (establishment oriented)	12	X
Land Grant University Traditionalizers	10	X
Subservient Society Servants	X	54
Autonomous Critics (academic elites)	X	7
Critical Society Servants	X	42
Total	125	103

Chapter 3 Footnotes

1. If the authors seem to be overly obsessed in making a case for acceptance of land grant university concepts as a legitimate diffusion issue, they regard it as necessary in view of the criticisms they have received for attempting to address what they regard as proper and very important diffusion issues by a method which they feel is uniquely appropriate. Criticisms have ranged from--
 - (1) those who say they are sick of hearing about the time-worn land grant designation,
 - (2) those who say there is nothing unique about land grant universities,
 - (3) those who think there is a uniqueness and they know what it is,
 - (4) those who say what we are doing has nothing to do with diffusion,
 - (5) those who regard the "information macrosystem" designation as unnecessary verbage,
 - (6) those who mistake the agricultural college origins of the system for an agricultural bias,
 - (7) those who regard any attempt to assess relative acceptance between service and non-service obligated faculty. Gad! "I don't suppose that it could get much more trivial."
 - (8) those who can't envision the existence of concepts residing only in the minds of knowledgeable individuals,
 - (9) those who would disqualify administrators as knowledgeable definers of what the unique concepts are,

--to those who--

 - (10) see ours as an attempt to assess the diffusion of a configuration of unique concepts into a new social setting as a legitimate diffusion issue ably pursued by a unique and innovative method. Critiques have been mostly by the former with encouragement by the latter.
2. This is in marked contrast to anthropologists who have long known and addressed such issues (Linton, 1936).
3. The exhaustive search of written documents included Arlt (1970), Beardsley and Morrison (1959), and Ben-David and Zloczower (1962), Carnegie Commission on the Future of Higher Education (1971), Cohen and Hals (eds., 1966), Wood (1968), Sower (1962), Ellis (1966), Etzioni (1968), Evans and Leppman (1968), Gardner (1964), Government of India (1966), Greeley, Van Cleve and Carroll (1967), Hefferlin (1969), Conference on Dynamics of Change in the Modern University (1966), Kerr (1963), Kritstol (1968), McGarth (1961), Miles (1964), Perry (1971), U.S. President's Commission on Higher Education (1947), Riesman (1956), Rogers (1968), Steiner (1965), Thomas (1971), University of Missouri (1968), Vaughn (1973), Wedemeyer (1970), Whitehead (1929), Woolfe (1969), Lionberger and Chang (1970). Countries represented in

the interviews with knowledgeable professionals included India, Taiwan, Colombia, Brazil, Denmark, the Netherlands, and the United States. A more detailed statement of this part of the procedure is available in a previous paper by the authors (1975b).

4. To achieve approximately plus-minus balance, two positive statements had to be changed to negative by adding a "not" to an otherwise positively oriented statement. This, the authors advise, should be done sparingly because of complications created in the analytical process. Likewise, conversion of plus-minus statements across the (-6 through 0 to +6) most agree/most disagree range into a zero to positive 13 standard scale simplifies computational procedures but requires interpreting the number seven position as neutral.
5. The eight definers included two retired administrators, one of whom had written a history of the University of Missouri, Columbia (UMC) land grant university and taught courses about the organization and operation of such universities. Another was regarded nationally as an authority on the subject. These and two others had been actively involved in disseminating land grant university concepts to other countries through the institution building efforts of UMC and/or had served on national committees for making projections on how this should be done; still another administrator was actively involved in administering research in the University and three were faculty members of distinction in matters of university organization and management. Academically, they drew heavily from agricultural economics, but also had representatives from animal husbandry, agronomy, history, and rural sociology.
6. The numbers here and subsequently entered in parentheses are item numbers reported in the tables and figures cited. This particular statement was stated negatively. Accordingly, the positive stance in the text was indicated.
7. The authors were well aware that initially distinctive concepts were no longer regarded as distinctive when they were generally accepted by adopter clienteles, as many of the so-called unique land grant university concepts are; also, that there will always be some adopters who will continue to insist that the new ideas that they have accepted are the product of their own personal experience or of independent invention. Even so, the authors were inclined to the view that acceptance is mostly a product of diffusion. For those who disagree, a mere acceptance context will suffice, thus avoiding the controversy of where the ideas came from in the first place.

CHAPTER 4

THE COMMUNICATIVE BEHAVIOR OF THE SOCIAL SCIENCE FACULTY

The second objective of the study was to operationally measure and explain the communication output of the social science faculty to their own academic colleagues and referents on the one hand and to social science information user audiences of academia on the other. Of these, there are many. In general, the extension type audiences include intermediaries that use information as a means of servicing the informational needs of others and those who seek and receive the information directly for their own personal use. An implicit assumption is that communication to all audiences along the theory-to-practice continuum is necessary for a university to operate as a macrosystem of information development and flow.

Communication Orientation of the Faculty

Scientists must of course communicate and interact with each other to keep informed about what others are doing. This kind of communication is confined mostly to fellow academicians. But for information flow to user clienteles to occur there must also be a heavy flow of communication to potential users (extension audiences). Media channels commonly used for this purpose are articles in extension type journals, popular publications, newspaper releases, radio talks, television appearances, letters, and face-to-face communication. For research scientists, academic journals are the most used and respected medium. Papers prepared for professional meetings and special conferences are also used. Communication with own academic colleagues is both common and conventional. Communicating science-based information to potential users outside the university setting as a general practice is by comparison, innovative.

The central question raised at this juncture was the extent to which the communication output of the social science faculties on both campus settings (Missouri and Taiwan) was directed to specific audiences along the theory-to-practice continuum. General expectations in the nature of hypotheses were that faculty output would be:

- a. More directed to academic than to extension audiences.
- b. Within extension, more directed to professionals than to the public and within academic more to basic than to applied scientists.
- c. More universally directed to academic than extension audiences.

The rationale for hypotheses "a" and "c" derive from documented deference of academics to academia and accordingly writing articles mostly for the best academic journals (Havelock, 1972, 3-14; Reiff, 1961 and Weiss, 1978). For "b" the reasoning is that deference to professionals is more acceptable to academics than deference to the information-consuming public. It is further reasoned that this kind of deference will place a constraint on the faculty in regard to audiences to which their written and oral communication will be directed.

The Measure of Communicative Output

A suitable measure of communicative output for this study had to take into account all of the means that a faculty used to communicate to various audiences.

Essentially, laying aside controversial qualitative vs. quantitative issues (Meadows, 1974; Moravcsik, 1977), the authors chose a measure based strictly on estimated time spent in preparing for and completing communicative activities. A judgmental time standard for completing each activity supplied by well-informed and experienced peers on each campus was applied to the communicative activities reported by each faculty member (see Appendix B). The man-days assigned to each activity was an average of estimates made by the sub-sample of faculty members on each of the two campuses who had broad experience with the communication activities rated. The score for an individual was the total of the man-day estimates applied to the communicative activities reported in each case.

All estimates were in terms of an eight hour day, 40 hour week, probably far below that actually spent by most faculty members. Although it is not perfect, and is indirect and strictly quantitative, the authors feel that the estimate provides a satisfactory measure for comparing volume of communication output. It cannot be regarded as an accurate indicator of how much time the faculty actually spent in their communicative effort because the time required to prepare and deliver messages varies greatly from individual to individual. Also, some faculty, particularly those in extension, may use the same presentation more than once and publish in slightly different form in more than one place. Those who are particularly adept at exploiting their research or especially active in extension work can easily accumulate man-day output figures far in excess of the number of days that are in a year.

Probably most readers will find reason to argue with the man-day requirement assigned to one or more of the communication activities enumerated as it applies to them, and may well adduce evidence in support of the position taken. But as they do they should recognize that they are pitting their judgment against that of a panel of social scientists chosen for their breadth of knowledge concerning average time requirements for the communicative acts enumerated.

In terms of the theory-to-practice continuum the faculty may direct their communication primarily to basic or applied scientists, to intermediaries (professionals) who become involved in helping people with their problems, or directly to people who are the ultimate users of the information. Among the intermediaries are such professionals as extension specialists, social workers, health educators, doctors, and soil conservationists.

Communication within academia and to the information-consuming public is conceptually different. The operational definition used in this study for academic communication is information directed primarily to basic and applied scientists. The definition used for extension communication is information directed primarily to intermediaries (professionals) or directly to the consuming public. Intent of the communicator was used as the audience determinant.

This chapter looks at the means of communication used by the faculty and the magnitude of output directed to each of these audiences.

Chapter 5 attempts to explain extension communication output in terms of the variables. Chapter 6 does the same for academic communication.

Means of Communication

Because extension communication is innovative in terms of traditional faculty orientations, specific attention is directed to channels or media used by extension personnel to communicate with extension audiences. Table 15 shows the proportion of the social science faculty on each campus using one or more outlets to communicate with professionals or the general public.

Extension type journal articles were most universally used by the UMC faculty to communicate to professionals. Personal letters were their next most universally used channel. The Taiwan social science faculty on the other hand used short courses and seminars about as frequently as journal articles. The proportion of faculty members involved in seminars and short courses was higher for the Taiwan faculty. These media provided an interactive atmosphere for the faculty to work in. The UMC faculty made somewhat more universal use of committee work, consulting, speeches, and special papers--most of which also provided an opportunity for interactive exchange. Extension bulletins designed to provide wide exposure to extension audiences were used by just under one-fifth of the UMC faculty. Considering the fact that only 28 percent of the UMC social science faculty had extension appointments, this is a substantial contribution. Much fewer of those on the Taiwan campuses used such bulletins to communicate.

For communicating with the general public, the media channels used were much more restricted. Journals were used by just under a fourth of the faculty members on the UMC and a little over a fourth on the Taiwan campuses to reach public audiences. In general, the UMC faculty used a greater variety of channels. Yet the reader should not overlook the fact that a very high proportion of the faculty made no use of mass media channels for communicating with the general public.

Magnitude and Direction of Communication

Tests of hypotheses a and c were provided by simply:

- a. Computing the man-day amount of communication directed to basic and applied scientists (academic) and to professionals and the public (extension).
- b. Determining what percent of the total that was primarily directed to academia and extension audiences and the component elements within each.

A test of hypothesis b required examination of the distribution of output within each of the categories. Almost 98 percent of the Columbia campus social scientists produced some communication for academic audiences compared to 81.6 percent for extension audiences (see Table 17). Comparable figures for the Taiwan social scientists were 99.1 and 86.4 percent, respectively. The participation level was generally in the one to two journal article equivalency levels (1-239 man-days). However, high

TABLE 15. PERCENT OF THE SOCIAL SCIENCE FACULTY ON THE MISSOURI AND TAIWAN CAMPUSES USING DESIGNATED MEDIA TO COMMUNICATE WITH EXTENSION AUDIENCES DURING THE PAST YEAR

Type of Extension Audience	UMC Campus (n=125) (Number of Issues)		Taiwan Campuses (n=103) (Number of Issues)	
	None (%)	One or More (%)	None (%)	One or More (%)
Professionals				
Books*	83.2	16.8	86.4	13.6
Journal articles**	44.8	55.2	63.1	36.9
Special papers	76.0	24.0	82.5	17.5
Symposia and seminars	70.4	29.6	64.1	35.9
Short courses	69.6	30.4	63.1	36.9
Speeches	71.2	28.8	79.6	20.4
Consulting	75.2	24.8	80.5	19.5
Personal letters	63.2	36.8	84.5	15.5
Committee work	73.6	26.4	80.5	19.5
Extension bulletins	80.3	19.2	95.1	4.9
The General Public				
Books*	93.6	6.4	94.2	5.8
Journal articles**	75.2	24.8	72.8	27.2
Special papers	92.8	7.2	98.0	2.0
Symposia and seminars	93.6	6.4	94.2	5.8
Short courses	86.4	13.6	97.1	2.9
Speeches	81.6	18.4	90.3	9.7
Consulting	95.2	4.8	98.0	2.0
Personal letters	75.2	24.8	92.2	7.8
Committee work	94.4	5.6	100.0	0.0
Extension bulletins	88.0	12.0	93.2	6.8

*Computed on a 10 year base.

**Stated as a yearly average for the past 3 years.

TABLE 16. PERCENT OF THE TOTAL MAN-DAY COMMUNICATION OUTPUT OF
THE SOCIAL SCIENCE FACULTY ON THE UMC AND TAIWAN
CAMPUSES DIRECTED TO BASIC AND APPLIED
SCIENTISTS AND TO PROFESSIONALS
AND THE PUBLIC

Country - Campus	(N)	Total (N)	Audiences - from theory to practice			
			Academic		Extension	
			Basic Scientists (%)	Applied Scientists (%)	Professionals (%)	Public (%)
U. of MO- Columbia	(125)	100.0	39.0	28.0	23.2	9.8
Taiwan	(103)	100.0	33.5	43.5	18.0	5.0
National Taiwan	(74)	100.0	40.3	39.0	16.0	4.7
Chunghsing University	(29)	100.0	16.1	55.4	22.9	5.6

TABLE 17

PERCENT OF THE SOCIAL SCIENCE FACULTY ON THE UMC AND TAIWAN CAMPUSES
CLASSIFIED BY AMOUNT OF ACADEMIC AND EXTENSION COMMUNICATION

Campus Kind of Communication	Total (%)	None (%)	1-119 (%)	120- 239 (%)	240- 359 (%)	360- 719 (%)	720 & over (%)
U. of MO-Columbia							
Total	100.0	0.0	13.6	12.8	14.4	32.0	27.2
Academic	100.0	2.4	28.0	15.2	16.0	23.2	15.2
Extension	100.0	18.4	36.0	21.6	5.6	10.4	8.1
Taiwan Campuses							
Total	100.0	0.0	5.8	5.8	12.6	35.9	39.8
Academic	100.0	0.9	11.7	9.7	21.4	29.1	27.2
Extension	100.0	13.6	46.6	15.5	8.7	9.7	5.8

magnitude communication, i.e., generally above the 2 journal article level was much more to academic than extension audiences on both campuses (see Table 17).

Also, the communicative output per faculty was much higher to academia than to extension in both campus settings. The ratio was about two to one on the Missouri campus and three to one on the Taiwan campuses. Extension output per faculty member was less on the Taiwan campuses. Extension output per faculty member was less on the Taiwan than on the Missouri campus but academic communication was close to twice as high (see Table 18). Variation within department was great, particularly for extension audiences. On the Missouri campus the range was from none in Psychology to 222 in Agricultural Economics, with the Department of Regional and Community Affairs (which is highly oriented to educational outreach) a close second. In Taiwan, the Department of Sociology was the largest producer per man by a substantial margin. The Public Health Department was also a substantial producer compared to other departments.

The Question of Why

Definitive answers to why the faculty directed their communication (1) more to academic than extension audiences, (2) within extension more to intermediaries than ultimate information users, and (3) within academic circles more to basic than applied scientists must await a more detailed look at how background, prior socialization, position, reward, and perceptual and reference group influences combine and interrelate to explain magnitude of communication. These questions are addressed in Chapters 5 and 6.

TABLE 18

MEDIAN MAN DAY ACADEMIC AND EXTENSION COMMUNICATION OUTPUT OF THE
 UMC AND TAIWAN CAMPUS SOCIAL SCIENCE FACULTY DURING THE
 PAST YEAR CLASSIFIED BY DEPARTMENT

Department	Communication to Extension Audiences on the		Communication to Academic Audiences on the	
	UMC Campus (Median)	Taiwan Campuses (Median)	UMC Campus (Median)	Taiwan Campuses (Median)
All Departments	111	83	261	501
General and Rural Sociology	90	218	353	501
Agricultural Economics	222	70	297	605
Regional and Community Affairs	200	xxx	104	xxx
Political Science	51	66	79	592
Economics	105	28	305	343
Psychology	0	46	504	518
Anthropology	30	85	351	588
Public Health	xxx	152	xxx	348

CHAPTER 5

EXTENSION COMMUNICATION: A MORE DEFINITIVE LOOK

Communication of science based information to users is the primary means through which educational outreach of information occurs. Indeed, for a university to operate as a macrosystem of scientific information development and flow, some faculty must become involved in this type of educational outreach work. In the land grant university setting such outreach work is known as extension.

Although the extension function became an official charge of land grant universities in 1914 with the Smith-Lever Act, this mandate applied only to the faculties in the agricultural colleges. Not until the mid-century was the extension function added to other departments and divisions of these universities.

In most other countries, the extension activity is attached to government departments or agencies. Some are also charged with the responsibility for delivering goods and services and some are restricted to agriculture. Universities in these countries, which tended to remain mainly teaching institutions dedicated to academic excellence, were generally only peripherally concerned with extending knowledge and services to the public. Whatever research undertaken tended to be oriented to extending the frontiers of basic science knowledge and status achievement of the faculty. Of the two Taiwan campuses only one had an experimental extension program in which only a few faculty were officially involved. Even so the faculty on both campuses were relatively free to decide the audiences to which their communication would be directed.

Even where the extension activity is officially provided for, as on the UMC campus, social scientist may continue to orient their writing and oral communication to academic audiences in preference to non-academic audiences. This chapter was directed to examining the extent to which the social science faculty in the two campus settings directed their communication to extension audiences in contrast to the academic kind and how and why the volume varied among the faculty.

The Choice of Explanatory Variables

The 64 variables included for this purpose are listed in Appendix A. The rationale for their selection was discussed in Chapter 2. They were assumed to approximate the order in which a person is ultimately socialized into a university faculty member's way of thinking and acting. Operating first in order of time in the socializing sequence were the background influences from which the faculty members came. Included were such variables as age, years of schooling, geographic region of longest childhood residence, whether childhood was spent mostly in cities, small towns, or on farms, and whether faculty members perceived themselves as being from an economically and socially disadvantaged group.

Next came the socializing experiences of college and prior employment. Even though the undergraduate socializing experiences of college life were surely important, the emphasis here was mostly on

graduate school experiences, e.g., kind of extra-curricular activities in which the faculty engaged as graduate students, whether they did applied or basic research, whether they published from this research, previous employment experience, and the kind of institution from which they obtained their advanced degrees.

The conditions of appointment category included such variables as academic rank; whether appointment provided for doing research; teaching and/or extension work, receipt of research funds, if any; present salary, professional income from other sources; allocation of time to various university activities; and the organizational constraints under which the faculty were expected to work.

Perceptual variables, which are the product of both anticipatory and "on job" socialization included:

1. How much a faculty member thought a university should be involved in activities arrayed along a theory to practice continuum.
2. What each thought he himself should do.
3. Own orientation to university activities.
4. Satisfaction and/or other rewards derived from engaging in various types of university related activities.
5. Perceived constraints to becoming involved in applied research.

Inclusion of reference group influences was predicated on reference group theory, which holds that one's behavior, thoughts, and feelings are influenced by groups thought to be important to self and to which one thinks one would defer (Shibutani, 1968; Eisenstadt, 1968). Although, again, not exhaustive, those within and outside of academia to which the faculty frequently alluded in exploratory interviews, were included in the listing. In general, these were classified as within and outside of academia.

The authors initially assumed these six categories of variables would constitute a reasonably adequate base for explaining variance in the volume of extension communication that occurred.

The Choice of Appropriate Statistical Techniques

The procedure for describing the relative distribution of academic and extension communication output of the faculty on the two campuses was merely a matter of computing and reporting of simple percentages. However, explaining communication output was complicated by the inclusion of 64 diverse independent variables which placed constraints on the kind of statistical technique that would apply. It was also complicated by the badly skewed distribution of extension communication output. The limiting consequence of this for statistical analysis was reduced by the use of logarithmic transformations of the dependent variable (Sonquist, 1970; Pelz and Andrews, 1966). Most of the independent variables were either nominal or at the most ordinal in their measurement, so an analytical technique that would apply equally well to all was needed. Under these conditions, Automatic Interaction Detection (AID) technique seemed to be the most appropriate method of use. It is not only free from such restrictive requirements as additivity, linearity, and normality, but also permits the use of nominal or ordinal data (Sonquist, 1970).

Moreover, AID is an inductive procedure. It focuses on searching for data for an optimal model. The technique, in a sense, empirically simulates the procedure of a good researcher in choosing the variables that increase his power to explain variance in the dependent variable. Even though much of the variance in the dependent variable may be accounted for by variations over part of the total range or by interaction effects within restricted ranges, analysis of variance and regression analysis measure the effects of each predictor over the range of the total sample. They accordingly make assumptions that are often not true. AID, on the other hand, measures the effects of each predictor on each of the subgroups. Furthermore, analysis of variance requires at least one case in each of the sub-cells. This is sometimes a difficult requirement to fulfill in survey research data. These techniques require the researcher to specify his model in advance and assess its utility by statistical inference. The logic followed is thus deductive. These techniques are mainly used to test specific hypotheses. AID III, on the other hand, focuses on searching data for an optimal model. Thus, being basically an inductive procedure, tests of statistical significance are not appropriate and are accordingly not provided in the program.

The authors are aware that many more than the 125 cases on the UMC campus and the 103 cases on the Taiwan campuses are needed for making predictions from AID analyses, but here we are dealing with total department faculty in each case, minus less than 10 percent attrition. So whatever divisions occur in the splitting process are real.

AID is a step-wise procedure. The program, through a series of binary splits, breaks the sample into mutually exclusive subgroups. Dichotomous splits on a single variable are made at the point where most variance in the dependent variable is explained. Thus, predictors which affect large portions of the sample tend to appear early in the AID analysis.

When investigators apply AID analysis first to all of the variable categories as we have done, judgments can be made about the comparative amount of variance explained by each. From the resulting graphic representations, referred to as AID trees, it is possible to observe the order in which and on what variable each of the splits occurred. The first always occurs on the variable that explains the most variance in the dependent variable and at the point where the variance explained is maximized. The reader can then follow through the graphic trees which diagrammatically illustrate what occurs in the splitting process until points are reached where the computer is instructed to stop. The stopping point in this study was no less than ten in any group and no less than 0.6 percent of the variance explained as a result of any split permitted.

The order in which the splits occur is indicated by the group numbers. Thus, group 1 which includes all of the faculty involved in each case, is split into groups 2 and 3. Then a search is made for the variable in each of the two groups that explains the most remaining variance. The group in which this occurs is split into groups 4 and 5. Again the break is made on the variable and at the point where the variance explained is maximized. Thus, the process continues until it reaches the conditions for stopping.

If the splits tend to be on the same variables on each side of the branches as the splitting process proceeds, a symmetrical tree is formed. This indicates no interaction effects among variables, a condition that seldom occurred in this study. An irregular tree is one that splits on

different variables on each side, perhaps also with abrupt halts on some branches and continued splitting on others. This indicates that variables operate differently for different groups of faculty in explaining extension communication output. The way in which the splitting occurs, the variables involved, and the points at which divisions are made provide the basis for most of the description of the AID trees which follow. A graphic indication of how extension communication varies on the basis of each variable is included for each variable category. These graphs allow the reader to get a quick and easy estimate of how much output varied in each case.

Logarithmic transformations of the dependent variable were used in the AID analysis because of the highly skewed nature of the dependent variable--a condition where a few faculty produced a lot, and most produced little or none. However, since means and standard deviations derived from the logarithmic measure give the reader little idea of the actual communicative output of the faculty in the various groups, these statistics were also computed in terms of actual man-day output. These are also entered with logarithmic means and standard deviations for each group in the AID trees. However, these must be taken only as a rough indicator. Because of the skewed nature of the communications measure, the graphic representations of median extension output categories of persons within variable types provide a more accurate indicator of comparative output.

For those who care to pursue the analysis further, there are conclusions that may be drawn from the intercorrelations of variables that did not appear in the splitting process, but were highly related to others that did. In such cases, potentially powerful variables may have been eliminated in the competition simply because they explained slightly less variance than the variable with which they were correlated and upon which the split occurred. There is also the ability of certain variables to persist as explainers through the whole splitting process, meaning that they operate quite independently of all others, but do not explain quite enough variance to be selected as a basis for any of the splits.

However, except for highly salient qualities of the kind which the authors think ought to be brought to the reader's attention, further examination of these matters will be left to the reader. This can be done by examining the AID output tables in Appendix C. These show how the variance explained by each variable in the AID analysis is affected when the influence of the most highly correlated one is removed at each step in the splitting process.

Attention is first directed to the UMC campus social science faculty and then to those in the Taiwan campus setting, with comparisons and contrasts noted. In each case, the AID tree results are first examined. Occasional reference is made to graphic representations of median figures for the total faculty for variables abstracted as most salient in the AID analysis. Finally, analysis of variance is used on most salient variables across categories to determine the degree to which they operated independently or in interaction with the other variables in explaining extension communication output.

Research Findings

The UMC Faculty

As noted earlier, the distribution of extension communication output among the faculty members was extremely skewed on both the UMC campus and

the Taiwan campuses. At UMC, communication output ranged from a low of none (for 23 of the faculty) to a high of 1836 man-days for one person. Almost half of the total extension communication output (49.1 percent) was produced by only 10.4 percent of the faculty members. Only 24 percent produced three-fourths (74.8 percent) of the extension communication output of the social sciences faculty on the Columbia campus. The man-day mean for the Columbia campus was 235.6.

From Table 19 it is apparent that what the faculty had come to believe (perceptual variables) affected their extension communication more than any variable category related to becoming a faculty member or to their official conditions of their appointment.

Yet, as both the logic of the situation and the figures on amount of variance explained indicated, the variables were not discrete. Clearly, background and prior socialization contributed to own perception of the appropriate role of a faculty member. Also, conditions of appointment probably acted in a selective manner. Those who had certain kinds of inclinations tended to select positions compatible with own view of appropriate faculty roles and once employed, to become further socialized into position expectations. This type of interrelationship is indicated by the variance explained by each of the six categories of variables adding to much more than 100 percent. The attempt to address this interrelationship by an AID analysis of key variables across categories explained no more variance than the perceptual category. This further indicated the prime importance of the perceptual category.

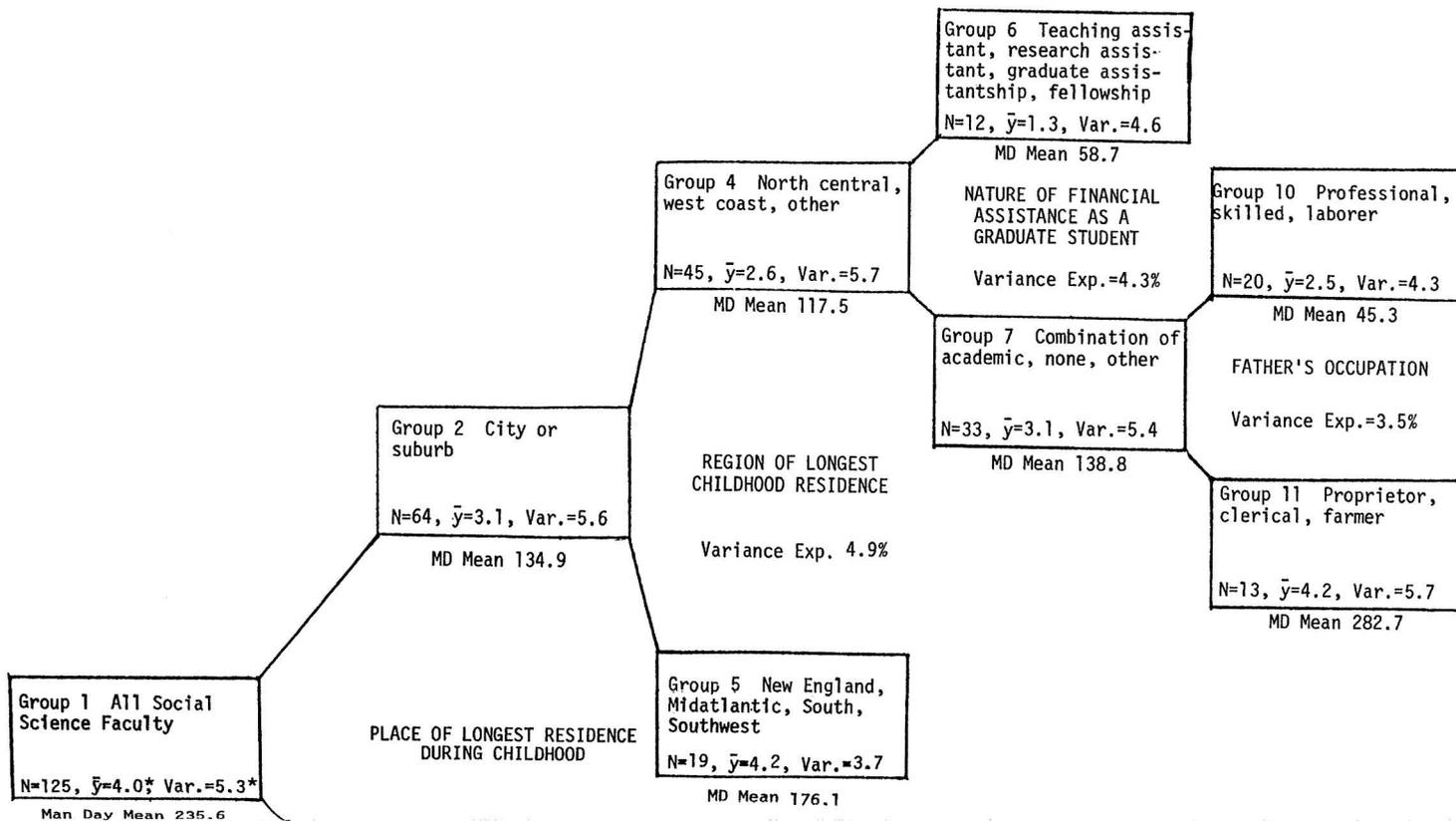
Background Variables. This was the only category in which all variables included appeared in the splitting process (see Figure 7 and Appendix Table 2). Of these, geographic place of longest childhood residence took precedence over all others in explaining extension communication. The faculty from small towns, farms, and the open country were the highest producers of extension communication. When prior open country residence was fortified by age 40 or over (Group 9) and prior residence in regions other than the Northeast (Group 13), extension productivity was further enhanced. For the younger faculty members, who must be concerned with achieving status in own academic discipline, there are much better ways of gaining peer and administrative recognition than writing for or otherwise serving extension audiences.

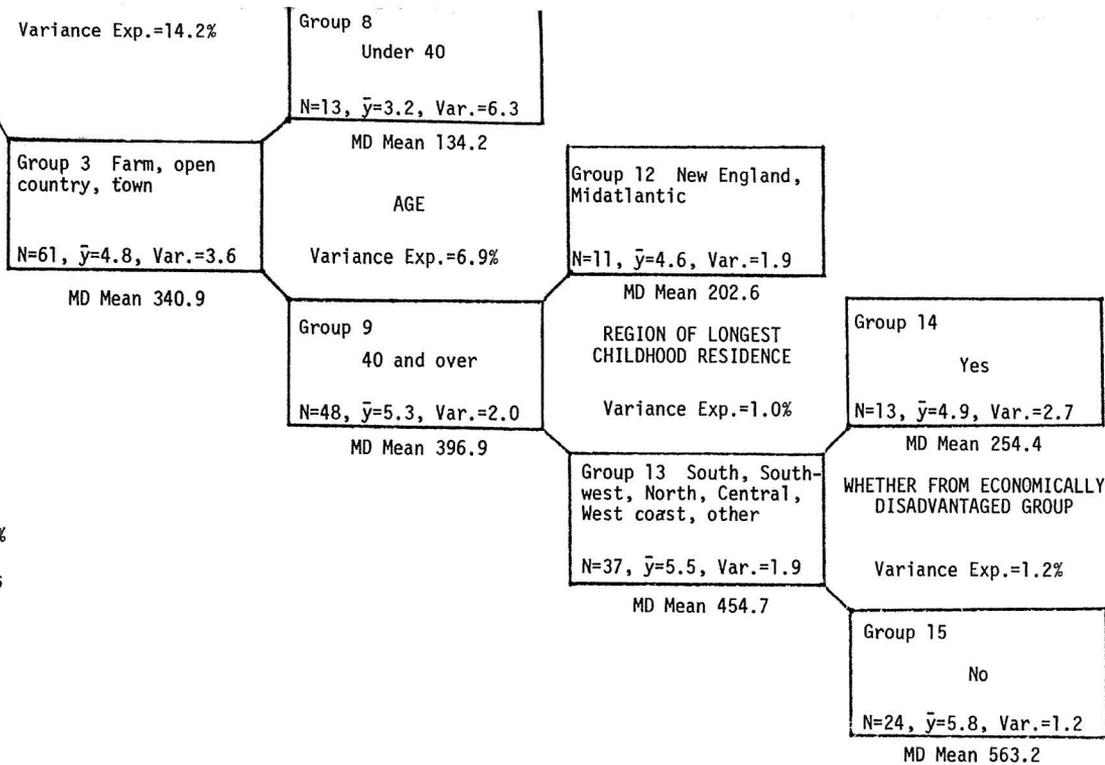
Insofar as judgment can be made about the influence of being from an economically disadvantaged group, the conclusion would be that it is something that one could best be without. Although not a prime consideration in and of itself, when combined with a series of other influences conducive to high extension communication (being from the South or Central U.S., the open country and over 40 years of age), its influence was negative (Group 14).

On the side of the lower producers, who were first of all from urban and suburban areas, being from the North Central and West Coast sections of the country detracted from productivity (Group 4). Receipt of the less elitist (non-academic) kinds of assistance during graduate study (Group 7), enhanced productivity. But the specific way in which kinds of employment, teaching, research, and graduate assistantships and fellowships combined in the group 6 and 7 break made the relationship of the kind of support for graduate study on extension communication obscure. In a break which followed, the positive influence of business and farm related experience was evident (Group 11).

TABLE 19. VARIANCE IN EXTENSION COMMUNICATION OF THE UMC
SOCIAL SCIENCE FACULTY EXPLAINED BY VARIABLE
CATEGORIES IN THE AID ANALYSIS

Variable Category	Variance Explained (%)
Background Characteristics	36.0
Prior Socialization Experiences	31.2
Conditions of Appointment	38.5
Perceptual Variables	56.7
Reference Group Influence	32.4
Prospects for Professional Advancement vs. Personal Satisfaction as a Reward	28.9
Variable Mix of Salient Predictors across Categories	55.5





TOTAL VARIANCE EXPLAINED = 36.0%

*Logarithmic means and variances

Figure 7. Man-day extension communication output of the social science faculty on the UMC campus by background characteristics.

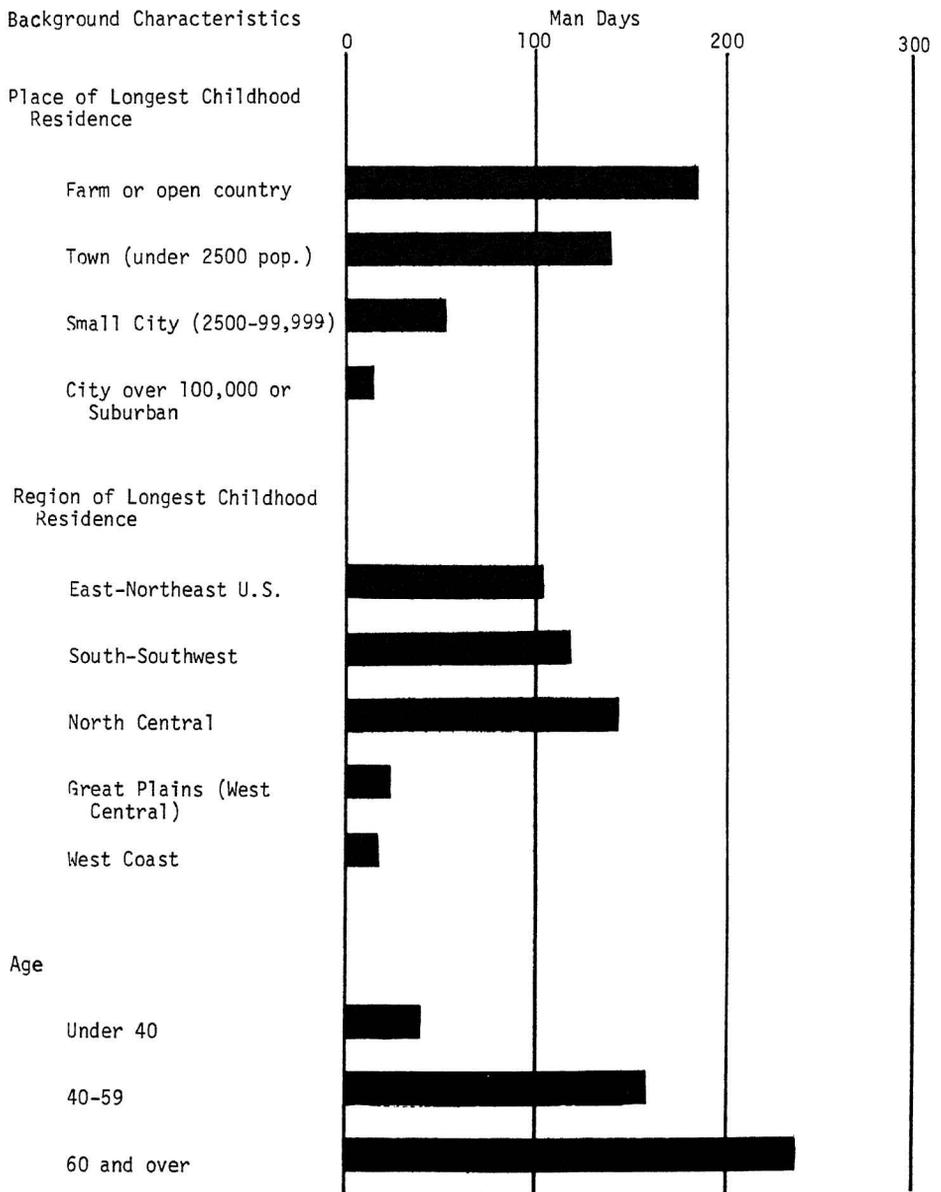


Figure 8. Median man-day extension communication output of the social science faculty on the UMC campus (USA) by selected-background characteristics.

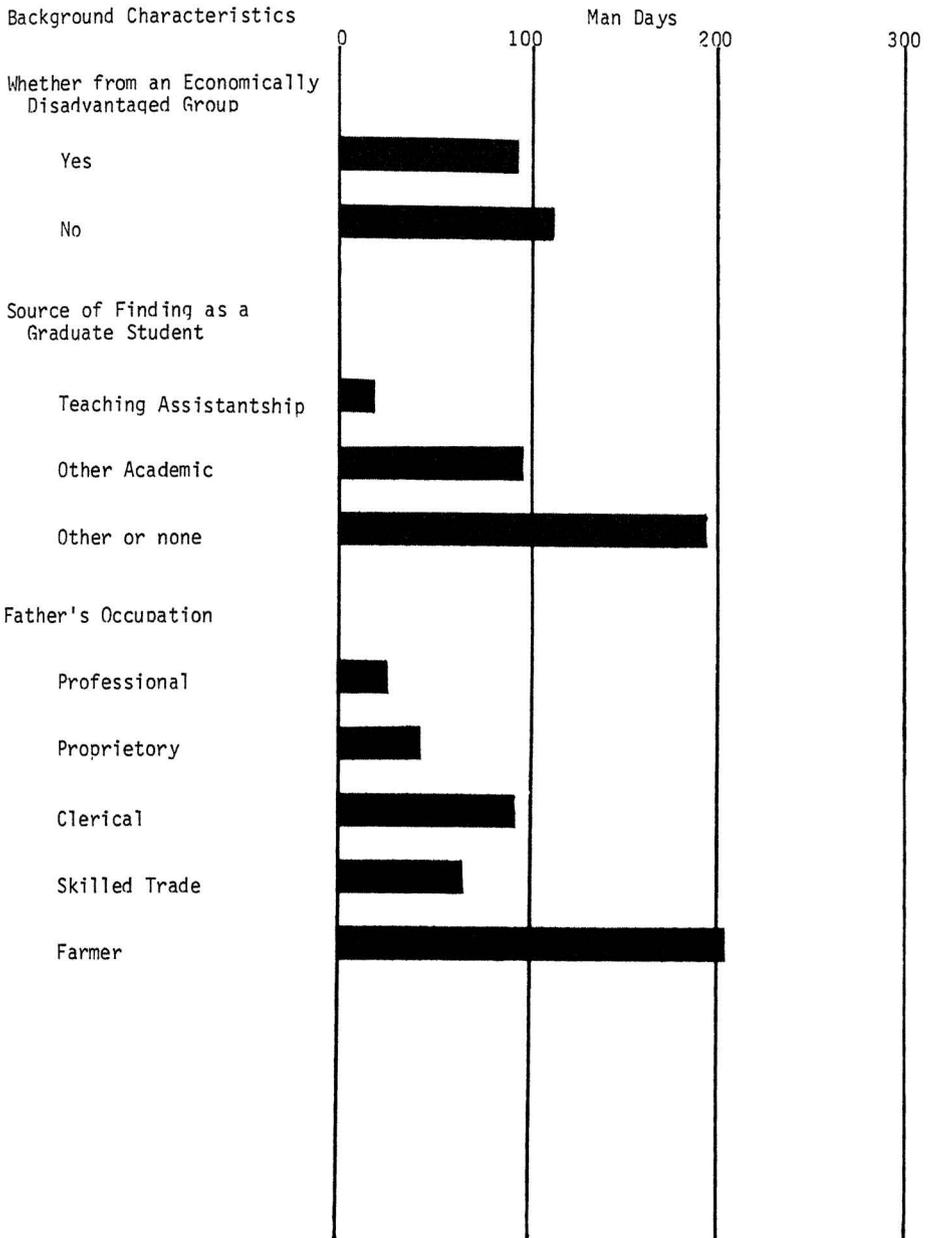


Figure 8. (continued)

Prior Socialization Variables

These were mostly from the period of graduate training in the university setting. They included such things as participation in extra-curricular activities during graduate study, involvement in applied and basic research, type of university from which the Ph.D. was obtained, and previous occupational experience. Appendix Table 3 and Figure 9 indicate that not all variables were directly involved. How those that failed to appear were related to those that did was also significant.

Included in the total list of variables were a series of activities in which the faculty participated as a graduate student. These included social reform, protest, church, political, and social welfare activities. From this category and in competition with 10 variables, whether the faculty member had participated in church work as a graduate student was the one in first order priority in the splitting process. When this type of socializing experience and/or personality orientation was fortified by the kind of people exposure that comes from prior employment, either academic or other, extension communication output was greatly enhanced (Group 13).

The next split, which pertained to where the Ph.D. degree was obtained, must be regarded as highly tenuous. This occurred between private and land grant universities on the low productivity side (Group 14) and other state universities, plus no Ph.D. on the higher productivity side (Group 15). The last had the highest extension communication output of any group. It may well be that the Ph.D. degree is a deterrent to extension communication for some. The result may also reflect a lingering belief that the Ph.D. degree is less necessary for extension work than for teaching and research. The prior socializing variable sequence for support of highest extension communication output was participation in church work as a graduate student, prior employment, either academic or non-academic, and a Ph.D. degree from other than a land grant university or no Ph.D.

On the lower productivity side (Group 2) involving the faculty who did not participate in church work as graduate students, having obtained a Ph.D. degree from a land grant university and failure to publish applied research findings as a graduate student enhanced productivity (Group 9). Having done applied research as a graduate student was a strong supportive factor among those who were not otherwise predisposed to high extension communication (Group 11). But on the whole, man-day output was much lower for those who "didn't participate in church work" than for those who did participate.

Conditions of Appointment

Since the variables had to do with conditions of appointment, whether or not the faculty member's appointment prescribed doing extension work was logically of first order importance (see Figure 11 and Appendix Table 4). For appointments that did, this appeared to be a sufficient condition for high productivity. Faculty with such appointments produced much more than those in any of the subgroups who did not have such an appointment. Yet, some who didn't have an extension appointment were substantial producers. It was with this group that other conditions of appointment interacted to enhance output. Receipt of additional income from professional sources other than salary was a factor of next order importance. Those with over \$500 extra income (Group 5) produced more than those with less extra income. On the "more side" an additional increment occurred with a base salary of \$20,000 and over

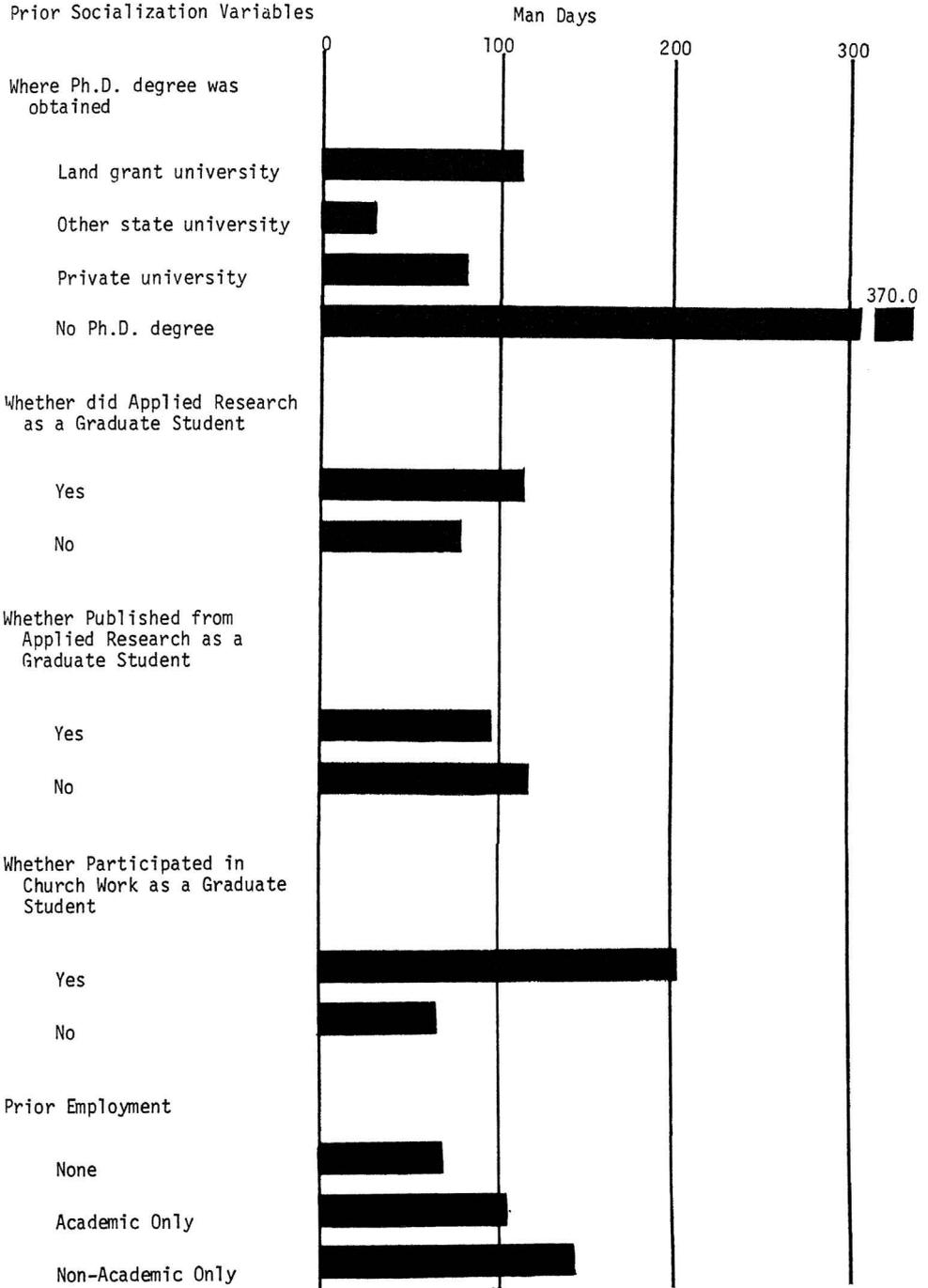
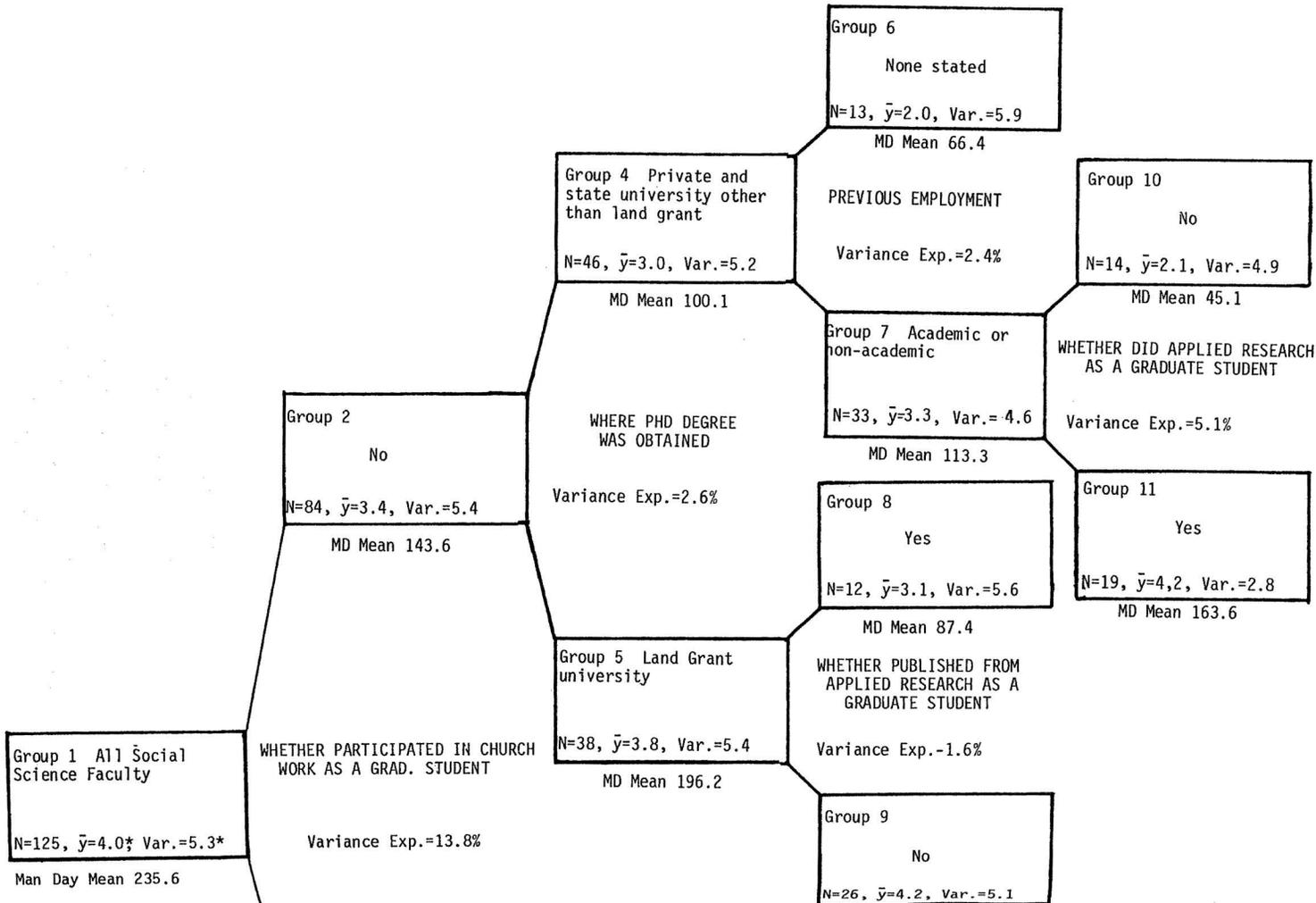


Figure 9. Median man-day extension communication output of the social science faculty on the UMC campus by selected prior socialization variables.



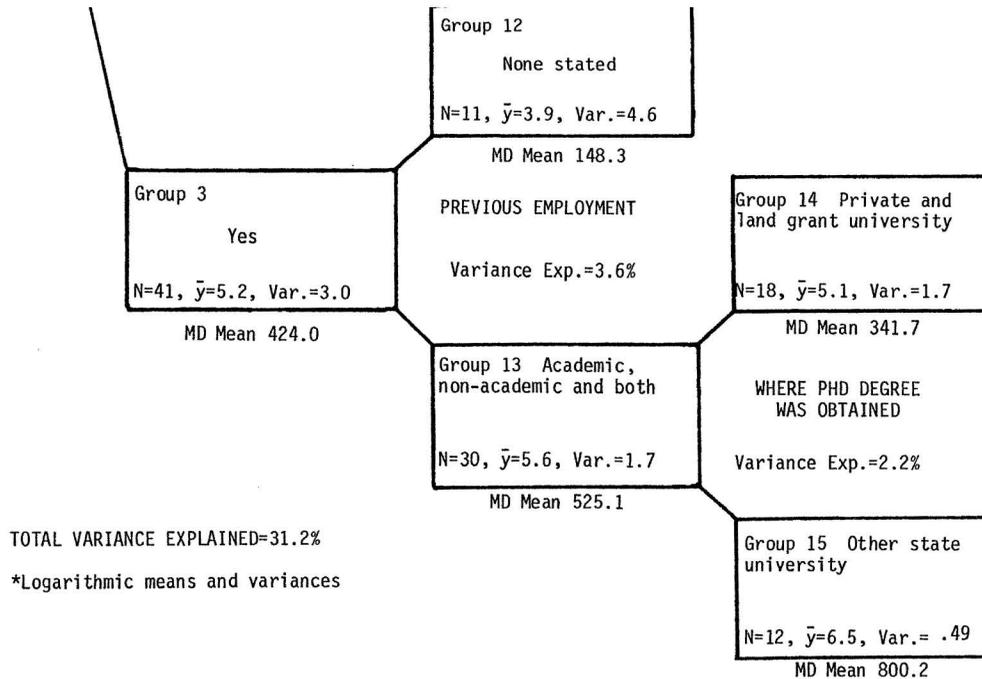
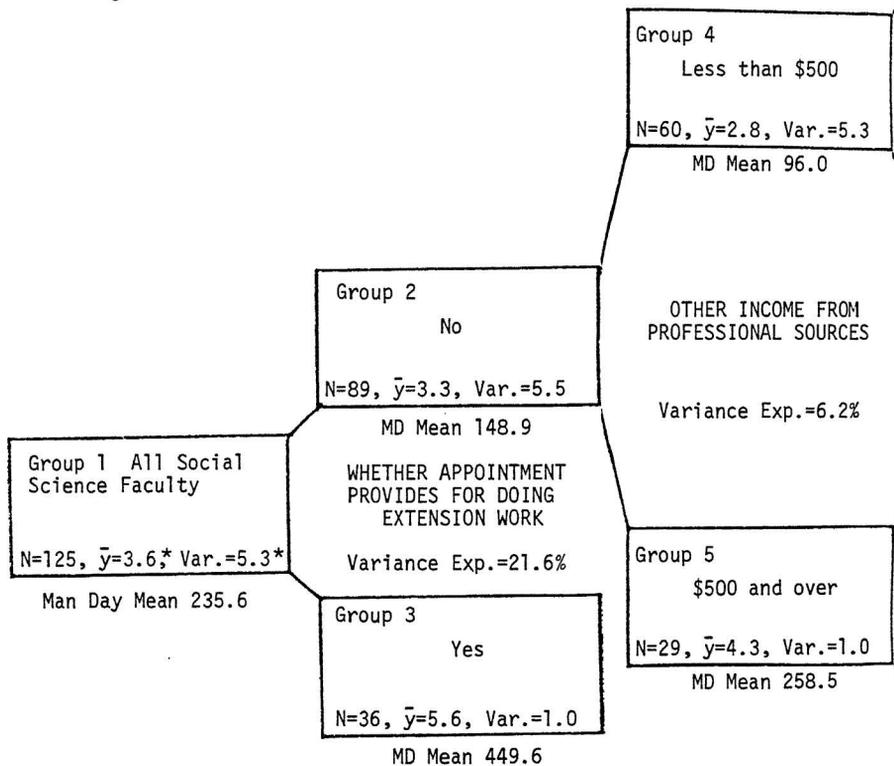


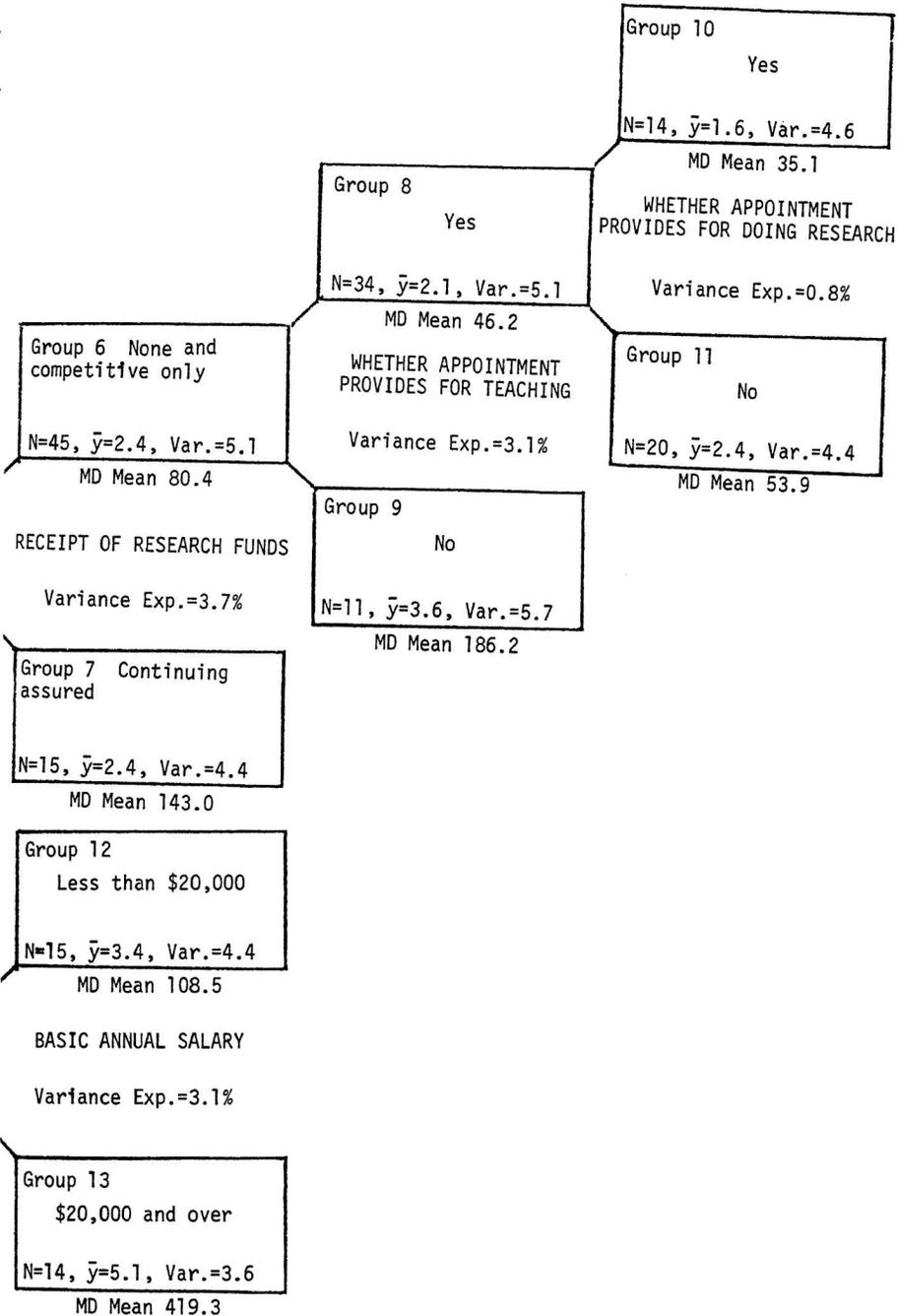
Figure 10. Man-day extension communication output of the social science faculty on the UMC campus by prior socialization experiences.

Figure 11. Median man-day extension communication output of the social science faculty on the UMC campus (USA) by selected conditions of appointment variables.

TOTAL VARIANCE EXPLAINED = 38.5%

*Logarithmic means and variances





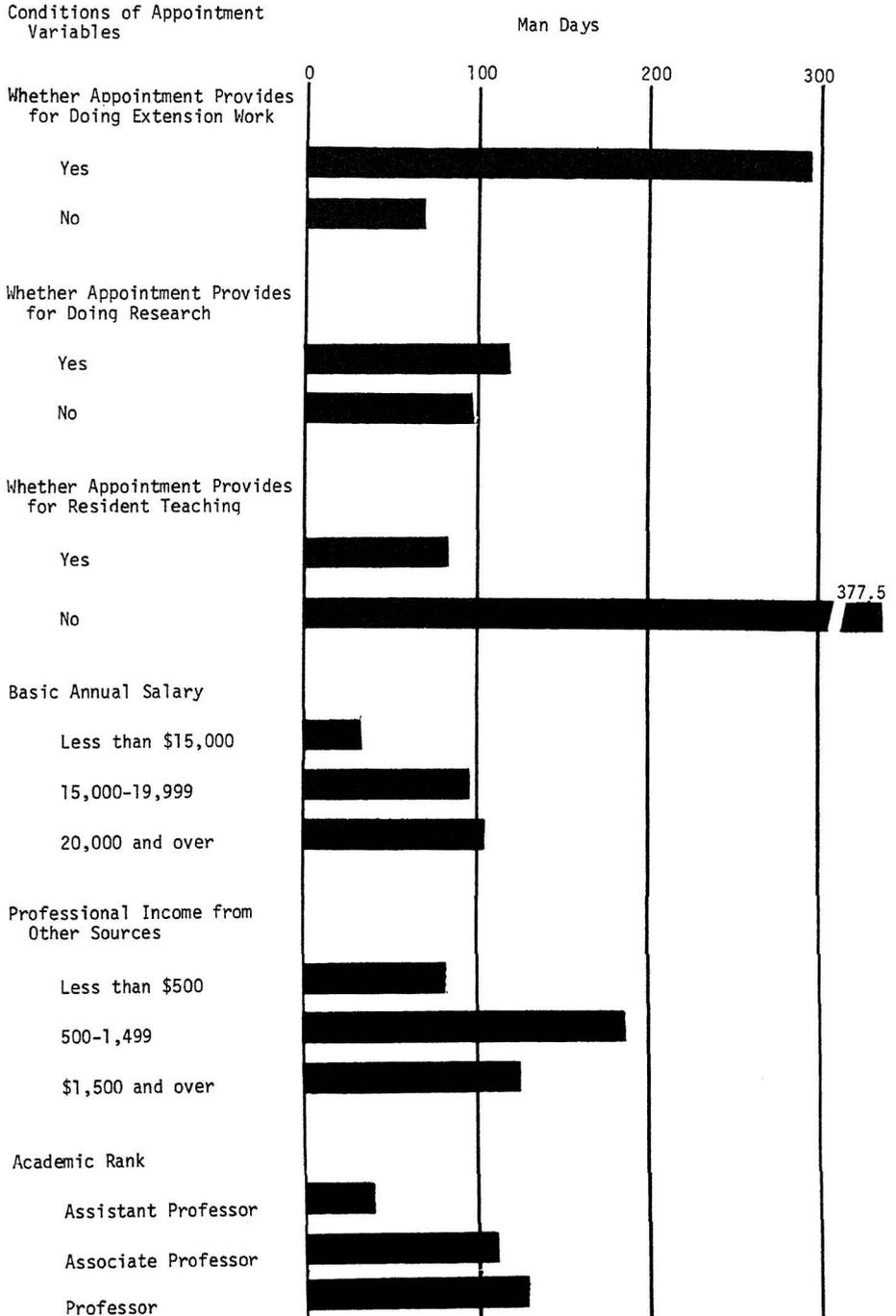


Figure 12. Man-day extension communication output of the social science faculty on the UMC campus by conditions of appointment.

(Group 13). Their level of productivity was almost as high as those who had extension appointments. Thus, money was very much involved in the high producing faculty without extension appointments.

For those with no extension appointment and low extra income (less than \$500), receipt of research funds enhanced extension communication slightly (Group 7), but a teaching appointment in particular had a depressing effect (Group 8). The group 10-11 split seems to indicate an additional depressing effect when a research appointment was added. Certainly with both of these responsibilities officially pursued, a faculty member would have little time left for extension. Apparently when resident teaching and research are in competition with extension work, the extension gets short changed." Research and teaching assignments combined with low outside professional income and absence of a formal extension appointment produced the lowest extension communication of any subgroup (Group 10).

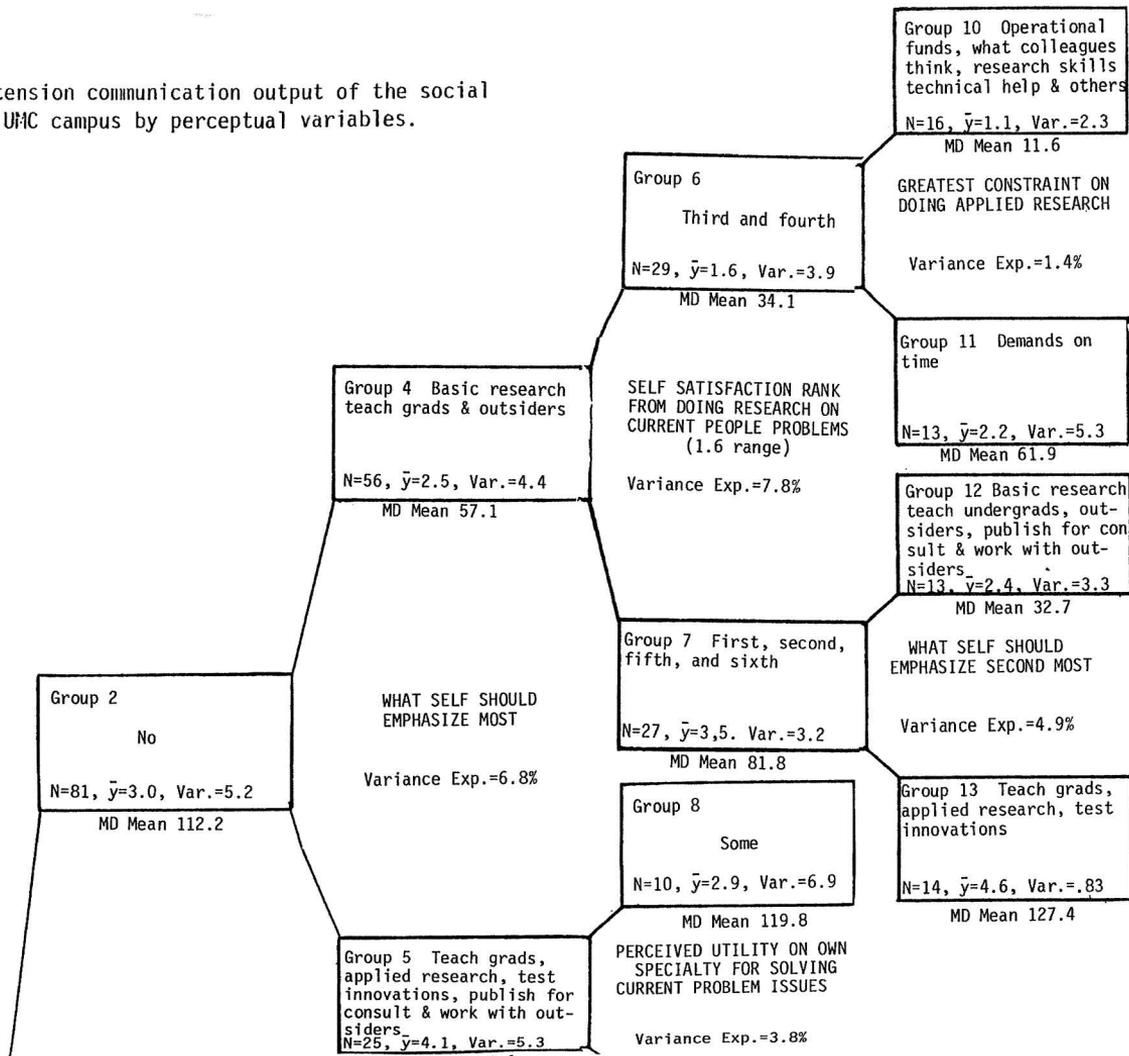
Perceptual Variables

W. I. Thomas (1918:68) long ago insisted that a social situation is basically what a person perceives it to be, and that this may in fact have more to do with how one feels, thinks and acts than what the situation actually is. This proposition provided the basis for selecting the perceptual variables to help explain extension communication variance and indeed why this aggregate explained more of the variance in the dependent variable (56.7 percent) than any other (see Figure 13 and Appendix Table 5). Perceptual variables in a social system as diverse as a university are indeed voluminous and restricted only by the ability of the researchers to conceptualize what they are and adequately measure them. Thus, more were included in this category than in any other. In general, they include how much the faculty thought a university should be involved in activities arranged along a theory-to-practice continuum (see Figure 1), what they thought they themselves should emphasize most and second most, the relative amount of personal satisfaction and/or professional recognition they thought they received from doing each type of activity, whether they thought various activities in which the faculty engaged were properly rewarded within the university system, how useful they thought their own academic specialty was for understanding and/or solving problem issues of the day, and what they thought were the greatest constraints for doing applied research from which most extension communication content must eventually come.

The perceptual quality of greatest significance in explaining extension communication output, indirectly measured, was whether the faculty perceived themselves as being involved in extension work or not, quite aside from any official appointment to do so.¹

For those perceiving themselves as being involved in extension activities, a major commitment to applied research, testing innovations for local adaptability, publishing for professionals, and/or working with people outside the university (Group 15) was more conducive to high extension communication than a major commitment to either basic research or teaching (Group 14). For those who perceived themselves as being involved in extension and who were highly committed to teaching and basic research, a secondary inclination to activities other than teaching graduate students tended to enhance productivity (Group 17). Such a conclusion, of course, must be regarded as highly tenuous.

Figure 13. Man-day extension communication output of the social science faculty on the UMC campus by perceptual variables.



Group 1 All Social
Science Faculty
N=125, $\bar{y}=4.0\ddagger$, Var.=5.3*
Man Day Mean 235.6

WHETHER FACULTY PERCEIVED
THEMSELVES AS BEING INVOLVED
IN EXTENSION WORK

Variance Exp.=29.7%

Group 9
Much
N=15, $\bar{y}=5.0$, Var.=2.8
MD Mean 312.5

Group 16
Teach grads
N=10, $\bar{y}=4.6$, Var.=1.2
MD Mean 176.4

Group 14 Basic research,
teach grads, undergrads,
& outsiders
N=21, $\bar{y}=5.2$, Var.=1.2
MD Mean 288.9

WHAT UNIVERSITY SHOULD
EMPHASIZE SECOND MOST

Variance Exp.=1.0%

Group 17 Basic re-
search, teach undergrad
outsiders, publish for,
consult & work with out-
siders
N=11, $\bar{y}=5.7$, Var.=.64
MD Mean 391.3

Group 3
Yes
N=44, $\bar{y}=5.7$, Var.=1.2
MD Mean 463.1

WHAT SELF SHOULD
EMPHASIZE MOST

Variance Exp.=1.2%

Group 15 Applied re-
search, test innovations
publish for, consult &
work with outsiders
N=23, $\bar{y}=6.1$, Var.=.80
MD Mean 622.1

TOTAL VARIANCE EXPLAINED=56.7%

*Logarithmic means and variances

Most of the splitting occurred among the 81 faculty who did not regard themselves as being involved in extension work (Group 2), but some were substantial contributors to extension communication output, nevertheless.

Of this group, the faculty who tended to emphasize teaching, applied research and/or publication for or consultation with clients outside of academia (Group 5) tended to be the higher producers when they also saw their academic specialty as having high utility for solving current problems of society (Group 9). For those mostly oriented to basic research and/or teaching graduate students (in and outside own academic discipline) (Group 4) either very high or very low self satisfaction from doing research on current problems enhanced extension communication productivity indicating two kinds of orientation in the Group 7 situation. Apparently, part of the group were more inclined to basic science research and teaching and the others were motivated by involvement in applied concerns, as indicated in the group 12-13 split. However, with only 27 cases involved, this observation must be regarded as tenuous.

Among those regarding the extension reward question not particularly relevant to them, who also had a strong orientation to graduate teaching and basic research, and who found moderate satisfaction from research on current problems (Group 6), the time constraint on doing applied research was less of a deterrent to extension communication than other constraints (Group 11). In other words, people tend to do what they are highly committed to doing.

In general, emphasis on outreach activities for clientele outside of the university (Groups 5 over 4) over basic research and teaching were conducive to high extension communication output.

It is also important to take note of variables that did not emerge in the splitting process (see Appendix Table 5). These included prospects for professional advancement and anticipated satisfactions from a variety of professional activities arrayed along a theory-to-practice continuum. The most notable result, however, was the failure of faculty type to emerge as a key explanatory factor. This conclusion arises from the relative importance that each faculty member assigned to 72 views, classified by activities in which faculty members usually become engaged on one dimension and a theory to practice level appropriate to university functions on the other.

These types were described in detail in Chapter 4. Briefly, they were:

1. Academic Elites who were highly oriented to unhampered pursuit of academic truth and showed a secondary acceptance of land grant university concepts mostly at the theoretical abstract level of knowledge production;
2. Society Servants who emphasized a "down to earth," "here and now" orientation to teaching and research, but nevertheless were reluctant to lower standards or to defer to the needs of the economically disadvantaged elements of society. For them, meritocracy concerns generally prevailed over the humanitarian;
3. Land Grant University Traditionalizers. Although these people, like the type ones, emphasized relatively unrestrained research to build a knowledge base from which to draw practical information and favored organizing a university for making this possible, their views were more in line with land grant university thinking 30 years ago than now.

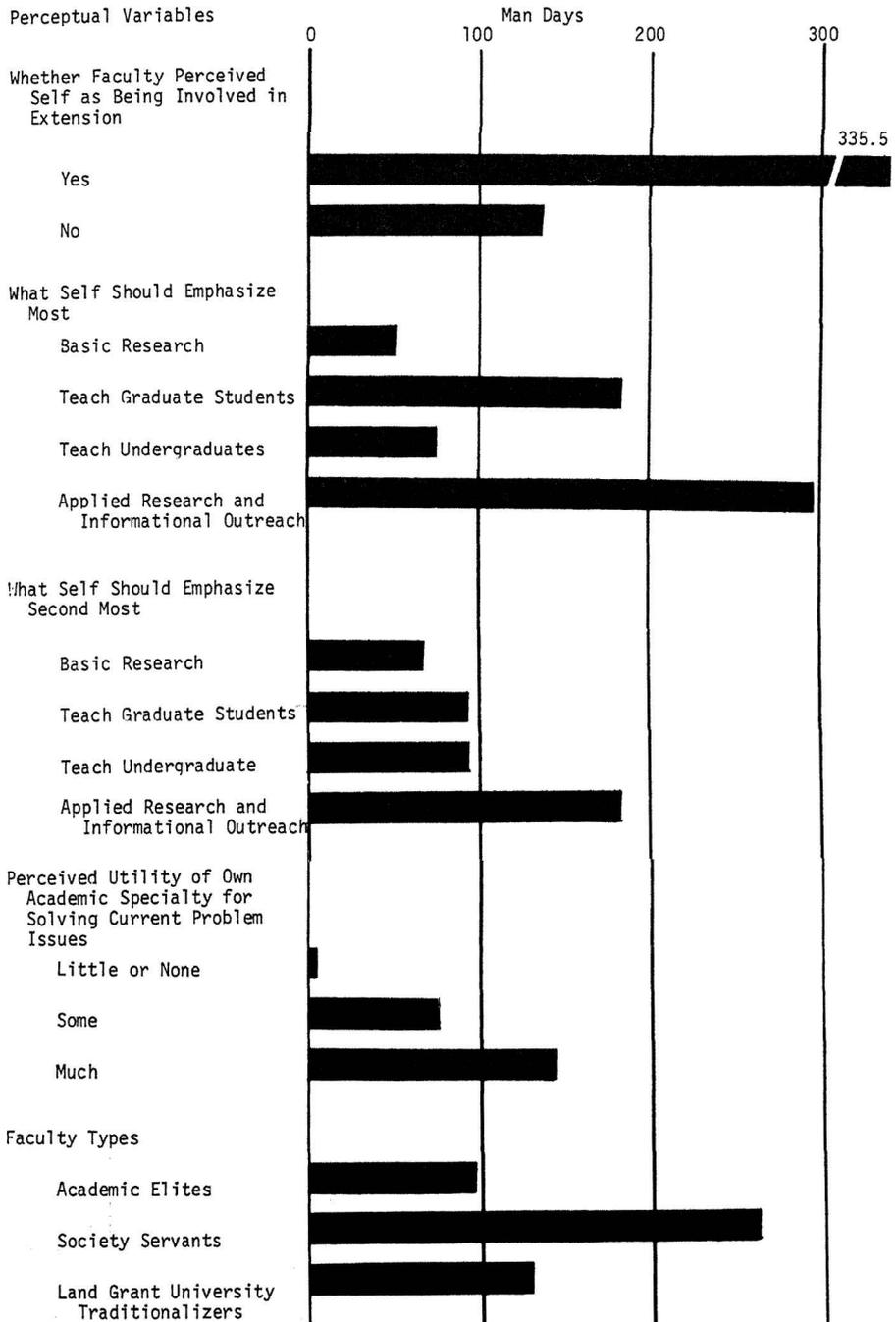


Figure 14. Median man-day extension communication output of the social science faculty on the UMC campus (USA) by selected perceptual variables.

Although faculty type was never a strong contender in any combination of variables for a split in the AID analysis, several conditions that should be noted. First a "no less than 10 persons" constraint was imposed on the analysis. With 104 of the faculty classified as Academic Elites, appearance of faculty type in the splitting process was almost precluded. Second, when the influence of what the faculty thought they should emphasize most was removed in early splits the variance explained by the faculty type was greatly reduced (see Appendix Table 5). The question requiring respondents to indicate which of 9 activities they as faculty members should emphasize most explained more of the variance than the more comprehensive faculty typology. A third matter of importance was that man-day extension communication was much higher for society servants than for academic elites, who were lowest. Land grant traditionalizers were in between (see Figure 14).

Reference Group Influence

People tend to identify with certain groups, both actively and perceptually. The ones included in this study were:

1. Colleagues
 - in own department
 - in own academic discipline
 - in the university system
 - in government and industry
2. Students - undergraduates and graduates
3. Professionals in action agencies
4. Funding agencies
5. University administration
6. The general public.

Each faculty member was asked to indicate how much (none, little, some, much, very much) influence he thought each had on his own work and thinking as a faculty member. This provided the basis for relating perceived reference group influence as independent variables to amount of extension communication by use of the AID analysis. Since this is a subject of more extended analysis and writing elsewhere, we note only the more salient findings here (Lionberger and Reddy, 1976).

Of first priority was perceived influence from colleagues in government and industry (see Figure 15 and Appendix Table 6). Those who perceived no influence from this reference group were very low producers.

The next split occurred on how much the faculty thought they were influenced by academic colleagues (Groups 4 and 5) (see Appendix Table 6). For a contingent of faculty who were weakly influenced by academia, an additional strong influence from the public greatly enhanced extension productivity (Group 13). For those little influenced by the public, some influence from the administration was associated with greatly enhanced output (Group 15). For those who were strongly influenced by academic colleagues, a sequence of breaks occurred in support of a position that extension communication tends to be low in the absence of strong reference group influences outside of academia. The group 6 and 7 split on influence

from professionals and the university administration split involving groups 10 and 11 show this to be the case. Conversely, strong influence from professionals and the university administration split involving groups 10 and 11 show this to be the case. Conversely, strong influence from undergraduate students, a within-academia influence, was associated with very low productivity (see the group 8-9 split).

Most faculty are keenly aware of own colleagues as referents in what they do as faculty members. This raises the question of what happened to their influence in the AID splitting process. Appendix Table 6 indicates that these were never strong influences in extension communication output. The one time in group 4 when they were a contender as a competing variable, the general public won. As noted, strong influence from the general public was associated with high extension communication productivity. The influence of own departmental colleagues was probably negative. Professionals and agencies that use social science information were strong contenders for the first split on which colleagues in government and industry won.

Rewards for Extension Work

Often repeated charges and perhaps some tangible evidence that extension work in the university is not rewarded commensurate with that of teaching and research, and the continued high extension communication output of some faculty in spite of this, posed the question of appropriate alternative rewards sufficient to sustain high productivity. Enthusiasm about the work they were doing and favorable response from outside reference groups suggested that sheer personal satisfaction from work done may be the answer.

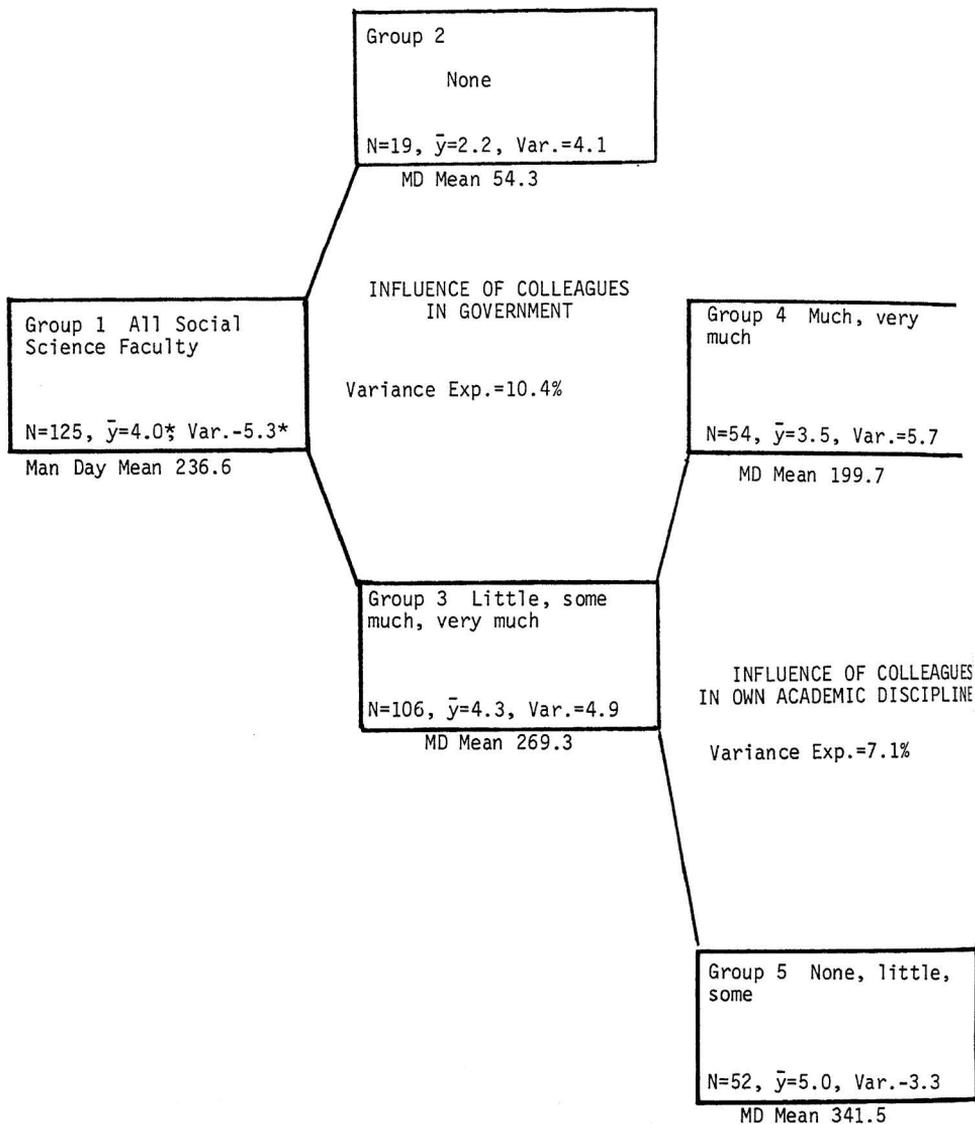
The evidence came from AID analysis of how respondents saw reference groups that were important to them as contributing to their personal advancement versus the groups' contribution to their personal satisfaction. These reference groups were arranged along a theory-to-practice continuum from own academic colleagues to user clienteles. The primary question was which was more important: (a) perceived prospects for professional advancement, or (b) personal satisfaction derived from reference group approval? The source of the approval was secondary. From Figure 17 it is apparent that satisfaction took precedence over prospects for professional advancement as an explanatory variable and second, that approval from reference groups outside of academia was the source of most of the satisfaction.

The Cross-Category Mix Variable

Finally, we wanted to examine how important variables from each category of independent variables would combine and interact when allowed to operate in an AID analysis. The first step was to identify major variables from each category. The general selection criterion used was that a variable must have explained 5 percent or more of the variance in the dependent variable within their respective categories. Exceptions to this criterion were where:

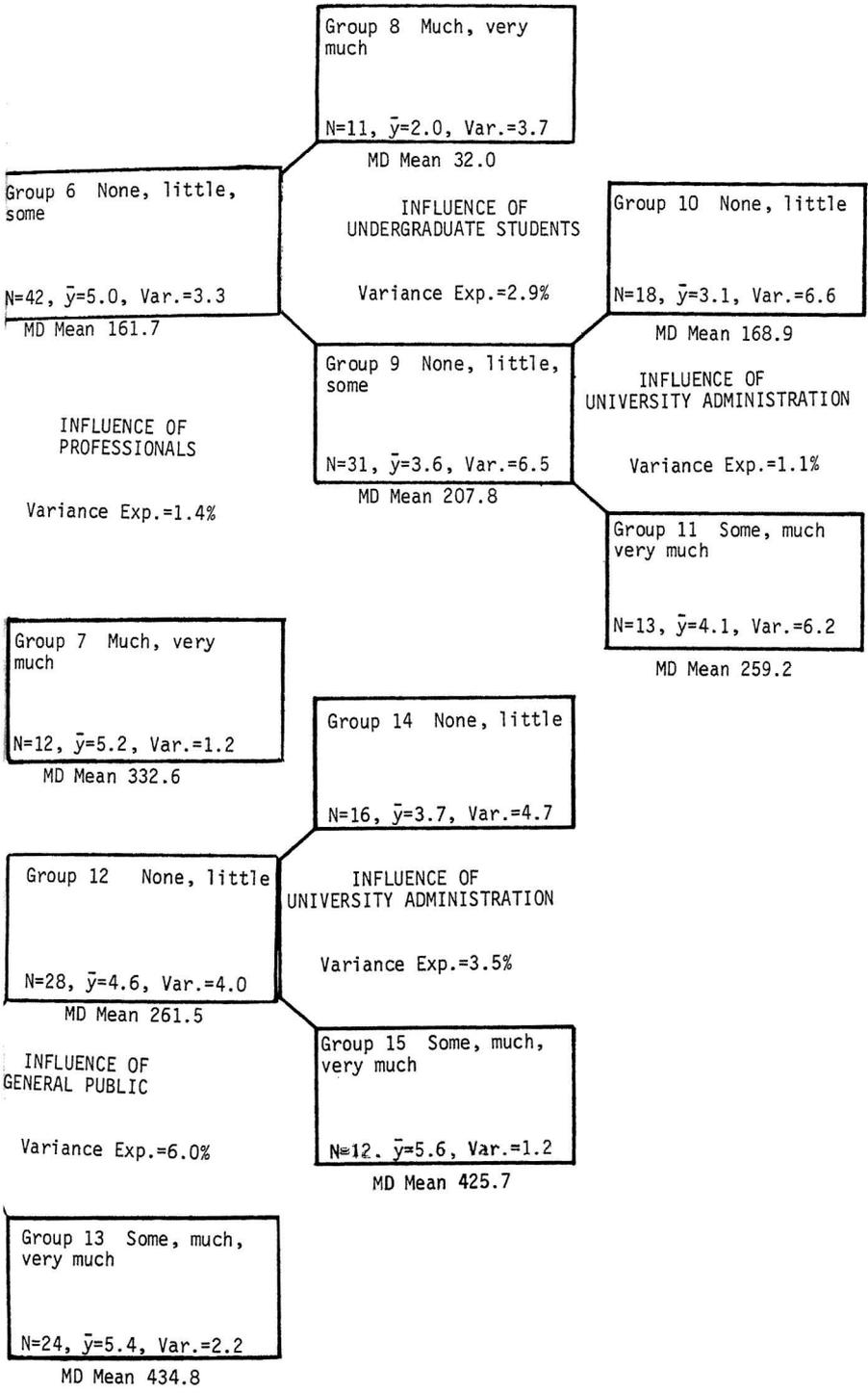
- a. The influence of the variable persisted across most of the splitting process,
- b. Three or four variables from each category could not have otherwise been selected, or

Figure 15. Man-day extension communication output of the social science faculty on the UMC campus by perceived reference group influence on own work.



TOTAL VARIANCE EXPLAINED = 32.4%

*Logarithmic means and variances



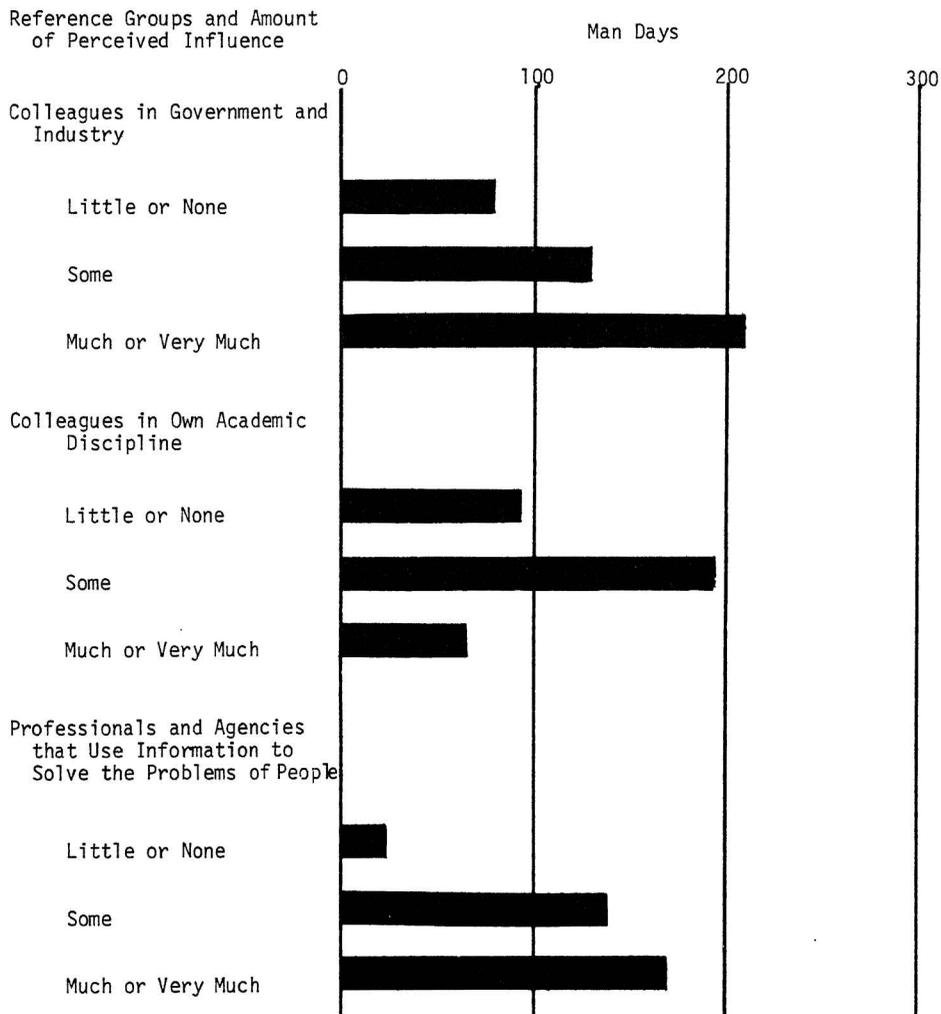


Figure 16. Median man-day extension communication output of the social science faculty on the UMC campus by perceived reference group influence on own work.

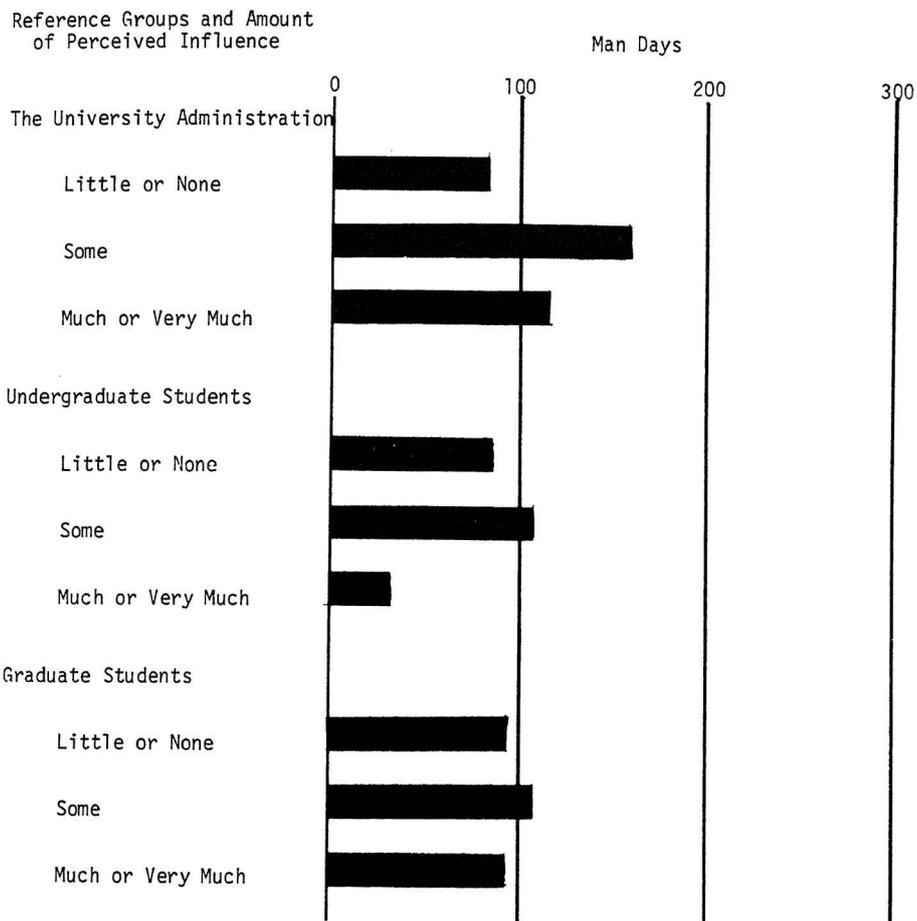


Figure 16. (continued)

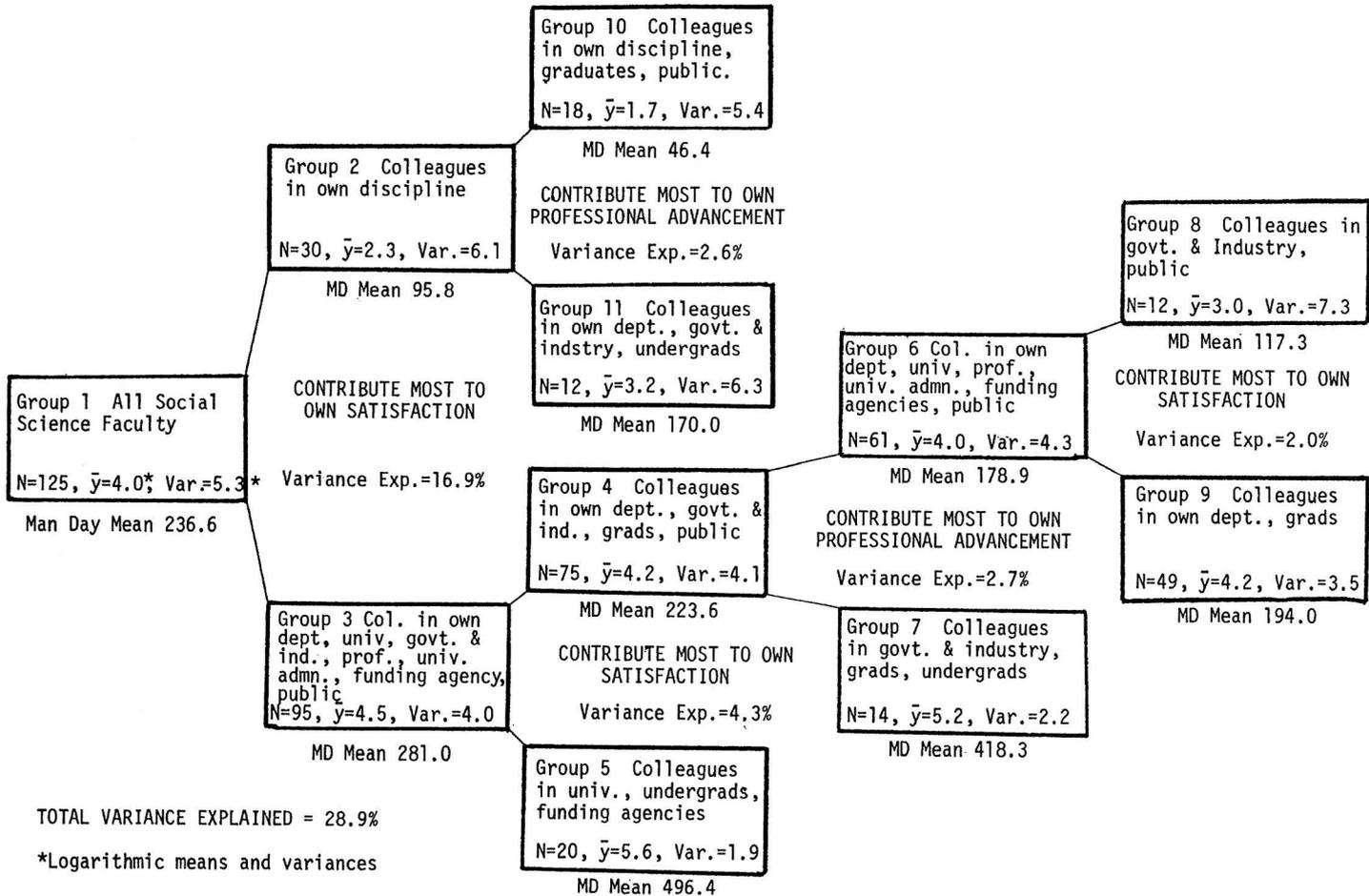


Figure 17. Relative importance of personal satisfaction and prospects for professional advancement from reference groups on the extension communication of the UMC social science faculty.

- c. Where initial strength of a variable was greatly reduced in the first or second split, meaning, of course, that this variable was closely associated with another in the explanatory process.

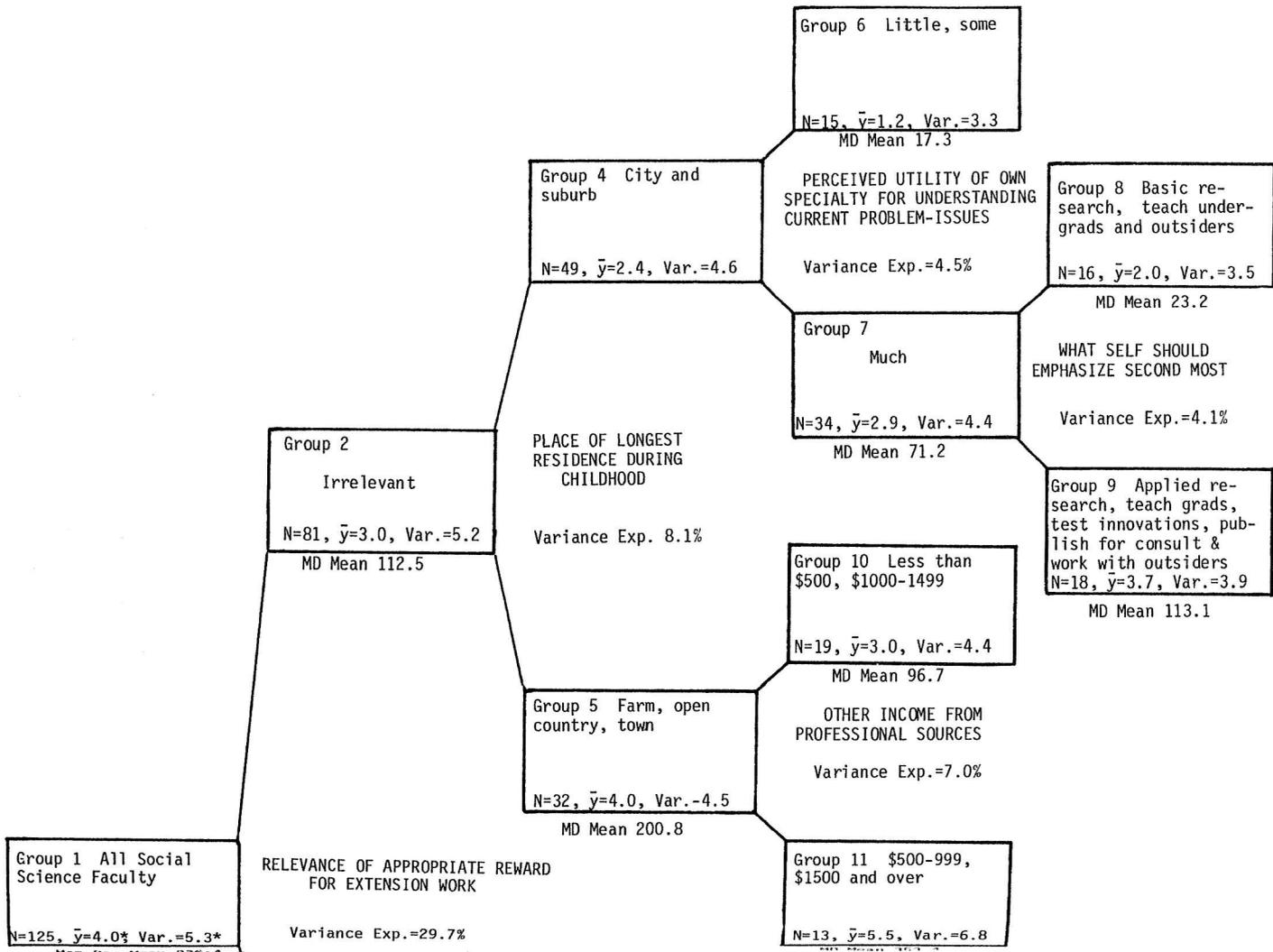
Contrary to expectations, this combination of variables explained less variance than the predominant perceptual aggregate. Comparative figures were 55.5 and 56.7 percent, respectively. Figure 18, which reports the results of the splitting process, shows that the high priority variables were heavily drawn from perceptual and background categories. Surprisingly absent were the variables having to do with a kind of formal appointment in the university or with reference group influence on own work. However, a more definitive answer requires a look at how these variables were related to those that emerged in the splitting process. This can be determined from Appendix Table 7 which shows how variance in extension communication explained by each of the variables changes throughout the analysis.

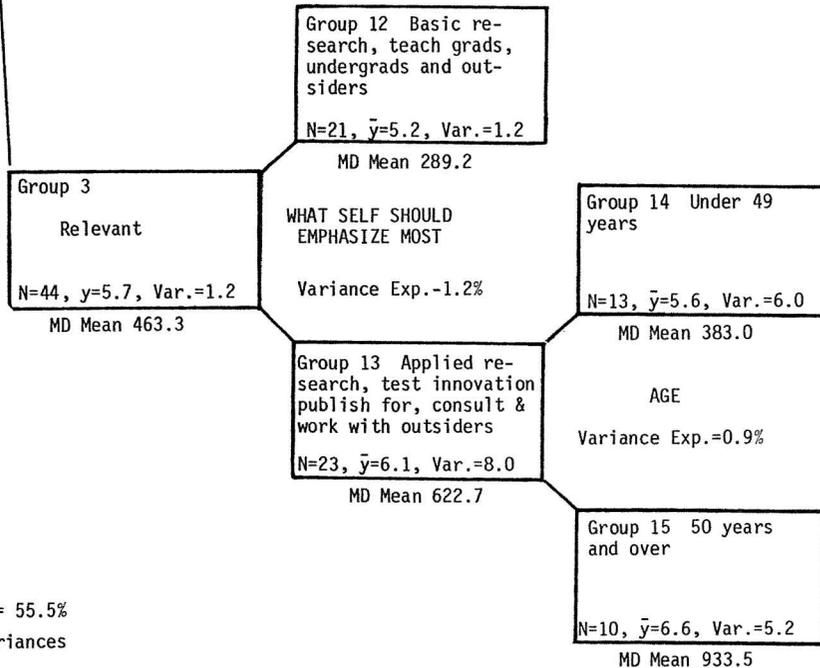
By far the most important variable was the one which distinguished between faculty who regarded themselves as being involved in extension work and those who thought they were not. This was quite aside from whether they had official extension appointments or not. The former, as we have noted, was indicated by the perceived relevancy of the extension reward question, i.e., whether they thought their extension work was properly rewarded or not.

Next in order was another perceptual variable: what a faculty member thought he should emphasize most. Those who thought they should emphasize basic research or teaching most were placed on the lower side of the extension communication break (Group 12). Those who thought they should most emphasize applied research, testing of innovations for local adaptability, or activities directed to providing information services to people outside of the university system were high producers of communication (Group 13). This type of perceived priority and extension work identification, fortified by being 50 years of age and over, was associated with the highest extension communication output of any of the subgroups (Group 15).

Yet on the low side of the first split involving faculty who did not identify with extension work were also contributors to extension communication output (Group 2). For them, place of longest childhood residence took precedence over all other variables. Being from a farm, the open country, or small town was substantially more conducive to a high extension communication (Group 5) than prior city residence (Group 4). For the more highly productive group from the open country-city residence break, having a sizeable professional income from sources other than salary was most significant (Group 11). One might reason that the extra money turned the trick but an alternative explanation would be that being worth more, their services were more in demand in the extension communication marketplace. Extra compensation for consultation is permitted for the faculty with research and teaching appointments but not ordinarily for those with extension appointments. This is part of their regularly assigned responsibilities.

With extension work initially provided only to farmers, for which on-farm experience was required, the rural farm background association with higher extension communication was not surprising. But a personality difference associated with rural-urban differences in the early socialization process cannot be completely ruled out.





TOTAL VARIANCE EXPLAINED = 55.5%

*Logarithmic means and variances

Figure 18. Man-day extension communication output of the social science faculty on the UMC campus by selected structural-background-socialization-perceptual variables.

For the staff with urban backgrounds who additionally were committed to extension work, believing that own academic specialty had high utility for understanding problem issues of the day was the variable most associated with high extension communication output (Group 7). For these a tenuous second emphasis on applied research and extension related matters emerged as a prime positive influence (Group 9).

Appendix Table 7 shows the proportion of variance explained in each subgroup by each of the variables. The proportions reported across the table permit the reader to observe how the variance explained by each of the independent variables was affected at every stage in the splitting process. The arrows in the table indicate on which variable the splitting occurred. Variances explained in the columns reveal which ones are in competition for first place, i.e., for splitting, and how removal of the influence of the variables involved in the split affects the amount of variance explained by the others. This, of course, provides a clue of how they are interrelated in the progression of splits that occurred.

First we note that no split occurred on perceived reference group influence on own work even though extension communication tended to be universally low in the absence of outside reference group influence on own work (Lionberger and Reddy, 1976). The variance explained in the dependent variable by such "outside" reference group influences as colleagues in government and industry, professionals, and the general public declined very sharply with the first split on relevance of the reward question for extension work. The variance explained by many of the other independent variables also dropped sharply on the first split, thus showing that many of them were highly intercorrelated. Thus, in a sense, "relevance of appropriate reward for extension work" subsumed reference group influence and a number of other variables. The first strongly suggests the impelling influence of rewards on personal satisfactions that derive from reference groups outside of academia.

The authors suggest that the high interrelationship among the independent variables in the combined category mix is one of the reasons why the combination of the high predictors from each of the six variable categories did not explain more variance in the dependent variable than the highly cogent perceptual category by itself. They further contend that the interrelated aggregate suggests a profile of the high extension communicator which may be described as follows.

Toward a Profile of the High Extension Communicator

High communicators were first and foremost faculty who had developed a commitment to applied concerns and clientele, with or without the favorable recognition of their own academic colleagues. Rewards from personal satisfaction in rendering services to their respective "outside of academia" clientele outweighed the reward that came from prospects for professional advancement. All of this, of course, was a product of prior socialization.

The high producer was more likely than not to have lived on a farm or in the open country for longest period during childhood, to have come from the more rural central and southern sections of the United States, and to have been reared by parents who were farmers, or whose occupations were business related (clerical), or managerial rather than professional.

Participation of the faculty in church work as a graduate student was the variable in the prior socialization category that explained most

variance in extension communication. This took precedence over the graduate-program-related experiences of the respondent while in graduate school. Actual involvement in church activity is indicative of a kind of humanitarianism that may well orient a student to university outreach kinds of activities.

On the whole, those who had extension appointments produced more than those who did not, but perception of being involved in extension work quite aside from official appointment was even more important. Some very high producers had no extension appointments. Among them, sizeable extra income from professional activities and high salaries (\$20,000 and over) were the rule. What is cause and what is effect can only be surmised by data from this study. But the authors suggest the hypothesis that for many who do not have extension appointments, being well established in the profession is a necessary condition for high extension communication. Achieving status in academia takes time. Accordingly, the high extension communicator was more likely to be over 50 years of age and to have come to believe that his academic discipline had utility outside of academia.

High extension communicators were not likely to have perceived themselves as being from economically deprived groups and were not likely to have obtained a Ph.D. degree from a "land grant" university, or indeed any Ph.D. degree at all. It is not that, as farmers have sometimes said, a little education for farming is all right, but too much will ruin the boy. Rather, it is likely that the Ph.D. degree and the academic status that goes with it may incline the recipient to academic concerns rather than deference to the needs of clientele outside of academia. Certainly it is apparent that land grant universities have no monopoly on socializing young Ph.D.'s into an information macrosystem way of thinking, at least for high performance as extension communicators.

A Possible Causal Sequence

Need for more social science knowledge inputs into the planning and operational concerns of society is increasing and the failure of most academicians to contribute information is a problem. Means for developing high producers are needed. This in turn poses a question of how this might be done. Although becoming a high extension communicator surely must be the product of the interaction of a number of variables through time, some inferences may be drawn from:

- (1) The order in which selected variables associated with high extension communication productivity at any given point in time would have to occur and
- (2) the way they combined and interacted to explain extension communication at the time the study was made.

The AID analysis has shown that of 52 variables in the background, prior socialization, perceptual and conditions of appointment categories, rural-urban background, participation in church work as a graduate student, perceiving oneself as being involved in extension work as a faculty member, and having an official extension appointment were the six key explanatory ones. They were the ones upon which the first split occurred in each of four categories--background, prior socialization, perceptual, factors and conditions of appointment. From them and their interrelationships a number of relevant questions can be addressed such as:

- (1) Does rural residence during childhood persist as a relatively independent influence in explaining high extension communication, or does it operate mostly as an antecedent variable?
- (2) Does a rural background predispose a person to getting an extension appointment or does it operate only to create a favorable perceptual base for this kind of involvement?

By subjecting the four key variables, in dichotomized form, to cross tabulation and to four-way analysis of variance² it was possible to partially address these issues (see Tables 20 through 25).

Many more of the faculty with rural backgrounds (47.5 percent) than of those with urban (13.1 percent) backgrounds participated in church work as graduate students (see Table 20). Relatively more from rural backgrounds (47.5 percent) than urban (23.0 percent) perceived themselves as being involved in extension work (see Table 21). Also more had extension appointments (44.3 and 11.5 percent, respectively) (see Table 22).

About 60 percent of those who had been involved in church work as graduate students perceived themselves as being involved in extension work, compared to an even 25 percent of those who were not (see Table 23). Furthermore, there was a positive relationship between having an extension appointment and having been involved in church work as a graduate student (see Table 24). Finally, a sizeable contingent of the faculty without official extension appointments perceived themselves to be in extension.³

This suggests the possibility of an interaction among the variables in explaining extension communication. A sequence of growing up on a farm, going to college, getting or staying involved in church work as a graduate student, participating in extension-type activities, getting an extension appointment, and ultimately becoming a high producer of extension communication is one possibility.

Alternative hypotheses would hold that:

- (1) Church work as a graduate student (key prior socializing influence) would operate as an explainer of extension communication independent of rural or urban background;
- (2) Having an extension appointment and a perception of being involved in extension work would persist as an explanatory variable irrespective of prior involvement in church work or rural-urban background.

As can be seen from the four-way analysis of variance table, there is partial support for the hypotheses. All four variables had a statistically significant, direct effect upon extension communication. Only one of the two-way interaction effects, between involvement in church work as a graduate student and whether faculty perceive themselves in extension, was significant. Place of longest childhood residence (rural-urban) and whether or not one had an extension appointment directly affected the extension communication output of the Columbia campus social science faculty, irrespective of the other variables. Involvement in church work as a graduate student operated independently of rural or urban background (see Table 26).

The effect of perceived involvement in extension appears to have operated most strongly for those who were involved in church work as graduate students. Of those involved in church work, those who also

TABLE 20. PERCENT OF THE UMC CAMPUS SOCIAL SCIENCE FACULTY CLASSIFIED BY INVOLVEMENT IN CHURCH WORK AS A GRADUATE STUDENT AND PLACE OF LONGEST CHILDHOOD RESIDENCE

Involvement in Church Work as a Graduate Student	Place of Longest Childhood Residence	
	Rural % (N=61)*	Urban % (N=61)*
All Faculty	100.0	100.0
Was	47.5	13.1
Was Not	52.5	86.9

$$\chi^2 = 15.52, \text{ sig.} = .0001$$

*Three cases with information unknown omitted.

TABLE 21. PERCENT OF THE UMC CAMPUS SOCIAL SCIENCE FACULTY CLASSIFIED BY PERCEIVED INVOLVEMENT IN EXTENSION WORK AND PLACE OF LONGEST CHILDHOOD RESIDENCE

Perceived Involvement in Extension Work	Place of Longest Childhood Residence	
	Rural % (N=61)*	Urban % (N=61)*
All Faculty	100.0	100.0
That they were	47.5	23.0
That they were not	52.5	77.0

$$\chi^2 = 7.04, \text{ sig.} = .01$$

*Three cases with information unknown omitted.

TABLE 22. PERCENT OF THE UMC CAMPUS SOCIAL SCIENCE FACULTY CLASSIFIED BY OFFICIAL EXTENSION APPOINTMENT STATUS AND PLACE OF LONGEST CHILDHOOD RESIDENCE

Official Extension Appointment Status	Place of Longest Childhood Residence	
	Rural % (N=61)*	Urban % (N=61)*
All Faculty	100.0	100.0
Did have	44.3	11.5
Did not have	55.7	88.5

$$\chi^2 = 14.72, \text{ sig.} = .001$$

*Three cases with information unknown omitted.

TABLE 23. PERCENT OF THE UMC CAMPUS SOCIAL SCIENCE FACULTY CLASSIFIED BY INVOLVEMENT IN CHURCH WORK AS A GRADUATE STUDENT AND PERCEIVED INVOLVEMENT IN EXTENSION WORK

Perceived Involvement in Extension Work	Involvement in Church Work as a Graduate Student	
	Was % (N=37)	Was Not % (N=88)
All Faculty	100.0	100.0
That they were	59.5	25.0
That they were not	40.5	75.0

$$\chi^2 = 12.09, \text{ sig.} = .001.$$

TABLE 24. PERCENT OF THE UMC CAMPUS SOCIAL SCIENCE FACULTY CLASSIFIED BY INVOLVEMENT IN CHURCH WORK AS A GRADUATE STUDENT AND EXTENSION APPOINTMENT STATUS

Official Extension Appointment Status	Involvement in Church Work as a Graduate Student	
	Was % (N=37)	Was Not % (N=88)
All Faculty	100.0	100.0
Did have	48.6	19.3
Did not have	51.4	80.7

$$\chi^2 = 9.81, \text{ sig.} = .002.$$

TABLE 25. PERCENT OF THE UMC CAMPUS SOCIAL SCIENCE FACULTY CLASSIFIED BY PERCEIVED INVOLVEMENT IN EXTENSION WORK AND OFFICIAL EXTENSION APPOINTMENT STATUS

Official Extension Appointment Status	Perceived Involvement in Extension Work	
	That They Were % (N=44)	That They Were % (N=81)
All Faculty	100.0	100.0
Did have	68.2	6.2
Did not have	31.8	93.8

$$\chi^2 = 51.35, \text{ sig.} = .00001.$$

TABLE 26. EXTENSION COMMUNICATION OUTPUT OF THE UMC CAMPUS SOCIAL SCIENCE FACULTY BY PLACE OF LONGEST CHILDHOOD RESIDENCE, WHETHER FACULTY PARTICIPATED IN CHURCH WORK AS A GRADUATE STUDENT, WHETHER APPOINTMENT PROVIDES FOR EXTENSION WORK, AND WHETHER FACULTY PERCEIVE THEMSELVES AS INVOLVED IN EXTENSION

Source of Variation	Sum of Squares	d.f.	Mean Square	F	Significance of F
A. Place of Longest Childhood Residence	1333733.00	1	1333733.00	14.55	.001
B. Church Work as a Graduate Student	1441267.00	1	1441267.00	15.73	.001
C. Official Extension Appointment	1111263.00	1	1111263.00	12.12	.001
D. Perceived Self in Extension	762711.00	1	762711.00	8.32	.005
Interaction Effects					
A x B	22734.13	1	22734.13	0.25	.999
A x C	170152.63	1	170152.63	1.86	.172
A x D	7248.85	1	7248.85	.08	.999
B x C	101805.81	1	101805.81	1.11	.295
B x D	509054.56	1	509054.56	5.55	.019
C x D	2676.69	1	2676.69	.03	.999
Residual	10173836.00	111	91656.13		
Total	15778275.00	121	130398.94		

TABLE 27. MEAN EXTENSION COMMUNICATION OUTPUT IN MAN-DAYS BY INVOLVEMENT IN CHURCH WORK AS A GRADUATE STUDENT AND WHETHER FACULTY PERCEIVES SELF AS INVOLVED IN EXTENSION WORK

Whether Faculty Member Perceives Self as Involved in Extension	Involvement in Church Work as a Graduate Student		Total
	Yes Man-Day Mean	No Man-Day Mean	
Yes	633.32	292.82	463.07
No	177.53	97.11	112.00
Total	448.54	146.03	235.58

perceived themselves as involved in extension had a man-day mean of 633.32. Those who did not perceive themselves as involved in extension had a man-day mean of 177.53; a difference of 456.79. On the other hand, for those who were not involved in church work as graduate students, perceiving self as involved in extension produced a mean of 292.82 man-days. Those who did not perceive themselves as involved in extension had a man-day mean of 97.11.

An inclination to become involved in extension work fortified the positive influence of involvement in church work as a graduate student. The effect of perceiving themselves involved in extension work was not as great for faculty who were not involved in church work as for graduate students. The positive effect of both variables combined to produce a level of extension communication beyond the single effect of each.

Although faculty from rural backgrounds were more likely than urbanites to become involved in church work and to have extension appointments, all three variables were independently associated with high extension communication. However, when involvement in church work is fortified by self perception of being involved in extension work, the leading perceptual determinant, extension communication is further enhanced.

Comparison with Taiwan Campuses

On the two Taiwan campuses, a somewhat similar situation was found. Communication output aimed at outside audiences ranged from none for 14 people to 2222 man-days for one individual. Exactly half of all the extension communication output was produced by 10.7 percent of the faculty interviewed. Just over 24 of the faculty produced just under 75 percent of the extension communication output. As can be seen, the distribution of communication output was extremely skewed in both social settings (see Table 17).

As on the Columbia campus, perceptual variables explained more of the variance in output (36.4 percent) than any other category of variables (see Table 28). We have already noted that more of these faculty than of the faculty in Missouri believed that a public university should be involved much or very much in educational outreach activities. Taiwan faculty members were influenced relatively more by reference groups outside of academia. Reference group influence as an aggregate was second in line at 34.0 percent. Prior socialization and source of professional and self satisfaction rewards explained the least (15.3 percent each). The variable mix explained more variance than any single variable category (44.5 percent). However, by comparison, variance explained by all variable categories except reference group influence, was greater for the UMC campus faculty.

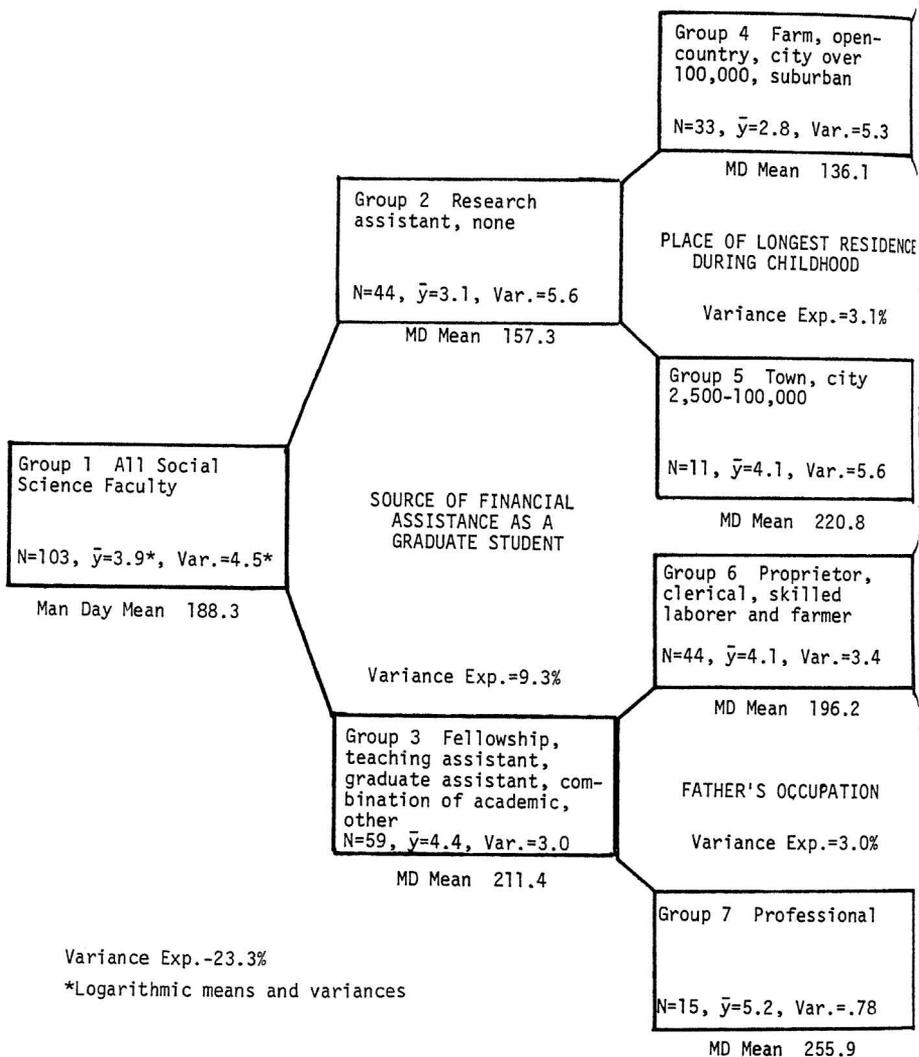
Background Variables

Much the same variables appeared in the splitting process in Taiwan as among the UMC campus faculty but in a different order and combination. The first variable in rank was the source of financial assistance as a graduate student (see Figure 19 and Appendix Table 8). Those with a research assistantship or no support were on the low side (Group 2) and those with other academic and non-academic assistance ranked on the high

TABLE 28. VARIANCE IN EXTENSION COMMUNICATION OF THE TAIWAN
SOCIAL SCIENCE FACULTY EXPLAINED BY VARIABLE CATEGORIES
IN THE AID ANALYSIS

Variable Category	Variance Explained (%)
Background Characteristics	23.3
Prior Socialization Experiences	15.3
Conditions of Appointment	22.3
Perceptual Variables	36.4
Reference Group Influence	34.0
Prospects for Professional Advancement vs. Personal Satisfaction as a Reward	15.3
Cross Category Mix	44.5

Figure 19. Man-day extension communication output of the social science faculty on the Taiwan campuses by background characteristics.



Group 8 Professional,
large farmer, small
farmer

N=17, \bar{y} =2.0, Var.=4.7

MD Mean 59.5

FATHER'S OCCUPATION

Variance Exp.=5.4%

Group 9 Proprietor,
clerical, skilled,
laborer

N=16, \bar{y} =3.7, Var.=4.7

MD Mean 217.5

Group 12 Proprietor,
clerical, skilled,
laborer

N=15, \bar{y} =3.5, Var.=5.1

MD Mean 135.5

Group 10 Central China,
Taiwan

N=31, \bar{y} =3.9, Var.=3.9

MD Mean 169.9

FATHER'S OCCUPATION

Variance Exp.=1.0%

REGION OF LONGEST
CHILDHOOD RESIDENCE

Variance Exp.=1.6%

Group 13 Large or
small farmer

N=16, \bar{y} =4.2, Var.=2.8

MD Mean 202.2

Group 11 South, East,
Northeast, Southwest,
Northwest China

N=13, \bar{y} =4.8, Var.=1.9

MD Mean 259.0

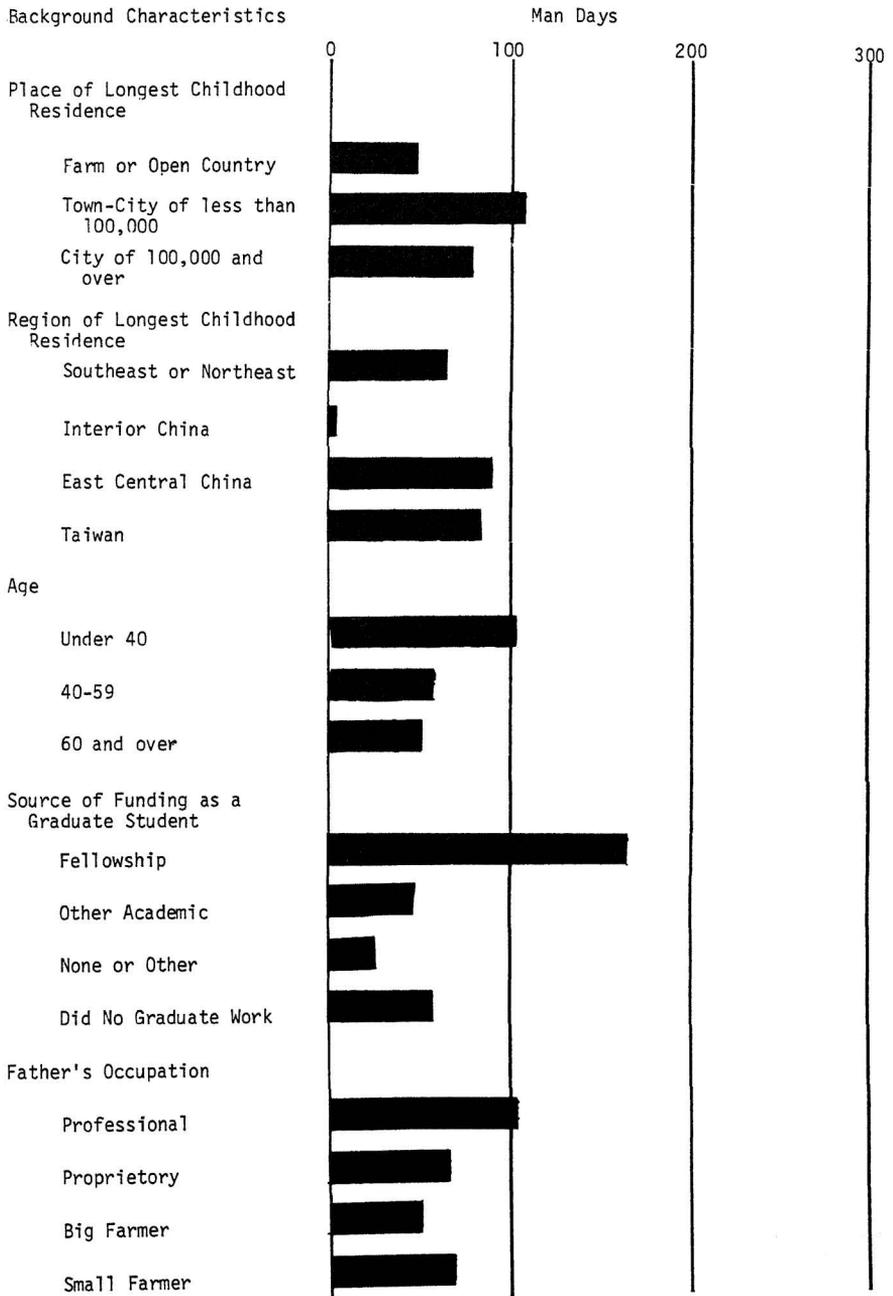


Figure 20. Median man-day extension communication output of the social science faculty on the Taiwan campuses by selected background characteristics.

(Group 3). Those who spent their childhood residence either on the farm or in open country or large urban or suburban centers were low producers (Group 4). Farm background served as a depressant to extension communication (Group 8), in contrast to results with the UMC campus faculty. Conversely, a father's occupation as a proprietor, clerical worker, or skilled laborer was associated with higher productivity (Group 9), as was residence in a medium sized town or city (Group 5).

On the high communications production side (Group 3), father's occupation as a professional enhanced extension productivity (Group 7). For those whose fathers had other occupational backgrounds, being from the coastal regions and northwest was a positive influence (Group 11). Faculty from central China or Taiwan were low producers (Group 10). For this group, having a father whose occupation was farming helped (Group 13).

Prior Socialization Variables

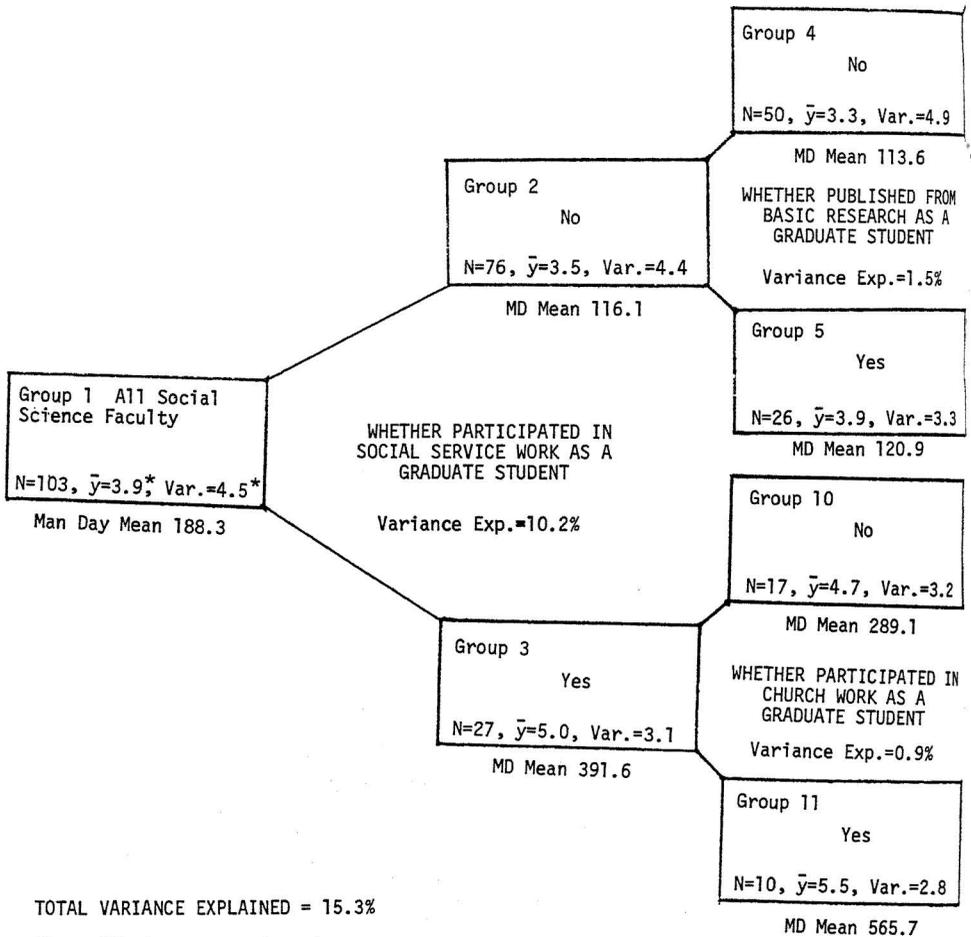
In one very important respect the splitting process on the two campus settings closely paralleled each other. The first split on the UMC campus was on participation in church work as a graduate student. On the Taiwan campuses, the first split was on social service work (see Figure 21 and Appendix Table 9). Differences in extension communication output between those who did and those who did not participate in social service were sizeable (391.6 and 116.1, respectively). When participation in social service work was fortified by church participation, extension communication reached its highest level in Taiwan (565.7 man-days). The significant thing is that these two related humanistic activities took precedence over what the educational system had to offer, including an opportunity to do basic and applied research, to publish, and to do other kinds of activities that have become more popular recently than when these faculty were in graduate school. These include social reform, political agitation, participation in student government and student organizations, and strikes against the university administration.

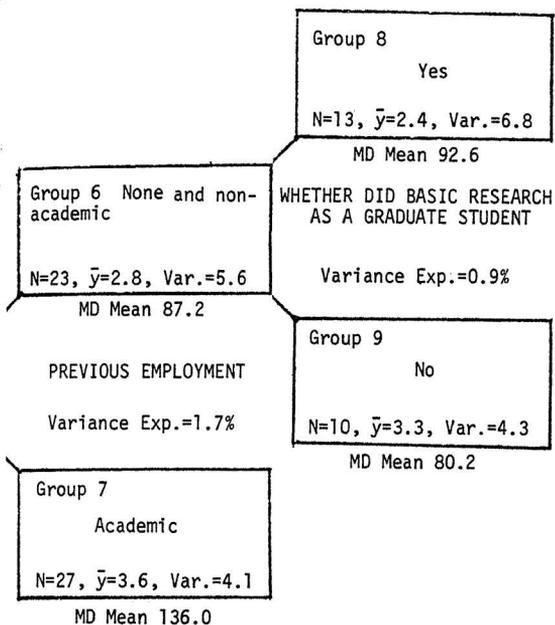
One type of graduate experience, publication from basic research (Group 5), and having done this type of research (Group 8), enhanced extension communication a little for those who had not participated in social service work. The basic research experience was most helpful to those who lacked prior academic occupational experience. Having been so employed resulted in a modest increase for those without social service experiences but who had published from basic research (Group 7). Yet no combination of prior socialization experiences enhanced extension communication more than a fraction compared to social service work fortified by participation in church work.

Conditions of Appointment

Despite the autonomous manner in which faculty members are inclined to operate in the university system, official prescription makes a difference. On both UMC and Taiwan campuses, whether faculty members had an extension appointment made the greatest difference (see Figure 23 and Appendix Table 10). This was enough in itself to enhance extension productivity by a substantial margin (Group 3 on both the Taiwan and UMC campuses). It was on the no extension appointment side of the first split that added factors made a difference. On the UMC campus the added variables combined to support an extension productivity almost equal to those

Figure 21. Man-day extension communication output of the social science faculty on the Taiwan campuses by prior socialization experiences.





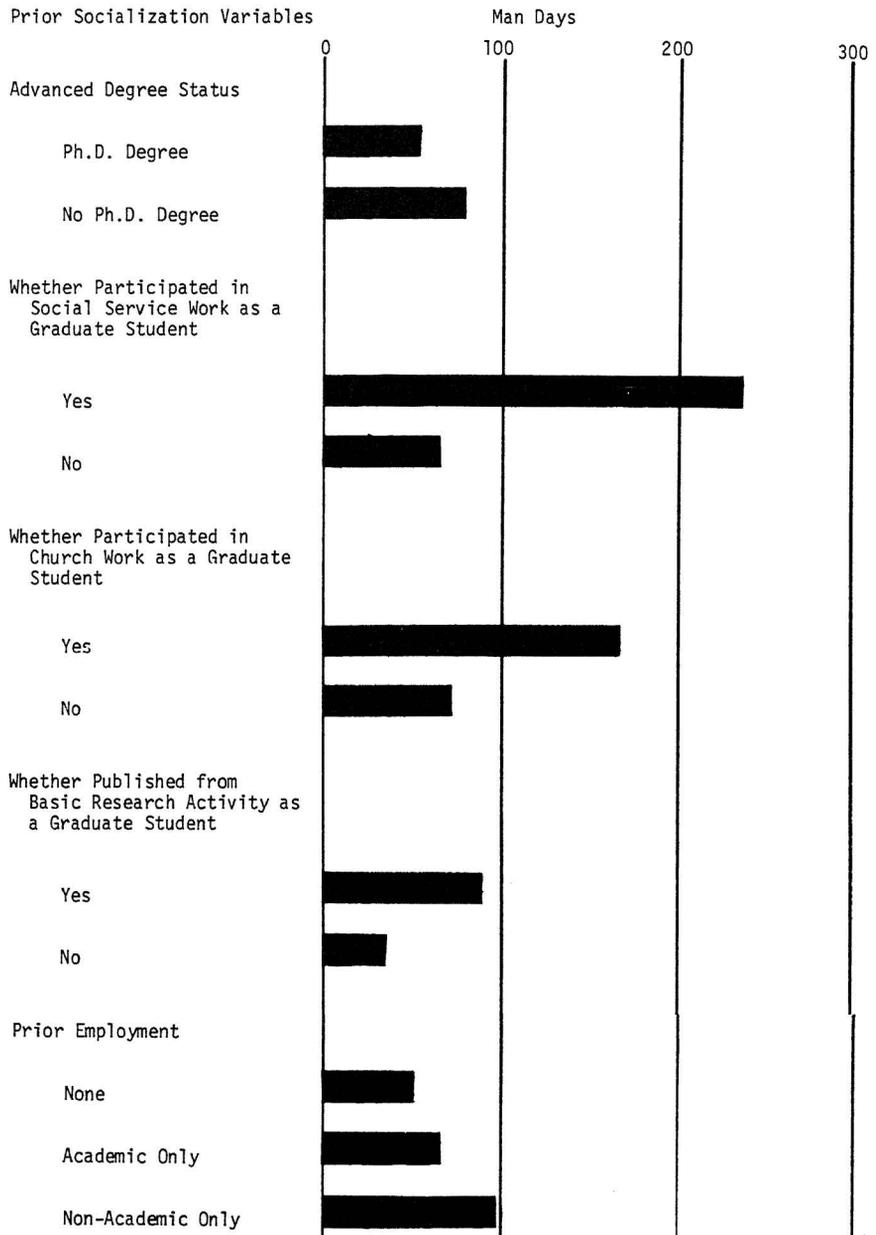


Figure 22. Median man-day extension communication output of the social science faculty on the Taiwan campuses by selected prior socialization variables.

who had extension appointments. On the Taiwan campus the fortification of other variables never closely approached the communication productivity of the staff with extension appointments.

For the large number who had no extension appointment, having less than half time assigned to research did most to enhance extension productivity (Group 8). For those without extension appointments and heavy research assignments, high base salaries were associated with greater output of communications (Group 9). Those with base salaries of less than \$70,000 NT, were a little more productive if they were either a full professor or an assistant professor (Group 11). However these individuals didn't produce much communications anyway.

Perceptual Variables

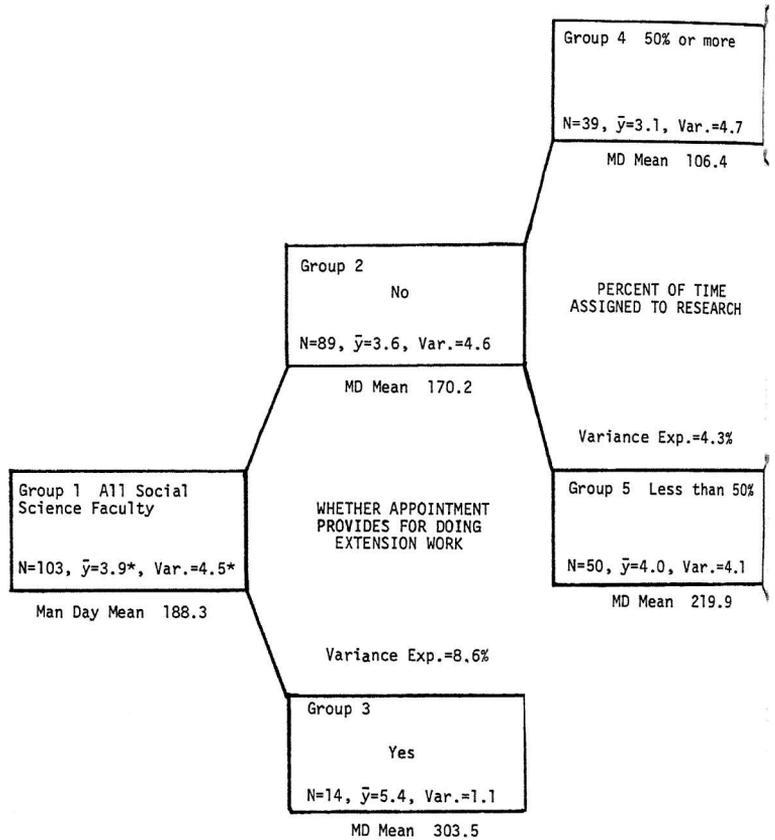
As on the Missouri campus, this category of variables explained the most variance in extension communication output on the Taiwan campuses. Also like the social scientists on the Missouri campus, whether the faculty perceived themselves as being involved in extension work, whether or not they were officially assigned to do extension work, made the most difference (see Figure 25 and Appendix Table 11). Like the matter of official appointment, perceiving oneself to be involved in extension work was a sufficient condition for substantially higher productivity. Again, all splitting occurred on the side of those who did not regard themselves as being involved in extension work. Further division on the high producing side was actually precluded by the numbers constraint imposed on the AID computer program.

Again as on the UMC campus, the variable, what self should emphasize most, provided the basis for the second split. Those inclined to place first order emphasis on any information macrosystem activity from basic research to people outreach were on the high side of communications production (Group 5) and those inclined to teaching were on the low side. For those inclined to information macrosystem activities, perceiving medium to high rank for professional advancement for outreach work (keeping intermediaries and people as information users) enhanced productivity (Group 11). For those who saw little such prospect for professional advancement in this activity, perceiving high rank for teaching as a source of professional advancement increased productivity.

For those with a teaching emphasis (Group 4), constraints on doing applied research, which included those who had no interest in doing so, deficiencies in own skills, and perceived lack of support services, reduced extension output further (Group 6). The extension productivity of this group was, in turn, enhanced somewhat if they derived high satisfaction from doing research on current people problems. For the teaching-oriented faculty, perceiving constraints on doing applied research as mostly a matter of time and what colleagues think resulted in communications productivity that was considerably higher (Group 7). Despite feelings of time constraints and sensitivity to what colleagues think, they were higher producers than those who were either not interested in doing applied research or had other reasons for not wanting to do it.

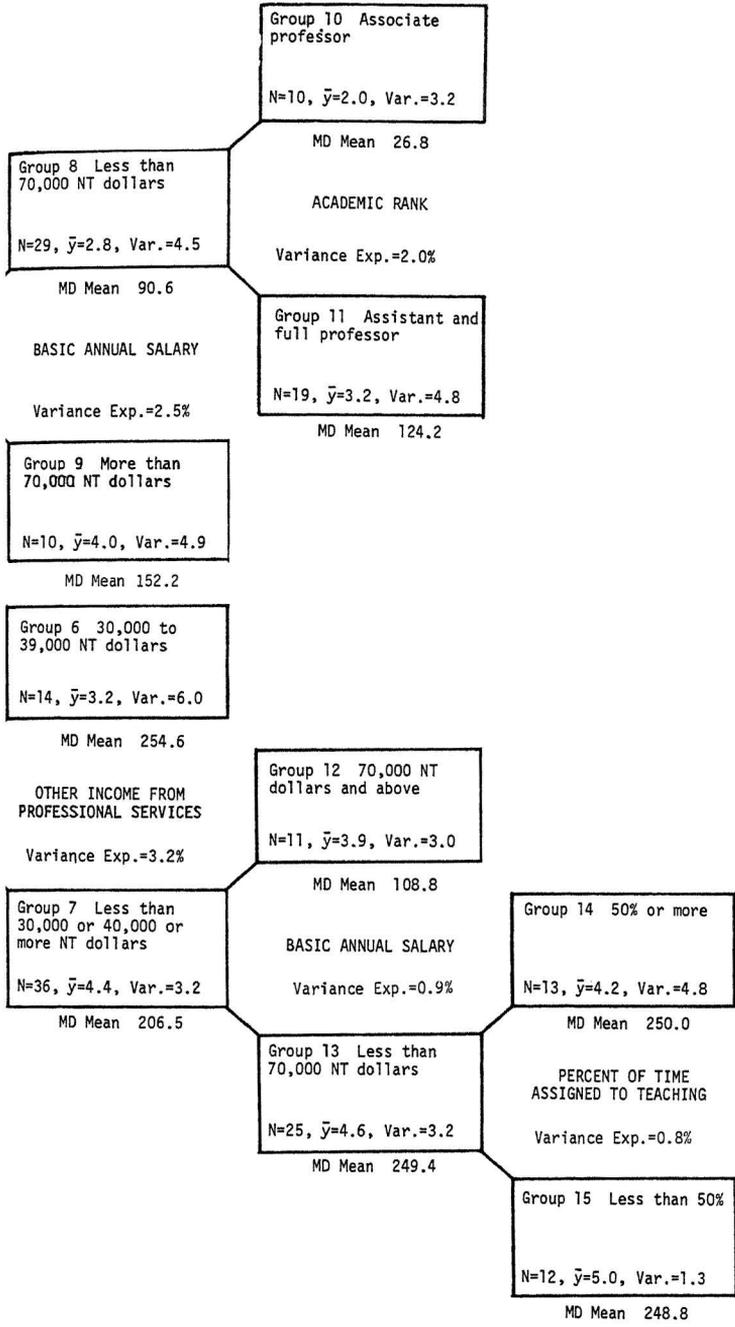
Faculty type, as on the UMC campus, again failed to appear as a variable in the AID splitting process. Unlike the UMC campus situation, the numbers in at least two categories on Taiwan campuses were sufficient for splitting to occur. Both the variance explained by faculty type, which was less than 3 percent (Appendix Table 11) and the graphic

Figure 23. Man-day extension communication of the social science faculty on the Taiwan campuses by conditions of appointment.



TOTAL VARIANCE EXPLAINED=22.3%

*Logarithmic means and variances



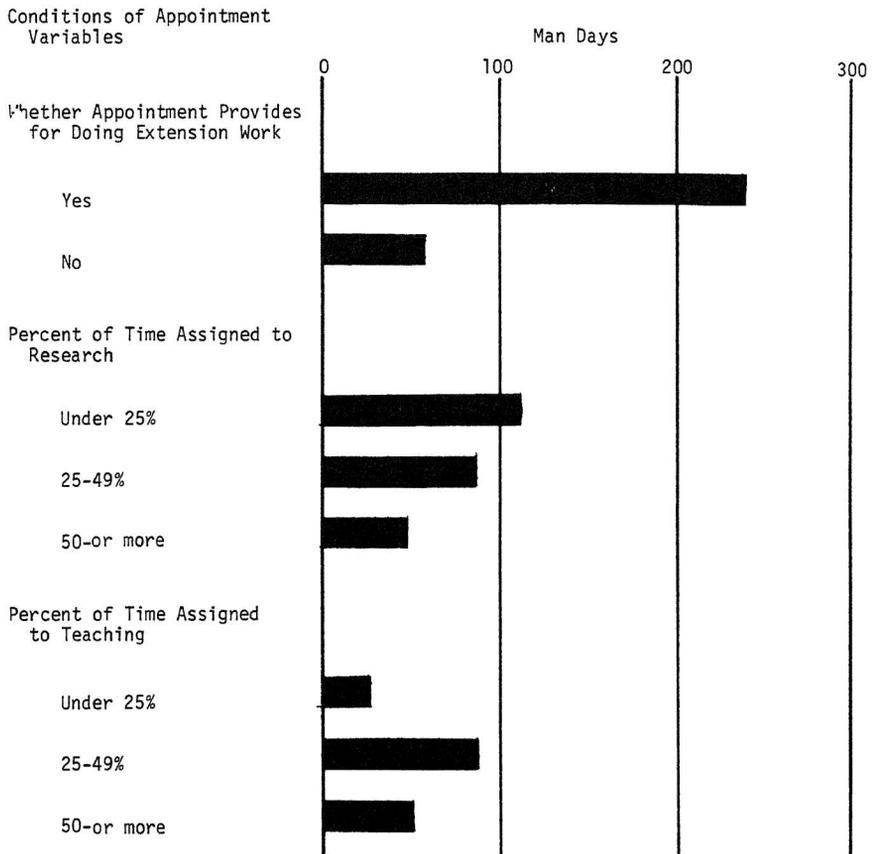


Figure 24. Median man-day extension communication output of the social science faculty on the Taiwan campuses by selected conditions of appointment variables.

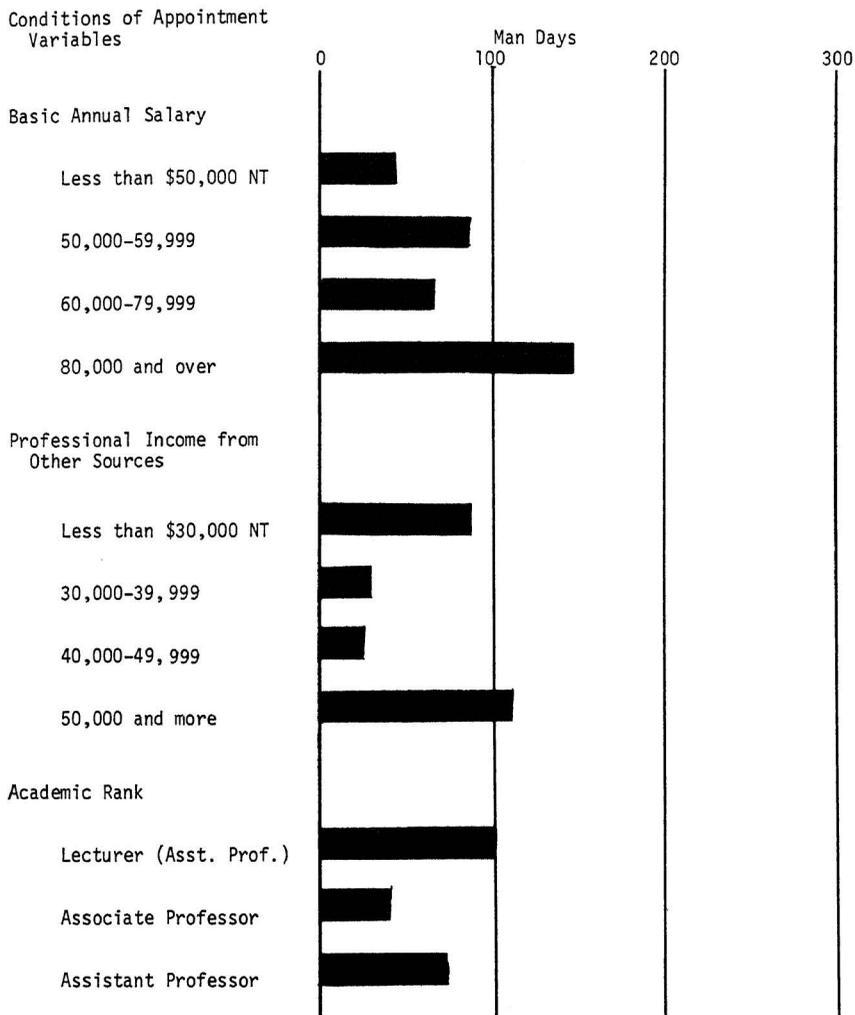
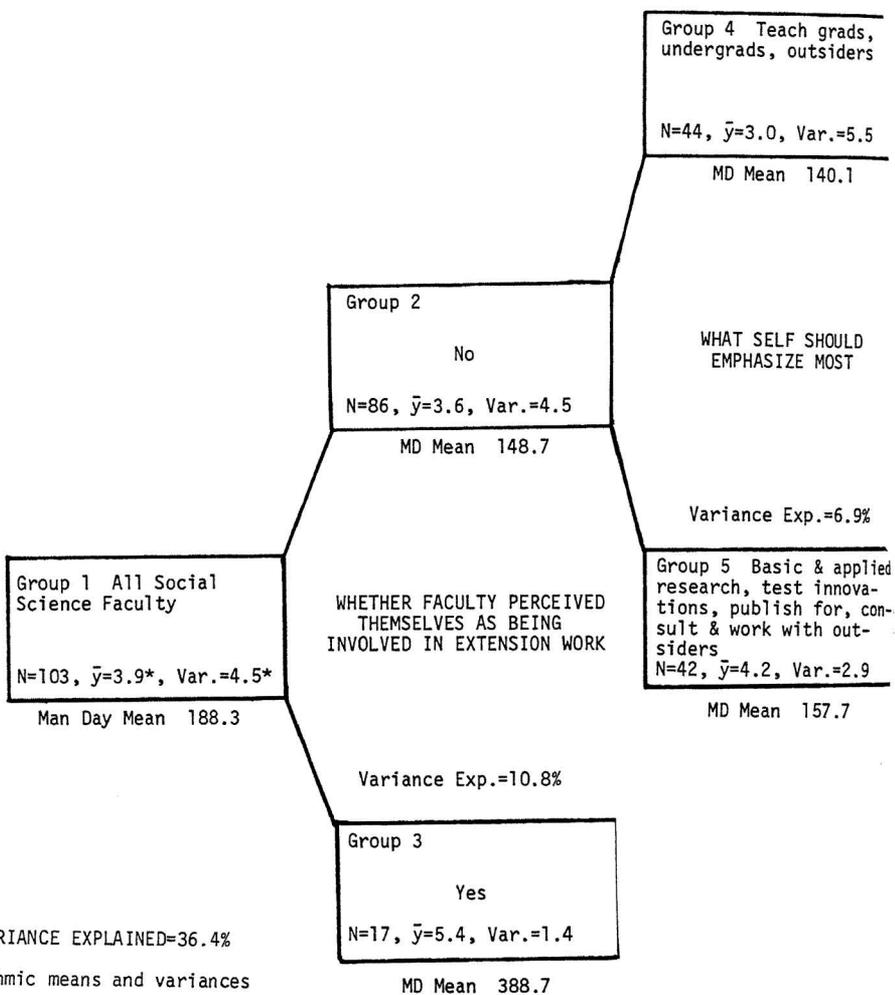
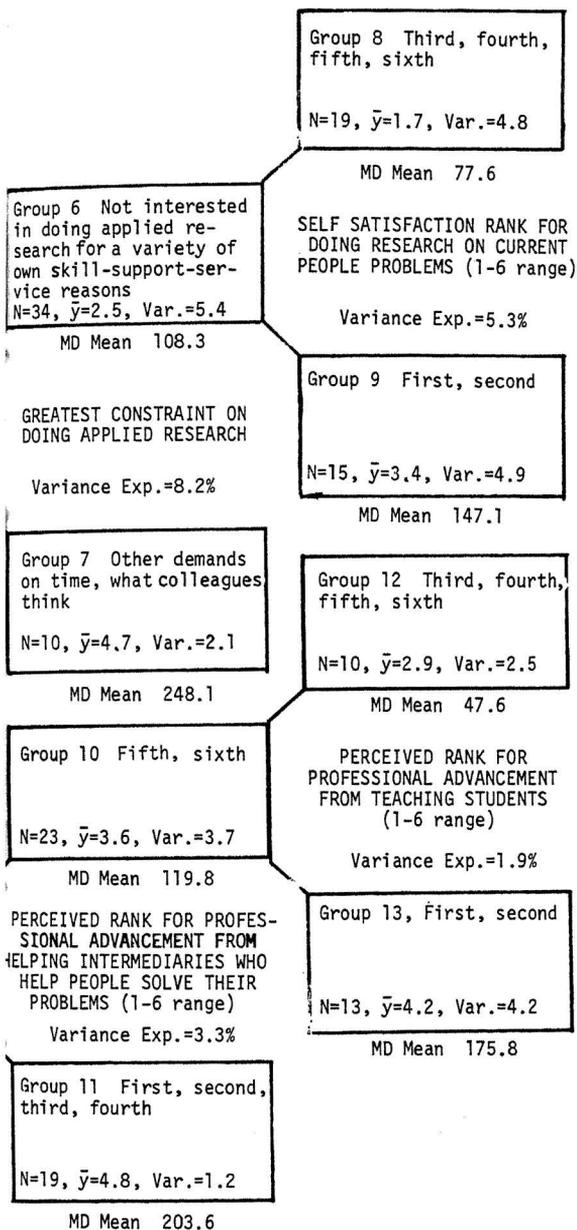


FIGURE 24 (CONDITIONS OF APPOINTMENT CONTINUED)

Figure 25. Man-day extension communication output of the social science faculty on the Taiwan campuses by perceptual variables.





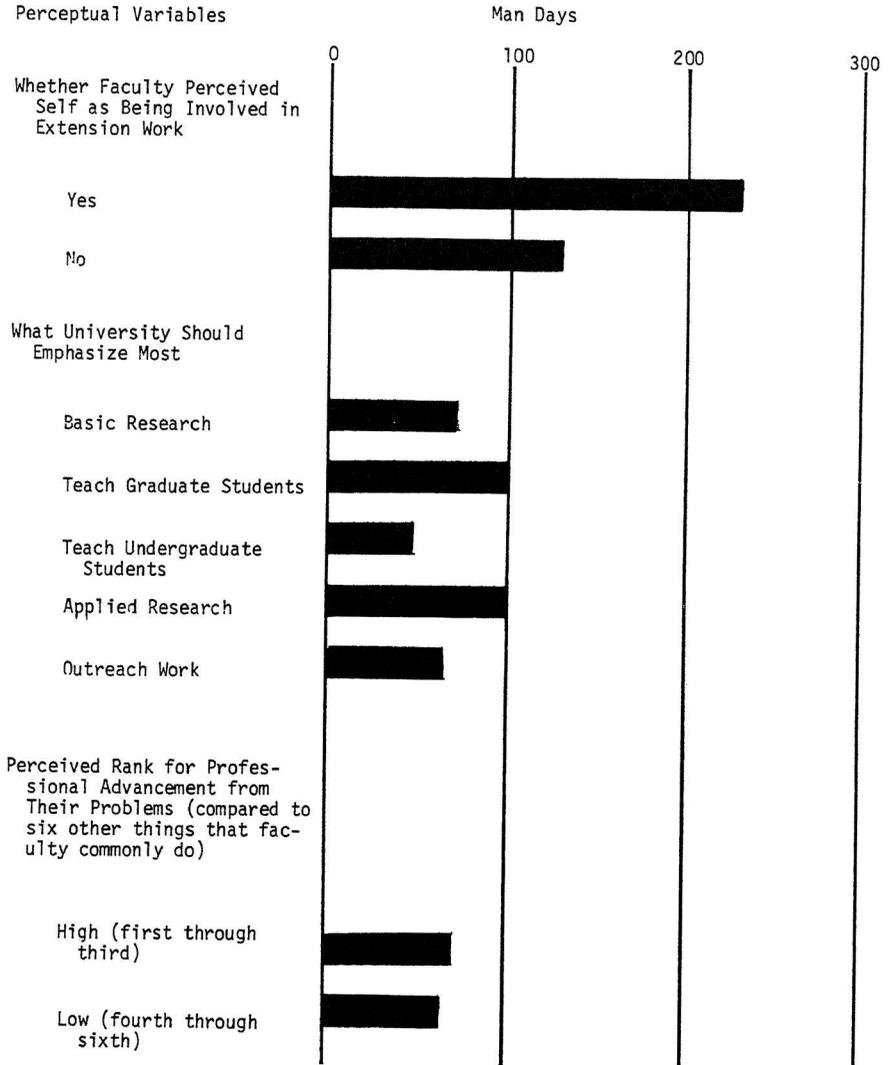


Figure 26. Median man-day extension communication output of the social science faculty on the Taiwan campuses by selected perceptual variables.

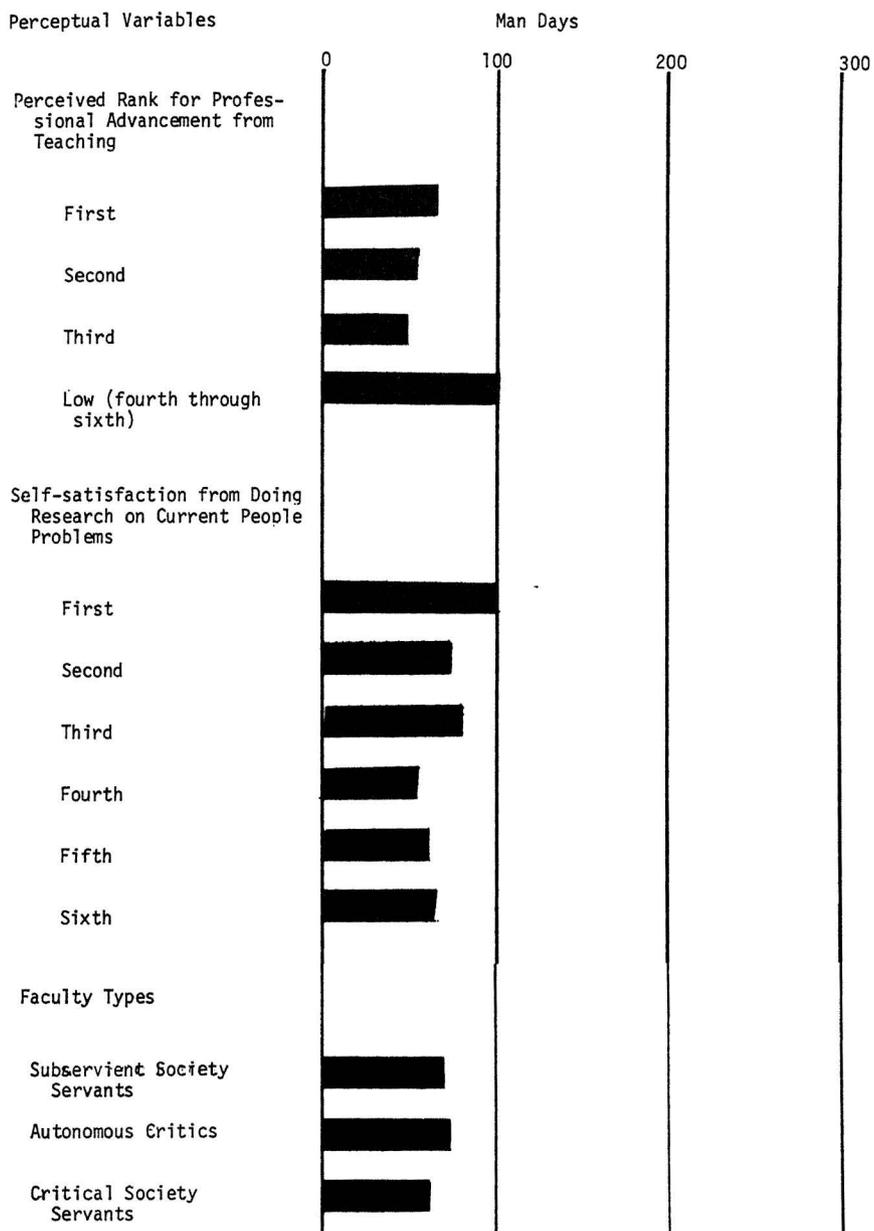


FIGURE 26 (PERCEPTUAL VARIABLES CONTINUED)

representation of output by type (Figure 26) indicate the variation was small. It will be further noted from Appendix Table 11 that variance explained by type was very closely associated with what the faculty thought a public university should most emphasize. When the variance explained by this variable was removed on the first split, the part explained by faculty type was reduced to near zero, indicating the close association between the two. Thus, for extension communication output, the question which required the respondent to indicate which of nine activities a public university should emphasize most explained more of the variance than the more comprehensive descriptive typology.

Reference Group Influence

Even though a sizeable number of the Taiwan campus social scientists failed to indicate their perception of how much influence they thought some of the reference groups had on their work, this variable category still explained the second highest amount of variance (34.0%) in extension communication output (see Table 28). The situation on the UMC campus was basically one in which high output was associated with low influence from academia and some influence from at least one reference group outside of academia. The situation was not as clearcut for the Taiwan campus social scientists. By far the largest amount of variance was explained (15.8%) by perceived influence of professionals and agencies that use social science information (see Figure 27 and Appendix Table 12). Those who perceived some, much, or very much influence were the highest producers (Group 3). For a few (Group 12) who did not respond to the graduate student reference group influence question, productivity was higher than for those who did (Group 11). Failure to answer may have been indicative of no involvement in graduate education in the university and less influence from academia. The productivity of those influenced in some degree by graduate students increased when they perceived no more than some influence from funding agencies (Group 15). In fact, these few were the most productive of any group.

On the side of those relatively less influenced by professional and agency intermediaries, a second break on the same variable occurred in which those not responding were placed in the more productive group (Group 5). When these were, in turn, influenced much or very much by funding agencies, extension communication output was considerably increased (Group 11). For those influenced none or little by outside professionals and agencies (Group 4), little to much by colleagues in government and industry (Group 7), and none to some by outside funding agencies (Group 13), productivity was increased a little.

Several general observations from what happened seem warranted. First, all those influenced little or not at all by professionals and agencies that use social science information, which included the majority of the faculty, were low producers irrespective of other combinations of perceived reference group influence. Except for a somewhat incongruous appearance of graduate student influence, academic reference groups were notably absent. All other groups that made a difference were outside of academia. Perhaps the one operating most negatively to extension communication output was high influence (much or very much) of funding agencies. In two of the three cases where it appeared in combination with other reference group influences, perceiving much or very much influence was associated with lowered extension communication productivity.

Rewards for Extension Work

As previously stated, association of extension communication output with perceived personal satisfaction and prospects for personal advancement as rewards was assessed indirectly. Each faculty member was asked to indicate the relative contribution of approval from the reference groups included in this variable category to his personal satisfaction and prospects for professional advancement. The central question was which would take precedence, self satisfaction or professional advancement, in explaining high extension communication. In Taiwan, just as in Missouri, self satisfaction took precedence over professional advancement in the first split. After a split on contribution to professional advancement, self satisfaction again appeared in the third split (see Figure 29).

The Cross Category Variable Mix

Influence of professionals and agencies that use social science information emerged as the number one variable influencing communications output of the faculty (see Figure 30 and Appendix Table 13). It explained 15.8 percent of the variance in extension communication output. Faculty who rated this variable as of some, much, or very much influence had substantially higher output than those who perceived it as having less influence and those who did not answer this question. The next greatest influence on productivity was appointment to extension work. Those who had extension appointments and those who did not answer were highest producers (Group 11). Those influenced substantially by professionals and agencies that use social science information, but without an extension appointment, were much more productive if they were not from an economically disadvantaged group (Group 13). In this combination of variable influence, being from an economically disadvantaged group was a serious deterrent to extension communication productivity.

The large number of social scientists (63) who were influenced none or little by professionals and agencies that use social science information (Group 2) produced more when their support as a graduate student came mostly from a combination of academic and other sources (Group 5). Research assistantships, apparently were not so prestigious and intellectually challenging as other types of academic support.

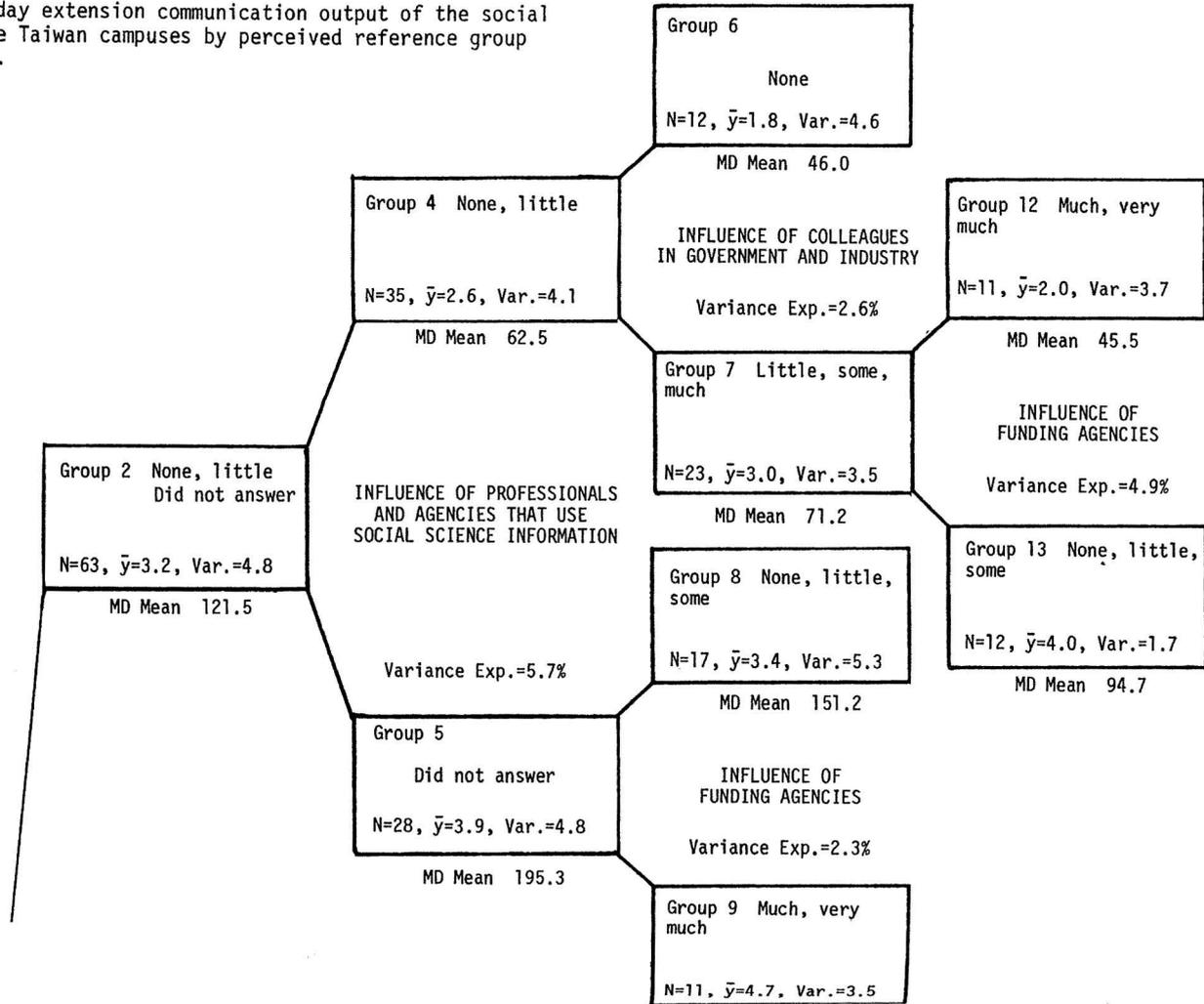
The next break put those who answered both yes and no to whether their appointment provided for extension work (Group 9) on a more productive side than those who did not answer (Group 8). The break itself, however, defies explanation. Those little influenced by professionals and agencies that use social science information, and supported either by self or a research assistantship continued to be very low producers. Their split on percent of time assigned to research is again hard to explain (Groups 16 and 17) but nevertheless it was associated with 5.1 percent of the variance in extension communication output.

Compared to the final mix for the UMC faculty, perceptual variables were less important than a variety of others in which conditions of appointment and background variables figured strongly for Taiwan faculty members.

Profile of the High Extension Communicator

The Taiwan high extension communicators received financial assistance other than a research assistantship as graduate students. Their fathers were middle or upper class occupationally and from South, East, Northwest, Northeast, or Southwest China, or from Taiwan.

Figure 27. Man-day extension communication output of the social science faculty on the Taiwan campuses by perceived reference group influence on own work.



Group 1 All Social
Science Faculty

N=103, \bar{y} =3.9*, Var.=4.5*

Man Day Mean 188.3

INFLUENCE OF PROFESSIONALS
AND AGENCIES THAT USE
SOCIAL SCIENCE INFORMATION

Variance Exp.=15.8%

Group 14 Much, very
much

N=16, \bar{y} =4.3, Var.=2.1

MD Mean 123.7

INFLUENCE OF
FUNDING AGENCIES

Variance Exp.=1.1%

Group 10 Little, some,
much, very much

N=28, \bar{y} =4.6, Var.=2.5

MD Mean 254.4

INFLUENCE OF
GRADUATE STUDENTS

Variance Exp.=1.6%

Group 15 None, little,
some

N=12, \bar{y} =5.1, Var.=2.7

MD Mean 428.6

Group 3 Some, much,
very much

N=40, \bar{y} =4.9, Var.=2.2

MD Mean 293.4

Group 11

Did not answer

N=12, \bar{y} =5.6, Var.=1.2

MD Mean 384.6

TOTAL VARIANCE EXPLAINED=34.0%

*Logarithmic means and variances

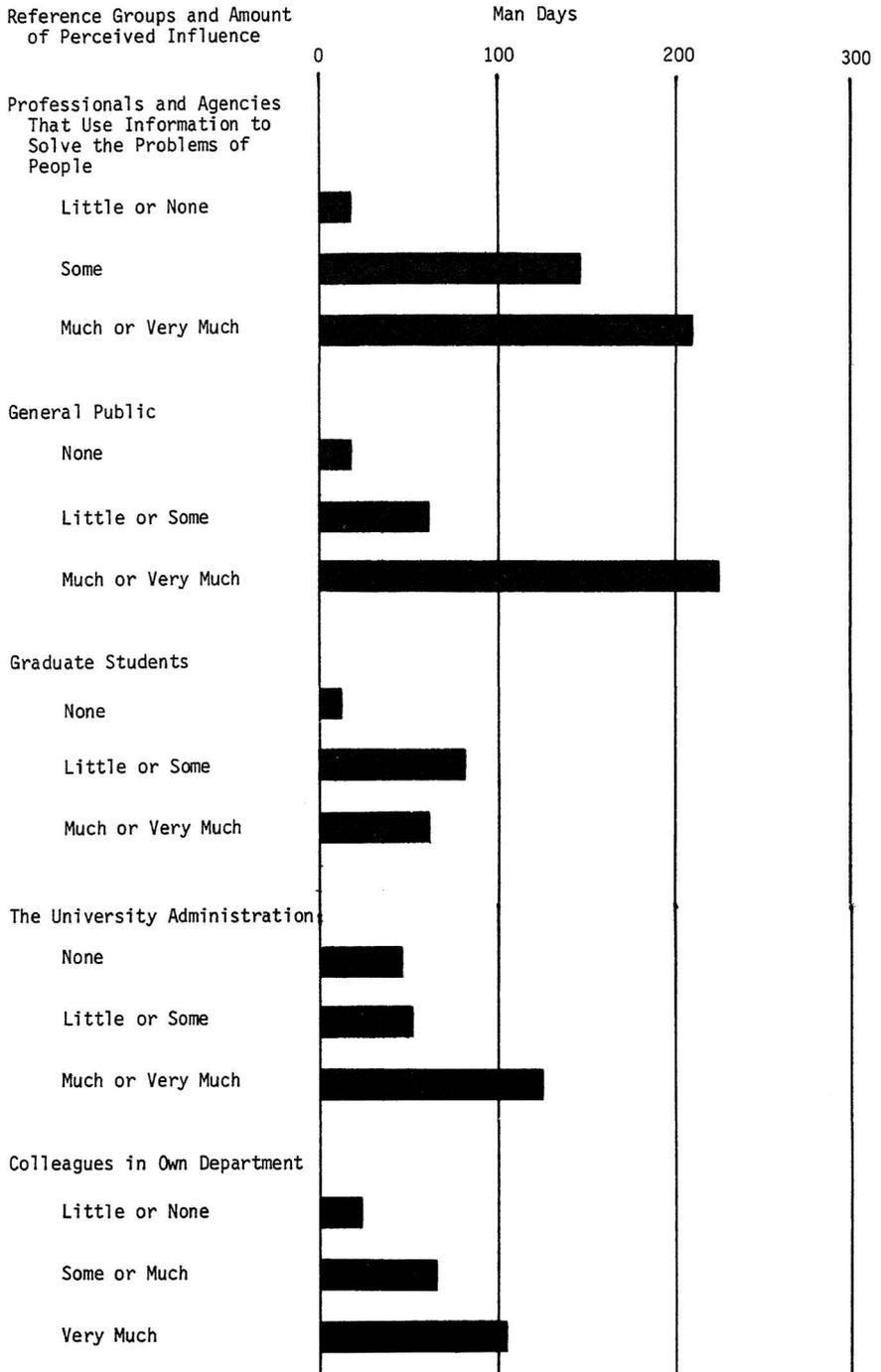


Figure 28. Median man-day extension communication output of the social science faculty on the Taiwan campuses by perceived reference group influence on own work.

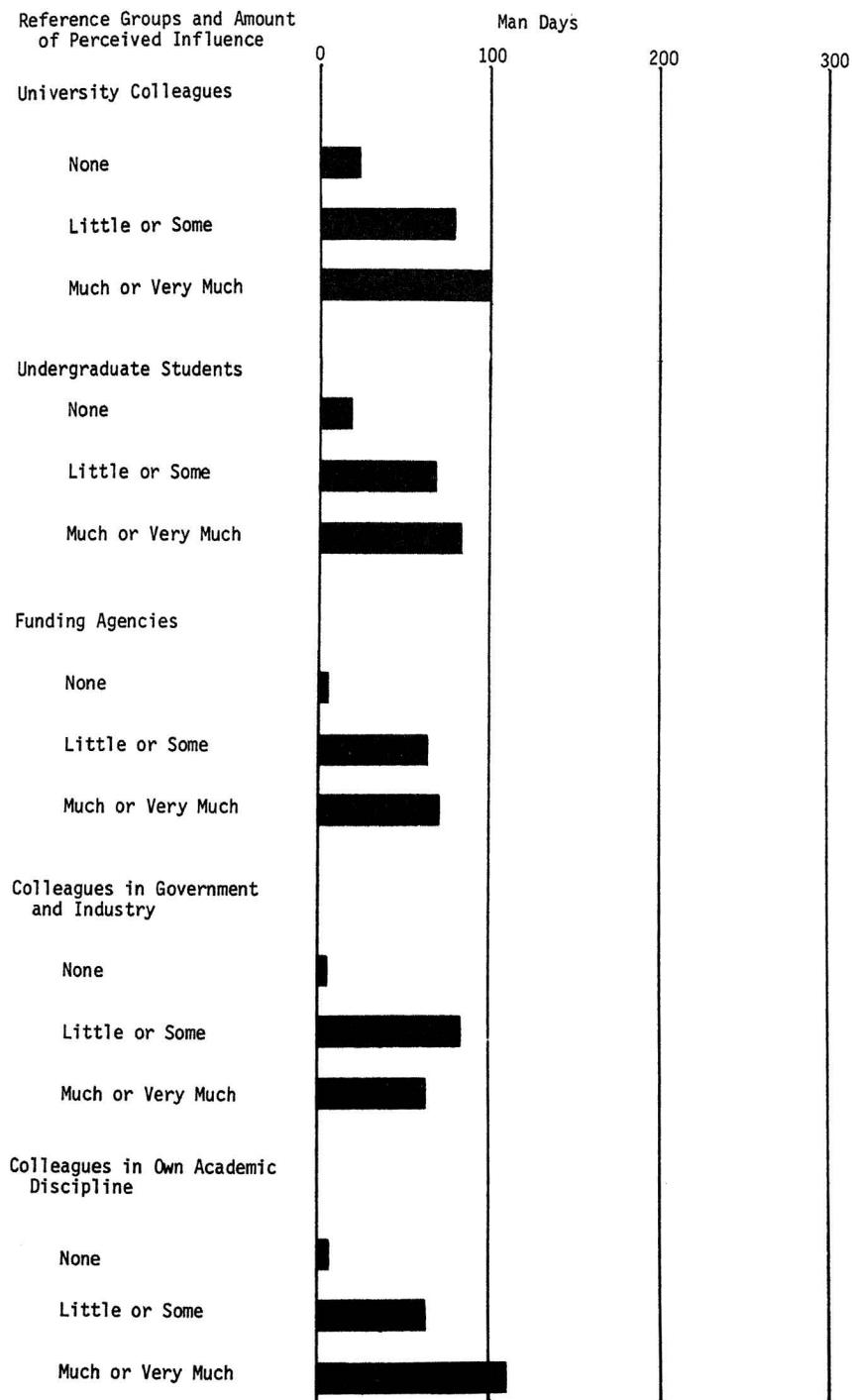


Figure 28. (continued)

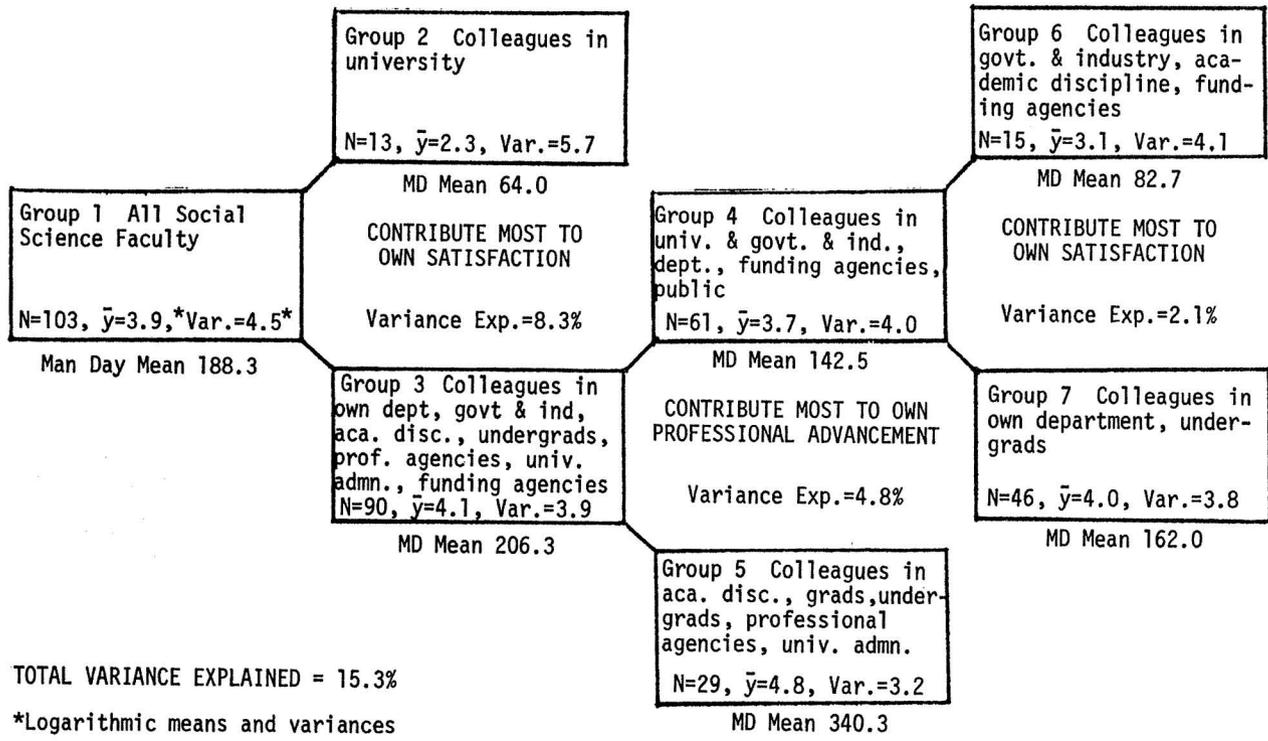


Figure 29. Relative importance of personal satisfaction and prospects for professional advancement from reference groups on the extension communication of the social science faculty on the Taiwan campuses.

They participated in social service and church work as graduate students. This suggests an early orientation to outreach activities as a prior condition to high extension communication.

As on the UMC campus, having an extension appointment was characteristic of the high producers. In this case, the appointment was enough to ensure a high output. Many of the high producers also perceived themselves as involved in extension quite aside from official appointment. Perception of such involvement was a sufficient condition for high productivity in Taiwan, the same as in Missouri.

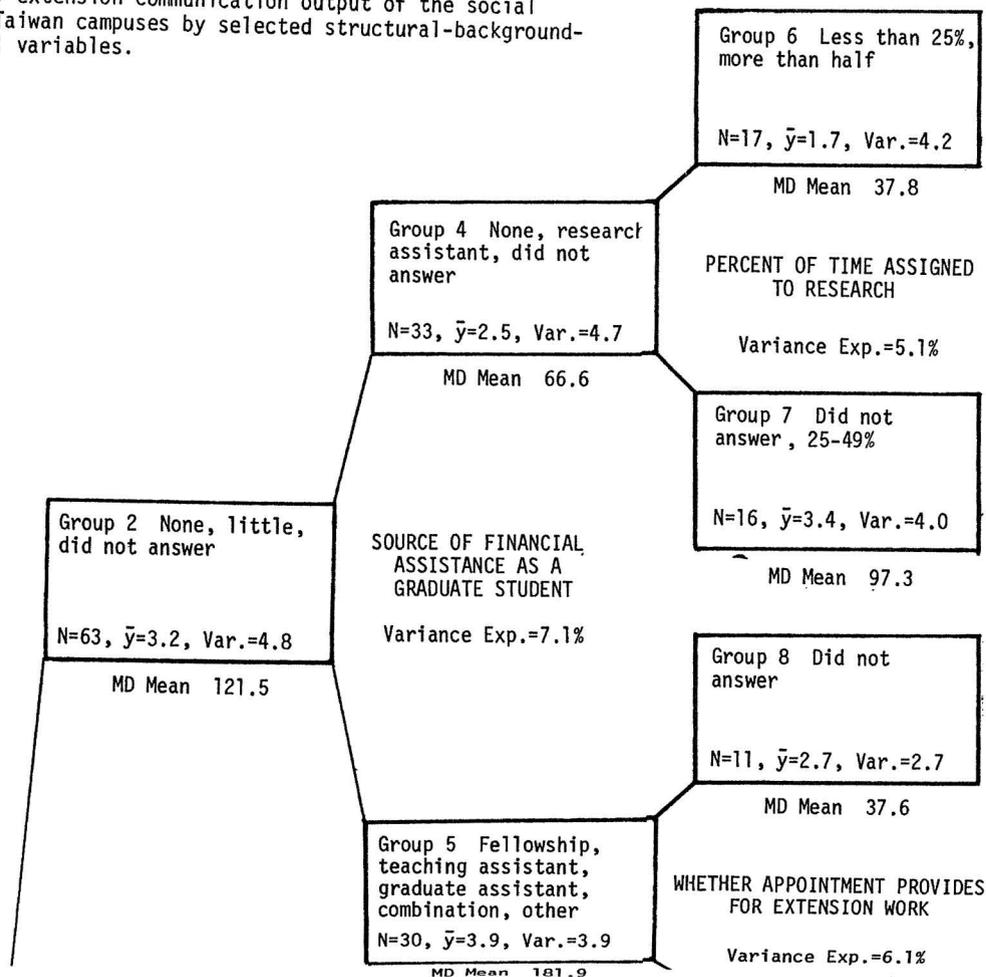
The high producers saw professionals and outside agencies as providing a strong influence on their work. Influences from other non-academic groups also helped. The high extension communicators felt that reference group contributions to their personal satisfaction were more important than reference group contributions to professional advancement.

The More Salient Characteristics

As in Missouri the variables that emerged as most salient among Taiwan faculty members operated in a more or less indirect fashion. As can be seen from Tables 29 and 30, perceiving self as involved in extension had a much greater effect upon extension communication output for those who had done social service work as graduate students than for those who had not. For those who had participated in social service work as graduate students, not having an extension appointment enhanced extension communication output. For those not participating in social service work, the absence of an extension appointment strongly detracted from extension communication output (see Table 31). This suggests that a strong inclination to social service tended to overcome the constraint of no extension appointment.

The situation in Taiwan is apparently more complex than in Missouri. The effects of the more salient variables acted indirectly and seemed to depend upon previously existing conditions to temper their effect. This is clearly seen in the effects of having an extension appointment and perceiving self as involved in extension.

Figure 30. Man-day extension communication output of the social science faculty on the Taiwan campuses by selected structural-background-socialization-perceptual variables.



Group 1 All Social
Science Faculty
N=103, $\bar{y}=3.9^*$, Var.=4.4*

Man Day Mean 188.3

INFLUENCE OF PROFESSIONALS
AND AGENCIES THAT USE
SOCIAL SCIENCE INFORMATION

Variance Exp.=15.8%

Group 9
Yes, No
N=19, $\bar{y}=4.7$, Var.=3.3

MD Mean 265.5

Group 12 Yes, did not
answer
N=11, $\bar{y}=3.5$, Var.=2.5

MD Mean 71.5

Group 10
No
N=21, $\bar{y}=4.3$, Var.=2.8

MD Mean 228.4

WHETHER FROM ECONOMICALLY
DISADVANTAGED GROUP

Variance Exp.=3.1%

Group 3 Some, much,
very much
N=40, $\bar{y}=4.9$, Var.=2.2

MD Mean 292.9

WHETHER APPOINTMENT PROVIDES
FOR EXTENSION WORK

Variance Exp.=3.5%

Group 13
No
N=10, $\bar{y}=5.2$, Var.=1.9

MD Mean 401.0

Group 11 Yes, did not
answer
N=19, $\bar{y}=5.6$, Var.=.85

MD Mean 364.2

TOTAL VARIANCE EXPLAINED=40.7%

*Logarithmic means and variances

TABLE 29. EXTENSION COMMUNICATION OUTPUT OF THE TAIWAN CAMPUSES' SOCIAL SCIENCE FACULTY BY PERCEIVED INFLUENCE OF PROFESSIONALS, WHETHER FACULTY PERCEIVE THEMSELVES AS INVOLVED IN EXTENSION, WHETHER APPOINTMENT PROVIDES FOR EXTENSION WORK, AND WHETHER FACULTY PARTICIPATED IN SOCIAL SERVICE AS A GRADUATE STUDENT

Source of Variation	Sum of Squares	d.f.	Mean Square	F	Sig
A. Influence of Professionals	168203.5	1	168203.5	2.47	.119
B. Perceived Self as in Extension	413944.8	1	413944.8	6.09	.015
C. Appointment for Extension	51166.5	1	51166.5	0.75	.388
D. Social Service Work as a Graduate Student	1126778.0	1	1126778.0	16.56	.000
Interaction Effects					
A x B	454.3	1	454.3	.01	.935
A x C	3554.6	1	3554.6	.05	.820
A x D	12978.8	1	12978.8	.19	.663
B x C	118824.8	1	118824.8	1.75	.190
B x D	523012.9	1	523012.9	7.69	.007
C x D	705889.5	1	705889.5	10.38	.002
Residual	6258375.0	92	68025.8		
Total	9708214.0	102	95178.6		

TABLE 30. MEAN MAN-DAY EXTENSION COMMUNICATION OUTPUT OF THE TAIWAN CAMPUSES' SOCIAL SCIENCE FACULTY BY WHETHER FACULTY PERCEIVED THEMSELVES AS INVOLVED IN EXTENSION AND WHETHER FACULTY PARTICIPATED IN SOCIAL SERVICE AS A GRADUATE STUDENT

Perceives Self as Involved in Extension	Participated in Social Service as a Graduate Student					
	Yes	N	No	N	Total	N
Yes	633.2	6	255.4	11	388.7	17
No	322.5	21	92.5	65	148.7	86
Total	391.5	27	116.1	76	188.3	103

TABLE 31. MEAN MAN-DAY EXTENSION COMMUNICATION OUTPUT OF THE TAIWAN CAMPUSES' SOCIAL SCIENCE FACULTY BY WHETHER APPOINTMENT PROVIDES FOR EXTENSION AND WHETHER FACULTY PARTICIPATED IN SOCIAL SERVICE WORK AS A GRADUATE STUDENT

Appointment Provides for Extension	Participated in Social Service as a Graduate Student					
	Yes	N	No	N	Total	N
Yes	305.6	5	302.7	9	303.5	14
No	411.1	22	91.1	67	170.2	89
Total	391.5	27	116.2	76	188.3	103

Chapter 5 Footnotes

1. The variable was whether the faculty thought their extension effort was properly rewarded in the university system. Those indicating either yes or no were aligned on one side of the split and those not answering or saying that the question did not apply were aligned on the other. The authors took this to mean that the former saw the question as relevant to them and thus that they perceived themselves as being involved in extension work. The others were operationally defined in post hoc manner as seeing themselves as not being involved in extension work.
2. The interrelationship of the independent variables required an adjustment of the sum of squares in the analysis of variance computations. This was provided in the computer program used.
3. Faculty in the College of Agriculture are occasionally reminded by their dean that all should be involved in extension work to some degree irrespective of their official appointments.

CHAPTER 6

COMMUNICATION TO ACADEMIA: A MORE DEFINITIVE LOOK

Introduction

Academic communication, like extension communication, is a requirement for a university to operate as a macrosystem for information development and flow. Scientists must maintain contact and idea exchange with their peers. Ideally, this should be on a world wide basis to maximize the scientist's output of basic science knowledge. In fact, it is at this level of abstraction that information and concepts are most transferable. If we think in terms of a world-wide system of information development and flow, as is entirely feasible, then free exchange of ideas and concepts at the basic science level is highly instrumental. At this level there are few, if any, cultural constraints on what can be transferred from one social setting to another. Basic science findings developed in one country are equally valid in another. However, as the information transformation process and necessary inputs move in the direction of local application and ultimate use, research and development in specific cultural settings become more and more necessary.

Communication among scientists has been a subject of research concern for at least three decades. The communication of ideas and research results among scientists was earlier seen by Merton (1942) as one of the fundamental norms of the scientific community. Others influenced by his work have continued to explore the role of academic communication in the structure of the reward system of science (Hagstrom, 1965; Cole and Cole, 1973).

Productivity has been tied to the rewards scientists have received within the system of science. Exploring the effect of the quality and the quantity of a scientist's work on rewards received, the Coles (1973) conclude that science, while not completely universalistic, approaches this more closely than any other social institution. Hagstrom (1965) has related productivity to the processes by which rewards are given. Science operates on an exchange process, whereby the scientist exchanges his information gathered through research or his own intellectual explorations for recognition. The greatest recognition goes to those whose publications make the greatest contribution to their science specialty and whose activities strongly reflect the norms of science.

Given the central role that communication plays in science, it should come as no surprise that considerable attention has been paid to the communication productivity of scientists. A wide range of factors have been used to explain productivity such as age (Zuckerman and Merton, 1972), doctoral institutions (Crance, 1965), the receipt of research funds (McCartnery, 1970), and resources such as time to spend on research and the number of research assistants (Allison and Stewart, 1974).

Most of the studies, however, have only concentrated on one or a few variables. In this chapter, we will look at the effect a number of factors have on academic communication output and in some degree how these different factors interact. A more definitive examination of academic communication is presented elsewhere by Pope (1978).

Distribution of Academic Communication Output

Similar to the findings of other researchers, e.g., Price (1963), our study shows a highly skewed distribution of academic communication output both on the UMC campus and the Taiwan campuses. On the UMC campus, the range was from no output for three people to an extremely large score of 7,978 man-days for one individual. The placement of the mode (0.0), the median (261.0), and the mean (477.3) gives an indication of the skew of the distribution. In terms of production, 10 percent of the UMC campus faculty produced over half (51.2%) of the academic communication output, 30 percent produced three-fourths (75.5%). One individual produced over 13 percent of the total output. But when we remove this individual and his output from the calculations, the figures remain much the same. Without the very high producer, 16 percent of the faculty produced 51.6 percent of the total academic output and 34 percent produced 74.9 percent of the total.

The Taiwan faculties showed a similar distribution, although not nearly so skewed (mode: 300.0; median: 501.0; mean 608.5). The academic communication output ranged from none to a high of 3,862 man-days. In this setting, 20 percent of the faculty produced over half (50.5%) of the output, while 43 percent produced 75.7 percent. Thus, while both campuses show the skewed distribution that is so common in communication output, that of the Taiwan campuses is slightly less than that of the UMC campus (see Table 17).

Because of the highly skewed nature of the distribution, the logarithm of each score was taken for the AID analysis. Those who had no academic communication output were given a score of one so transformation of their scores could be accomplished.

Explanation of Academic Communication Output

The same seven variable categories were used as for Extension Communication. On the Columbia campus, selected variables from all categories explained the most variance (39.8%) followed by Conditions of Appointment (34.1%) (see Table 32). Reference Group Rewards explained the least amount of variance (17.3%). Background Characteristics was, in turn, a close second from the bottom (17.5%). Reference Group Influence explained 19.1 percent; Prior Socialization variables, 32.1 percent; and Perceptual variables, 33.4 percent.

On the two Taiwan campuses, selected variables from all categories explained by far the most variance (41.6%). Reference Group Rewards was lowest with 16.0 percent of the variance explained. Perceptual variables explained 32.2 percent of the variance; Conditions of Appointment 29.4 percent. Slightly less (28.3%) of the variance was explained by Reference Group Influence, while considerably less was explained by Background Characteristics (21.6%). Prior Socialization variables explained only slightly more variance (18.5%) than Reference Group Influence.

Each set of variables explained different amounts of variance, but not necessarily difference variance. As in extension communication, variables were interrelated across the categories. Failure of the selected variable categories to explain more than half of the total

TABLE 32. VARIANCE IN ACADEMIC COMMUNICATION EXPLAINED BY VARIABLE CATEGORIES FOR SOCIAL SCIENCE FACULTIES ON THE UMC AND TAIWAN CAMPUSES

Variable Category	Columbia Campus % of Variance Explained	Taiwan Campuses % of Variance Explained
Background Characteristics	17.5	21.6
Prior Socialization Experiences	32.1	18.5
Conditions of Appointment	34.1	29.4
Perceptual Variables	33.4	32.2
Reference Group Influence	19.1	28.3
Prospects for Professional Advancement vs Personal Satisfaction as a Reward	17.3	16.0
Cross Category Mix	39.8	41.6

variance underscores this. On both campuses, however, the selected variables category explained the largest amount of variance. This and the way variables are interrelated suggest the importance of considering a number of variables simultaneously in any attempt to explain communication output.

On the UMC Campus

Background Characteristics

Five of the six background variables appeared in the analysis. The lone exclusion was source of financial assistance as a graduate student.

The variable that explained the most variance was region of longest childhood residence (see Figure 31 and Appendix Table 13). The faculty from the South, Southwest, North Central, and Plains (Group 3) were more productive than those from the Northeast, Middle Atlantic, or West Coast (Group 2). Productivity was further enhanced in those cases when the faculty members were not from economically disadvantaged groups (Group 5). Productivity was distinctly higher for the middle aged (50-59) (Group 7). For those who were younger, having a proprietor, clerk, or skilled laborer parental background enhanced academic communication in contrast to the parent's being a farmer or a professional (Group 10). Being from an economically disadvantaged group (Group 4) was detrimental to academic communication; even when such faculty lived in the same geographic area as the high producers (Group 3). Productivity of these economically disadvantaged is the least of any group.

Prior Socialization

This category of variables reflected the graduate training of the faculty. The variable on which the first split occurred was whether the respondent published from basic research as a graduate student (see Figure 32 and Appendix Table 14). Since the AID process sought the best split without regard to the nature of the categories between which the split occurred, a curious finding resulted. High productivity was associated with answering the question yes or no. Those who did not answer, or to whom the question was not applicable, showed low academic communication output. While at first this split appears to represent those who did basic research as a graduate student and those who did not, Group 13 discounts that. Perhaps this first split is the result of the way in which the question was answered by respondents and the nature of the procedure used to produce the split.

Be that as it may, the results do provide some insight into the effect of prior socialization on academic output. For those who answered yes or no to publishing from basic research as a graduate student (Group 3), having only one type of previous employment, i.e., only academic or only non-academic employment enhanced communication output (Group 5). When this was fortified with having a Ph.D. from a university other than one of land grant origin and having published from basic research as a graduate student, academic communication output was the highest (Group 11). Those who held a Ph.D. from a land grant university or no Ph.D. at all produced more if they had not done basic research as a graduate student (Group 13), a somewhat unexpected result.

On the low side of the first split, those who did not answer or to whom the question of basic research publication as a graduate student

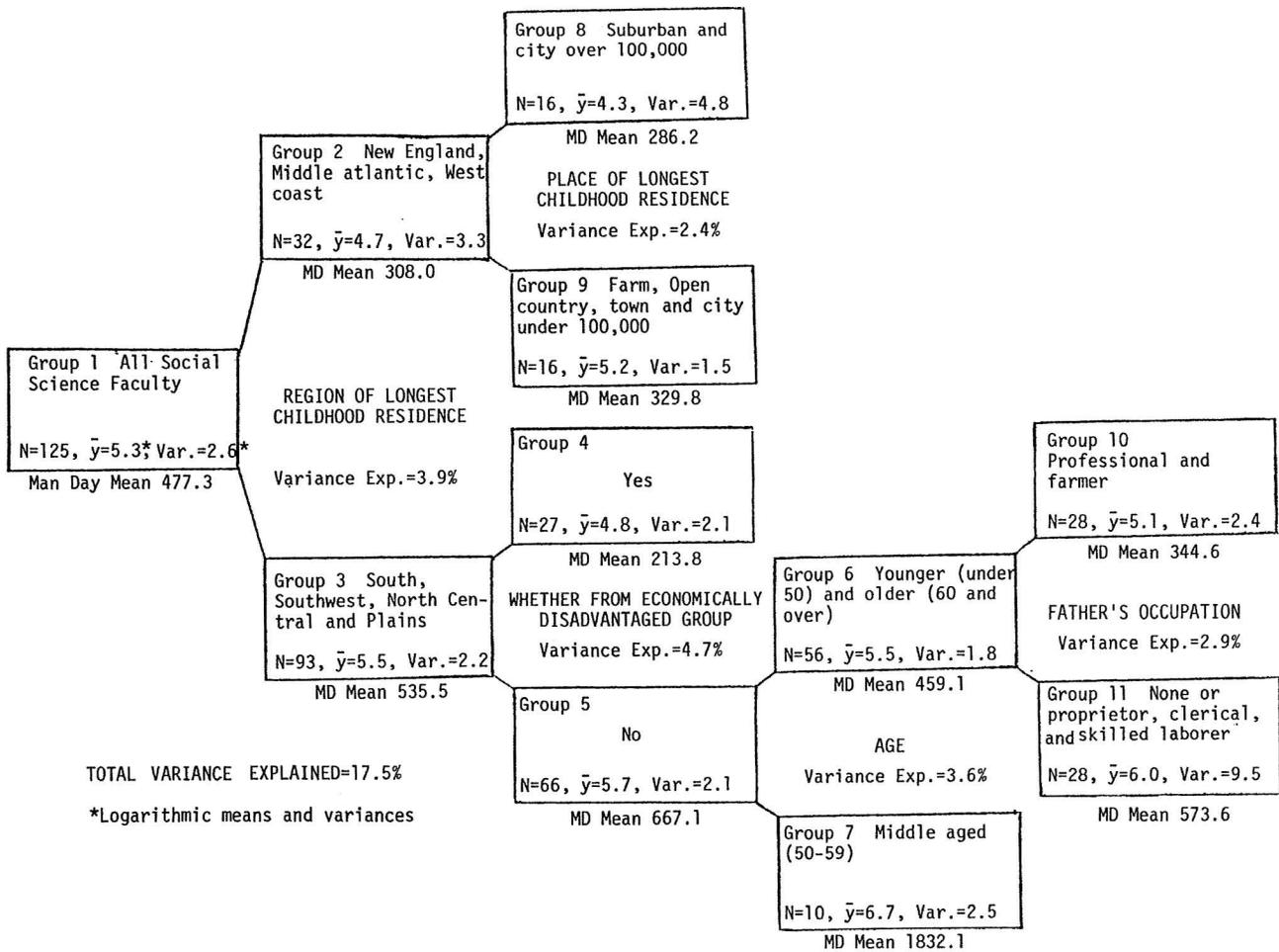
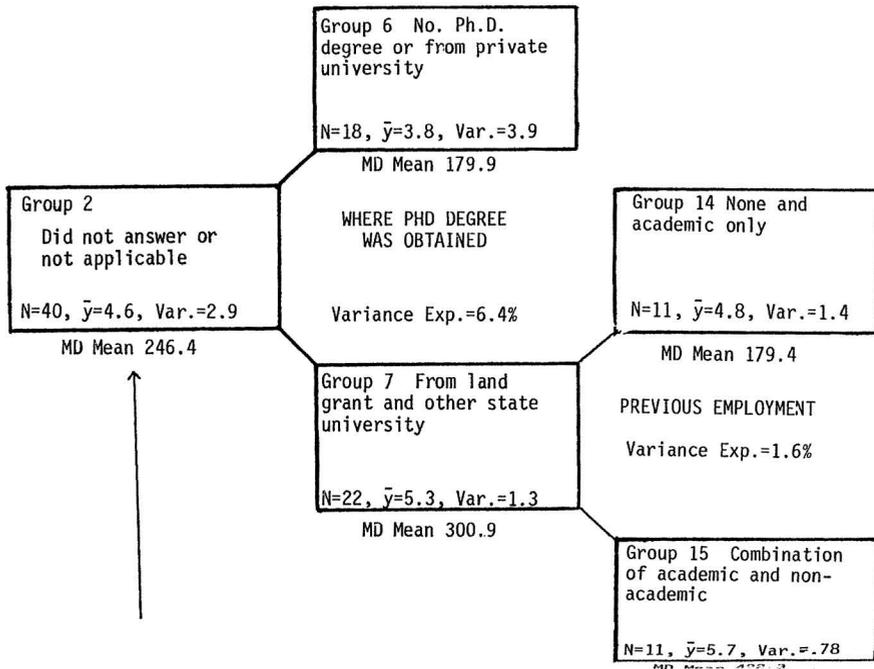
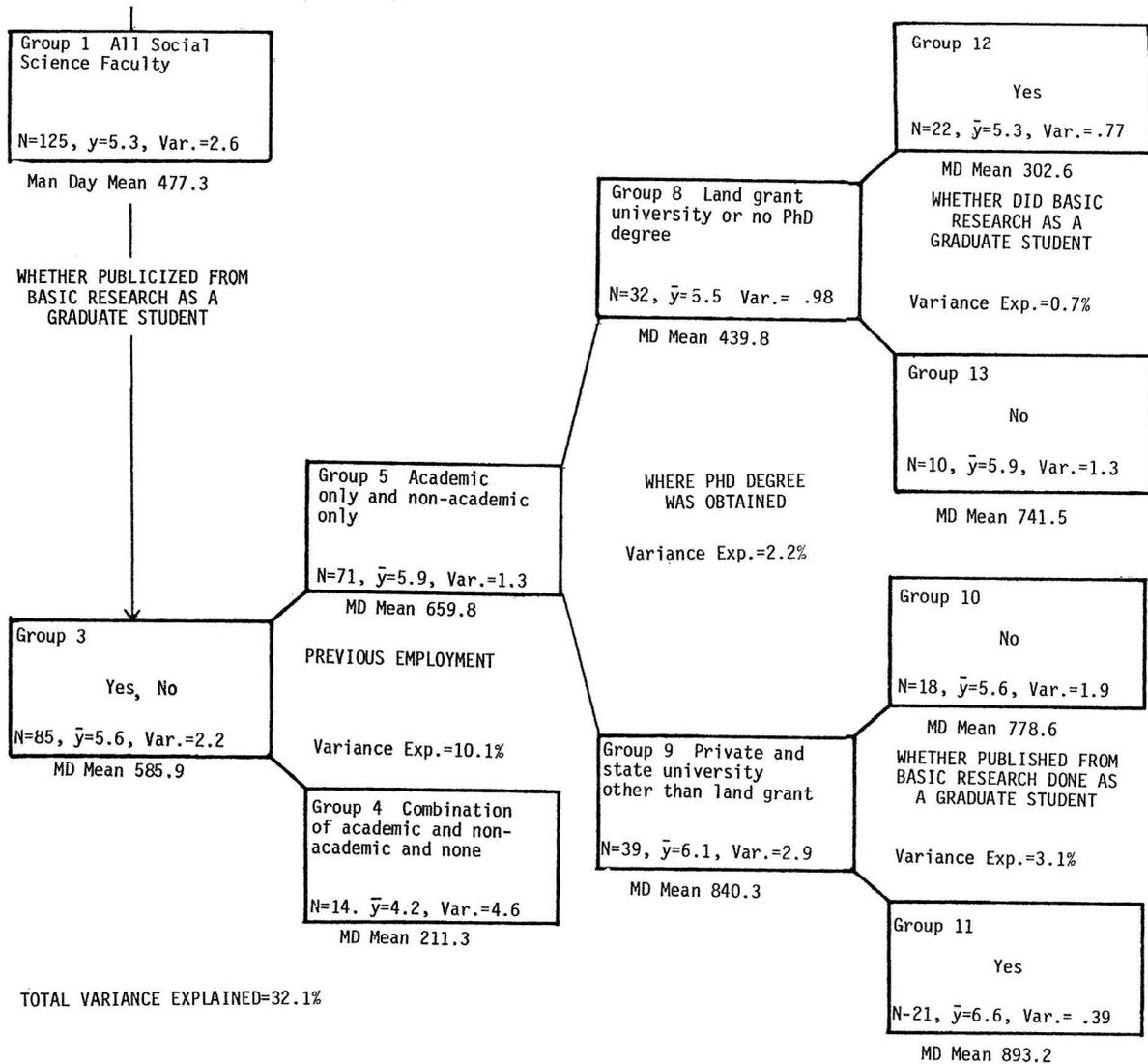


Figure 31. Man-day academic communication output of the social science faculty on the Columbia campus by background characteristics.

Figure 32. Man-day academic communication output of the social science faculty on the Columbia campus by prior socialization experiences.





TOTAL VARIANCE EXPLAINED=32.1%

apparently did not apply (Group 2), communication output decreased for those holding no Ph.D. from a land grant or private university. For those holding advanced degrees from a land grant or other state university productivity was increased when accompanied by a combination of academic and non-academic previous employment (Group 15). Having had no previous employment or academic employment only negated the positive effect of receiving the Ph.D. from a land grant university or other public university (Group 14).

Conditions of Appointment

Of the variables representing the structural and organizational conditions under which faculty work, the receipt of research funds emerged as the variable explaining the most variance in academic communication output (see Figure 33 and Appendix Table 15). Those who received research funds (Group 3) in any form were understandably more productive than those who received none (Group 2). This, McCarney (1970) has shown, operates in subtle ways. When those receiving research funds spent 25-49 percent of their time on administration and/or extra-curricular activities, output was enhanced (Group 9). This group had the highest man-day mean of any in this category. Although the inclination in western universities to involve the best academicians in administrative affairs--committees and the like--comes at considerable cost to academic communication, a little of it seems to be beneficial.

For those who spent a quarter or less or more than 50 percent of their time on administration and other activities (Group 8), teaching less than 25 percent or more than 50 percent of the time (Group 13) enhanced academic communication output. Those teaching an intermediate amount of time produced more if they were associate professors.

On the low side of the first split (those who did not receive research funds--Group 2), being of high academic rank (full or an associate professor--Group 5) enhanced academic communication. Their higher productivity may reflect a differential capacity to more advantageously use scarce resources or more opportunity to capitalize on a resource base already established by prior effort, particularly when their appointment also provides for doing research (Group 7). Having no research appointment (Group 6), having a teaching appointment (Group 10), and spending more than 50 percent of time in teaching (Group 16) were very detrimental to the academic communication of full and associate professors who did not receive research funds. Being free from teaching responsibilities, even though appointment did not provide for research resulted in higher productivity.

One feature that emerges here is the importance of teaching load on academic communication output. Having a teaching appointment (Group 10) and spending more than half of one's time teaching (Group 16) was detrimental to productivity. Clearly, when responsibilities become tied to teaching, little time and effort can be placed in research. But not having a teaching appointment or administrative responsibilities is not necessarily tied to high academic communication output. Rather, the researcher needs the exposure to other activities, possibly as a source of idea input and/or clarification of own thinking (Andrews, 1964).

Perceptual Variables

The variable of greatest explanatory power in this category was what the faculty members thought they should emphasize most (see Figure 34 and

and Appendix Table 16). Faculty who felt they should emphasize basic or applied research or the testing of innovations (Group 3) had a much higher academic communication output than those who felt they should emphasize teaching and outreach work (Group 2), confirming Fulton and Trow's (1974) findings on the association of research orientation and publication. When the research-oriented contingent (Group 3) saw some prospect for professional advancement from helping people solve their problems (Group 11) and, additionally, saw some utility of their specialty for solving current problem issues (Group 19), their productivity was the highest of any subgroup.

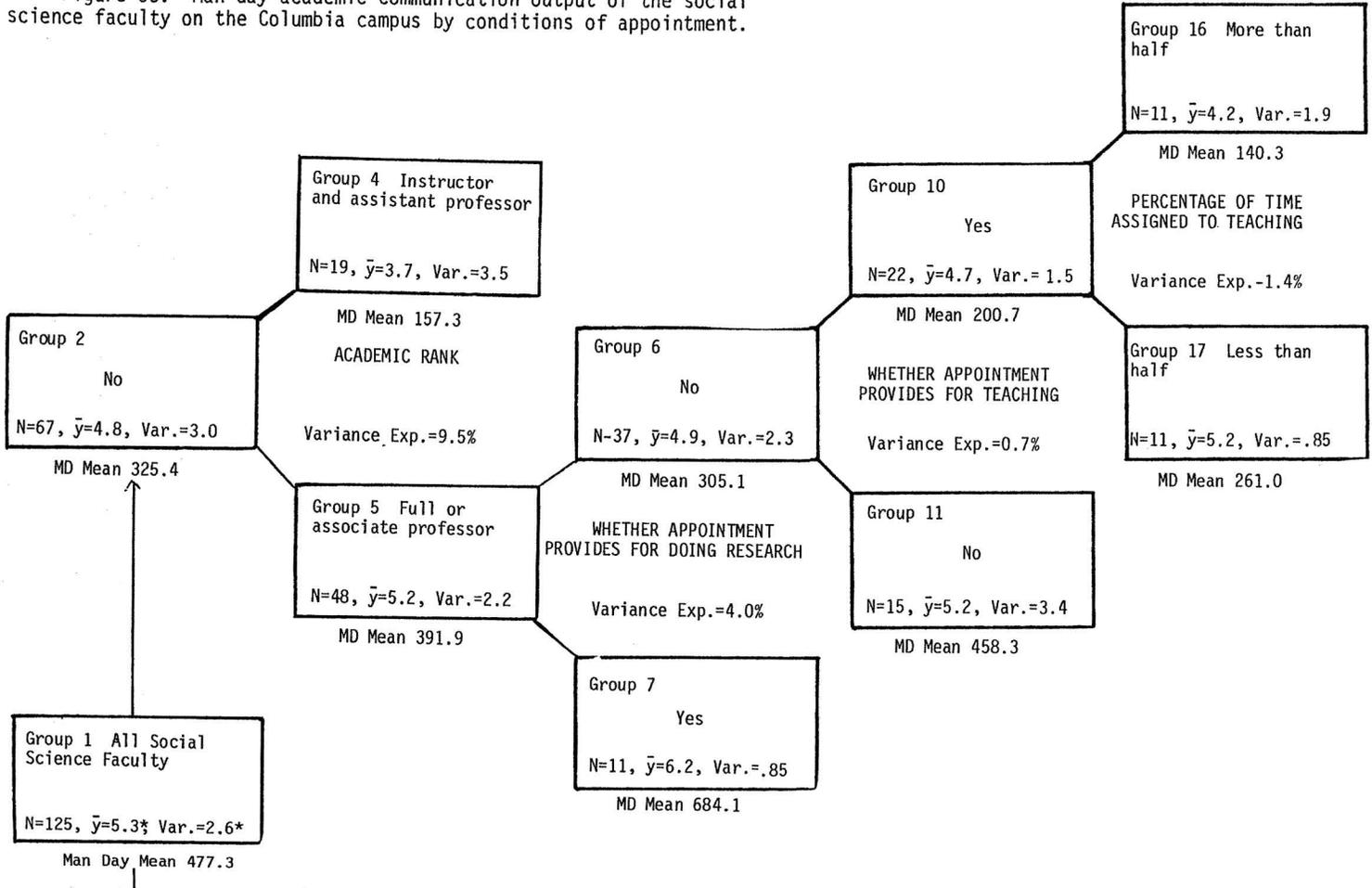
On the low side of the first split (Group 2), being an Academic Elitist (Group 5) enhanced productivity. Being a Society Servant or a Land Grant University Traditionalizer (Group 4) resulted in a lower productivity than for any other combination of perceptual variables. For those who were Academic Elites, perceiving some utility for their specialty in understanding current problem issues (Group 7) was associated with high productivity. Perceiving either little or much utility for their specialty (Group 6) detracted from the academic communication output of the Academic Elites. Those of this group who perceived some constraints upon doing applied research (Group 9)--actually those who were already doing or were interested in doing applied research--had a higher productivity than those who did not answer the question. It seems likely that many of these were neither doing nor interested in doing applied research (Group 8). Perceiving their extension work to be properly rewarded enhanced the academic productivity of those who perceived constraints (Group 13). For those who felt their extensions work was not properly rewarded (Group 12), feeling the university should give the least emphasis to teaching, applied research, or outreach activities helped (Group 15).

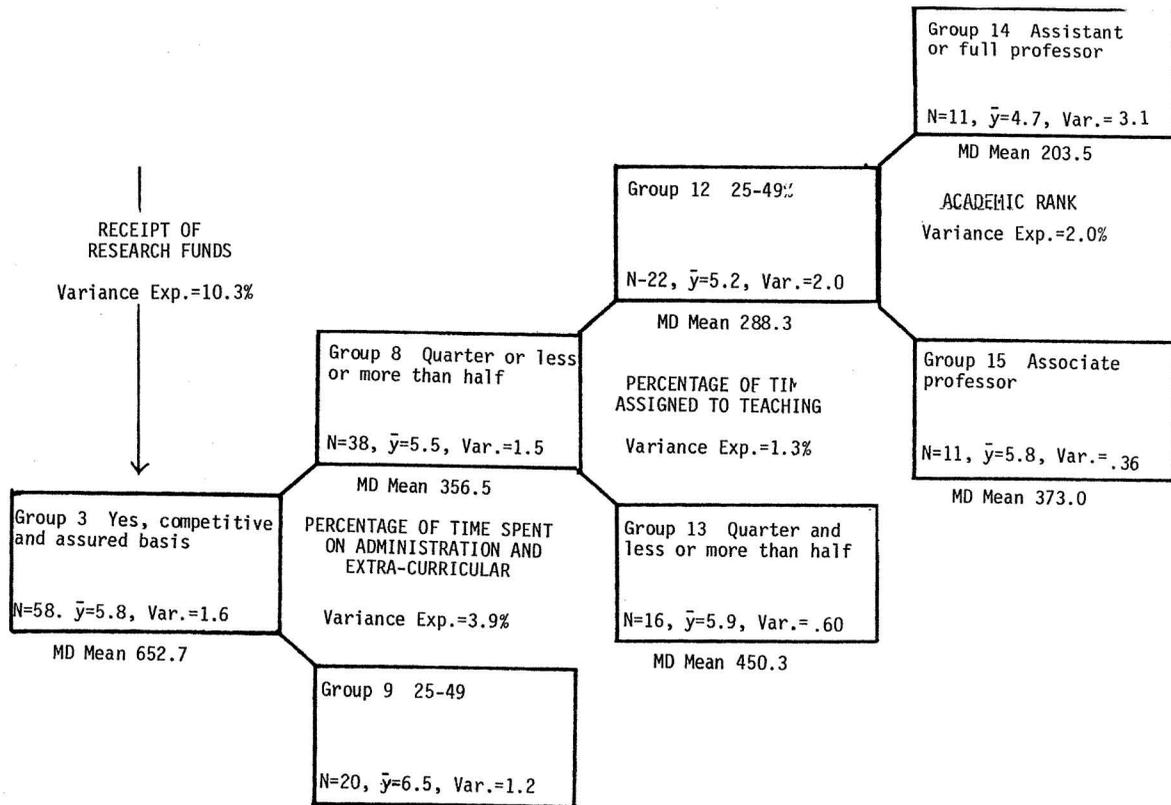
Perceived Reference Group Influence

Faculty were asked how much influence they perceived from a number of reference groups to which faculty may defer. These ranged from the pure academic to the general public. Those perceiving any amount of influence from funding agencies (Group 3) showed a much higher academic communication output than those who perceived no such influence (Group 2) (see Figure 35 and Appendix Table 17). Perceiving no influence from the university administration augmented the output of the high producers (Group 5). Of those perceiving little, some, much, or very much influence from university administration (Group 4), academic communication was enhanced by perceiving at least some influence from the general public (Group 6). A little influence from university administration and much or very much influence from colleagues in own academic discipline increased academic communication to the highest level of any group (Group 15). Strong influence from university administration diminished academic communication output (Group 8). A further decrease resulted when strong influence from undergraduate students was reported (Group 10). Those influenced by the university administration produced more when influenced none, little, or some by undergraduate students (Group 11) and still more when perceiving much or very much influence from graduate students (Group 13).

For those who perceived no influence from funding agencies (Group 2), perceiving little or some influence (Group 17) from departmental colleagues increased productivity but perceiving high influence from this group (Group 16) detracted from academic output. This latter group had the lowest mean productivity for any combination of reference group influence.

Figure 33. Man-day academic communication output of the social science faculty on the Columbia campus by conditions of appointment.

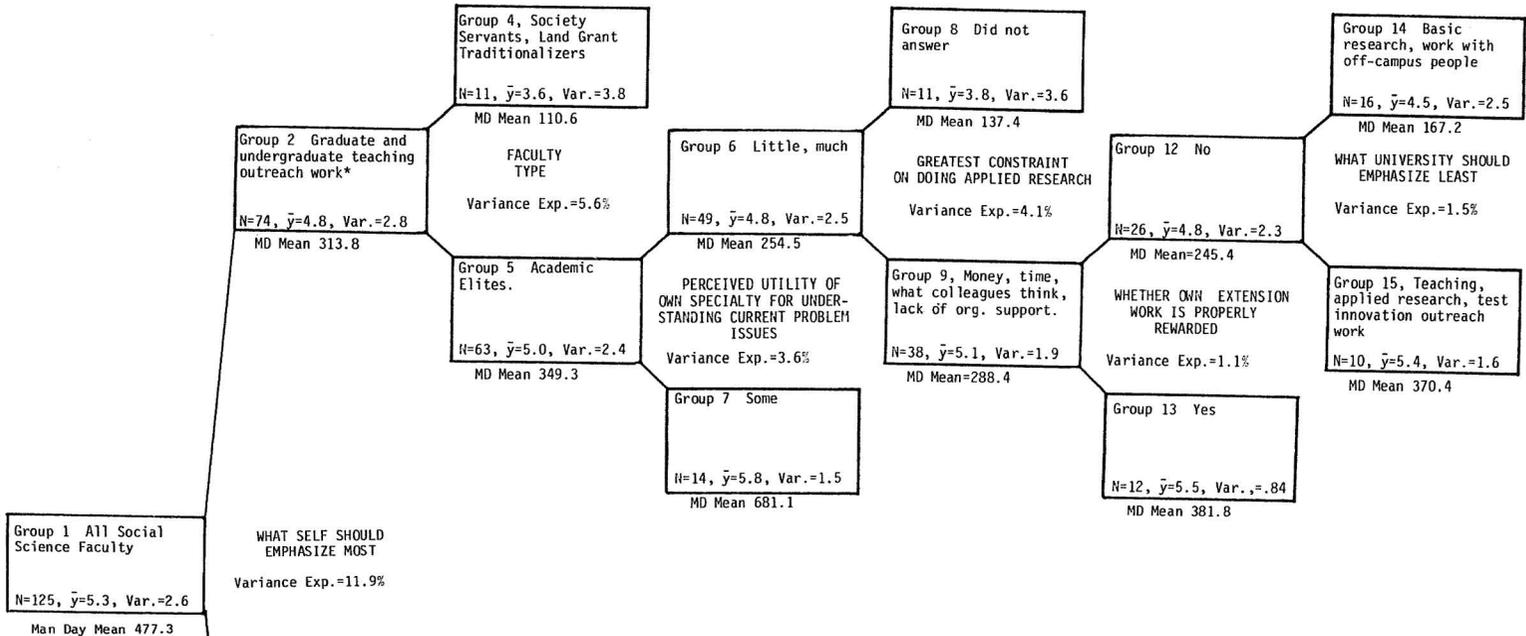


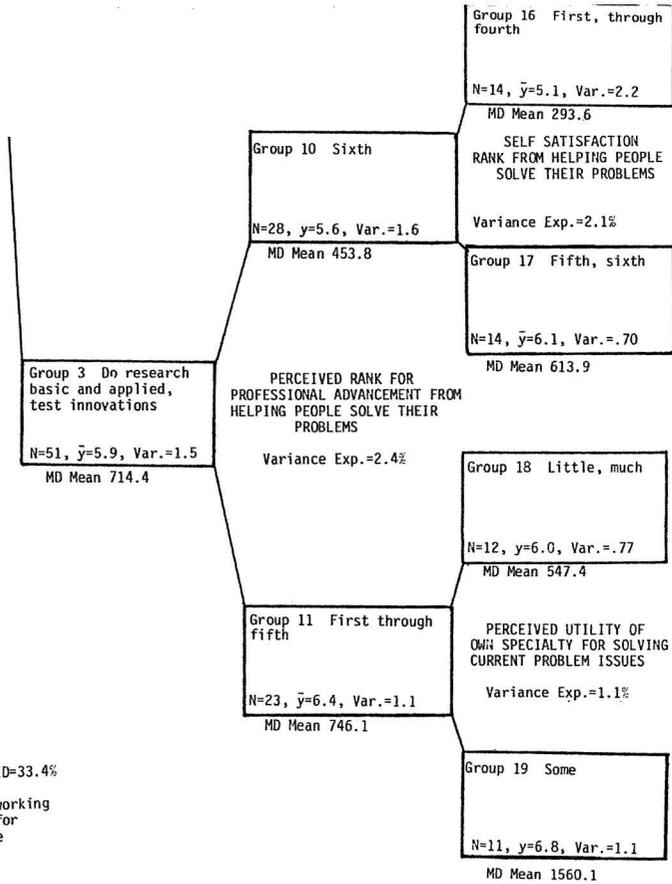


TOTAL VARIANCE EXPLAINED=34.1% MD Mean 1215.5

*Logarithmic means and variances

Figure 34. Man-day academic communication output of the social science faculty on the UMC campus by perceptual variables.





TOTAL VARIANCE EXPLAINED=33.4%

*Includes consulting, working with, and publishing for clientele outside the university.

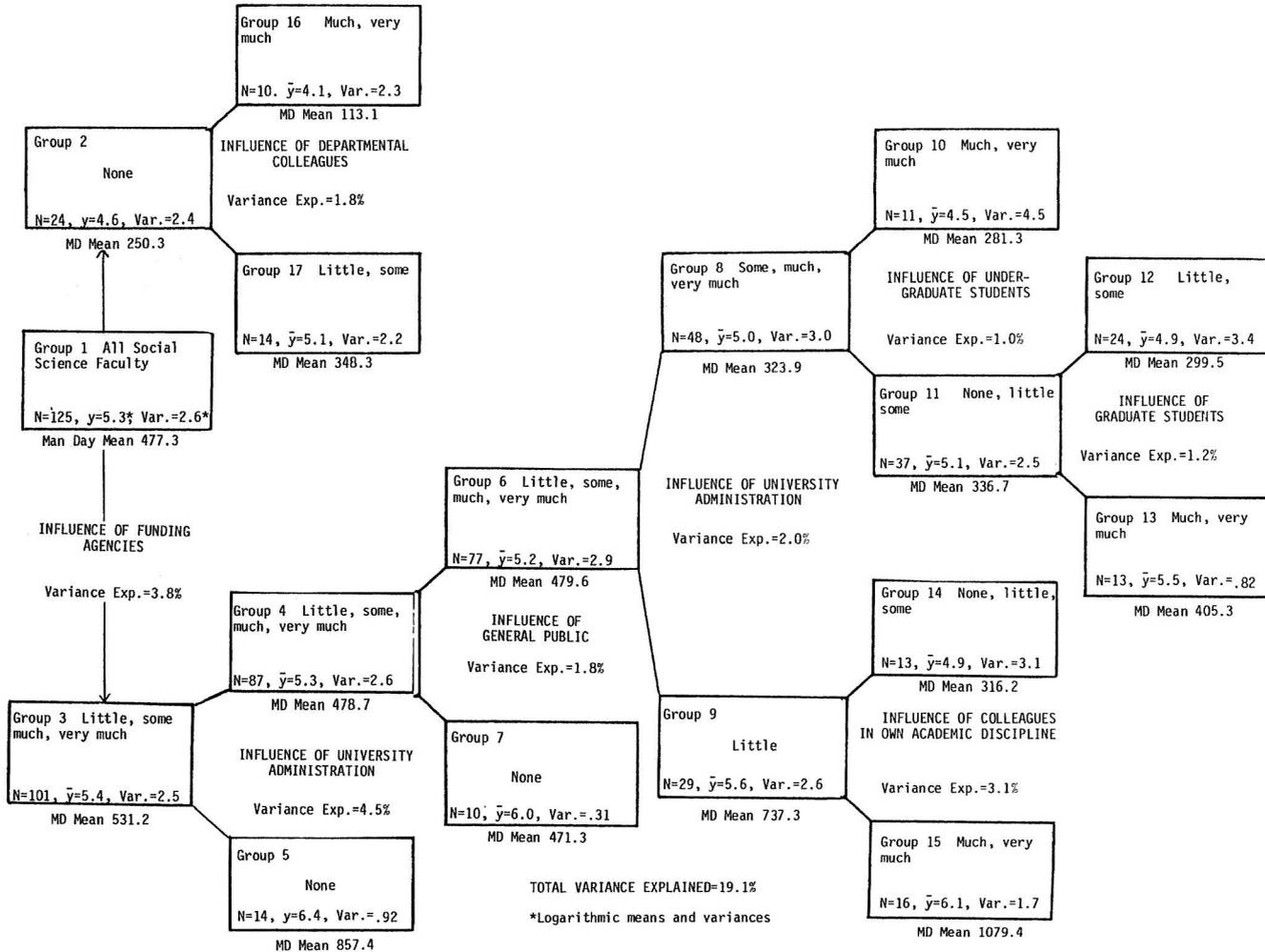


Figure 35. Man-day academic communication output of the social science faculty on the UMC campus by perceived reference group influence on own work.

The most striking feature in regard to reference group influence was the importance of funding agencies in explaining academic communication output. Another feature was the relative absence of academic reference groups. Only in the latter stages of the splitting process did influence from colleagues in own academic discipline emerge. The effect of influence from departmental colleagues was the reverse of what one would expect. But on the contrary--except for funding agencies and to some extent the general public--moderate to high influence from reference groups outside of academia was associated with low productivity. Perhaps the norms of academia operated in a more or less uniform manner as a compulsion to publish (in the "right" places). The faculty may have recognized that some deference to funding sources is also necessary while at the same time requiring a tight line on how much deference is appropriate. Also, the faculty were surely aware of the effects that funding has on research output (Useem, 1976).

Personal Satisfaction vs. Professional Advancement as Rewards

Here again reference group influence on academic communication output is at issue. But in this case perceived reward is the central concern. Here, as with extension communication output, the first concern was which would take precedence in explaining academic communication output, rewards from professional advancement or own personal satisfaction. Where the reward came from was somewhat incidental. To provide the data base for the analysis, faculty members were asked which reference group contributed most to their professional advancement and which contributed most to their personal satisfaction.

The first split occurred on "contribution to professional advancement" rather than "contribution to self satisfaction" (Groups 2 and 3). This explained over twice as much variance in academic communication output as any other split (see Figure 36). For some, even the second split explaining next most variance occurred on a combination of reference groups from which prospects for professional advancement were at issue (Groups 5 and 6). For a much smaller number of faculty and a much smaller amount of variance, self satisfaction was a reward. This is in contrast to extension communication where self satisfaction as a reward predominated over prospects for professional advancement as an explanation of high academic communication.

The Cross-Category Mix

In accord with previously stated guidelines, high explanatory variables from background, prior socialization, conditions of appointment, perceptual factors, and reference group influence were selected for a final mix with the view of determining how the variable types interacted to explain the variance in academic communication and whether amount of variance explained could be increased.

The mix did explain more of the variance (39.8%) than any of the single categories. A perceptual variable, what the faculty member thought he should emphasize most, provided the basis for the first split (Groups 2 and 3) and explained 12.0 percent of the total variance (see Figure 37 and Appendix Table 18). This was high by comparison to that explained by other variables (see Table 33). Those committed to basic and applied research were on the high side and those dedicated to educational outreach on the low.

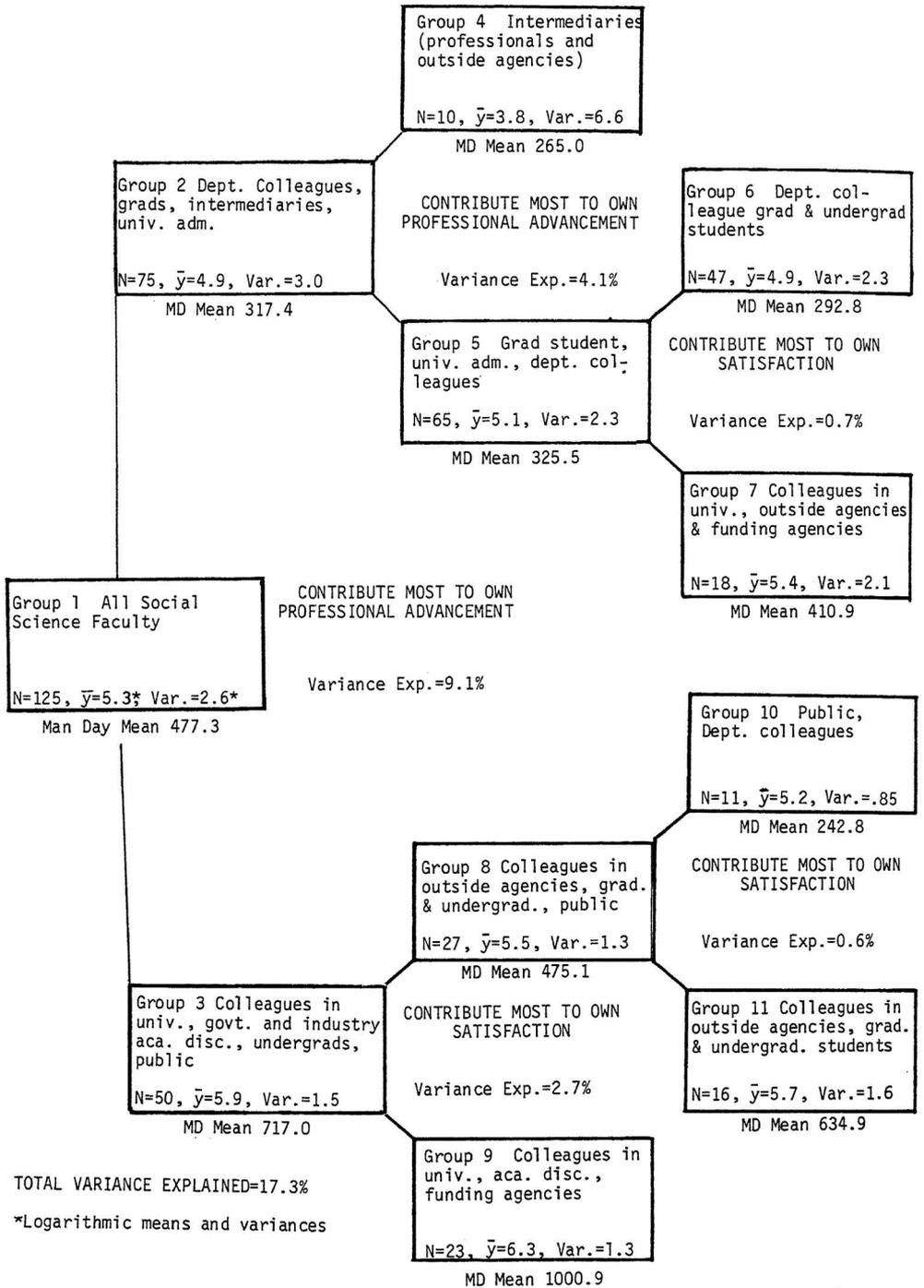


Figure 36. Relative importance of personal satisfaction and prospects for professional advancement from reference groups on the academic communication of the social science faculty on the UMC campus.

Next in order was a prior socialization variable for the low producers (Group 2) and region of longest childhood residence for the high producers. In regard to the latter (Group 3), faculty from the North Central, Plains, and West Coast (Group 9) greatly outproduced those from other areas of the U.S., including the Northeast, Middle Atlantic, and South (Group 8). For the high producers from Group 9, the additional reinforcement of first to fifth perceived rank for professional advancement in helping people solve their problems climaxed the combination of influences that supported the highest academic communication (Group 13).

On the side of the low producer on the first split (Group 2), who were basically committed to outreach work, having a Ph.D. degree from some place was the determining influence for high productivity (Group 5). This was helped by receipt of research funds, either on an assured or temporary basis (Group 7) and even more in an age group exclusive of those who were 60, under 30, or 40-49 (Group 15).

For those not very productive anyhow (Group 6), with a Ph.D. degree and committed to outreach over basic and applied research, a commitment to consultation with and publication for intermediaries who could use the information or to teaching graduate students helped a little (Group 11).

On the Taiwan Campuses

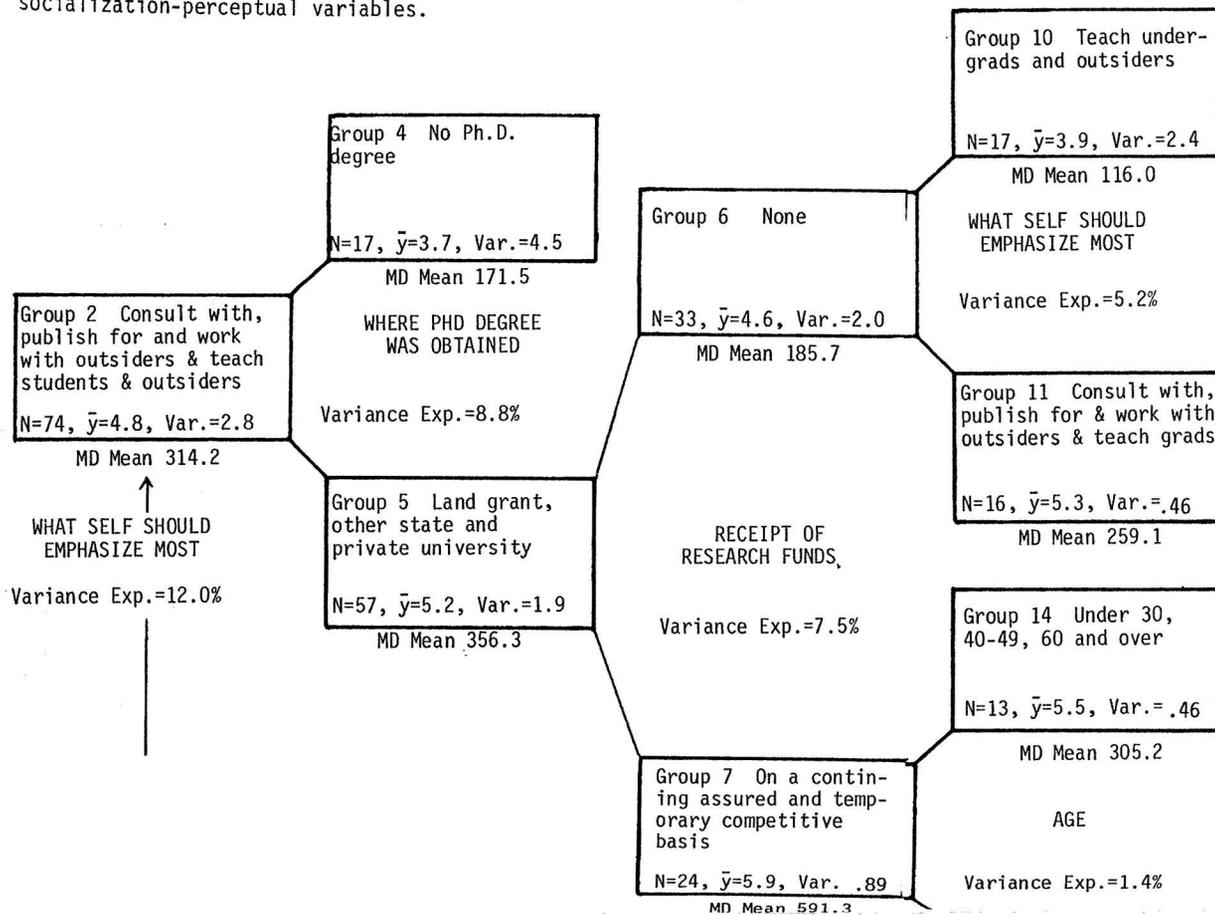
Background Characteristics

The variable that explained the most variance in academic communication was father's occupation (see Figure 38 and Appendix Table 19). Those whose fathers were professionals or farmers (Group 3) had a higher academic communication output than those whose fathers were proprietors, clerks, skilled laborers, or others (Group 2). For those whose fathers were professionals or farmers, financial assistance as a graduate student increased productivity (Group 7). When this followed by being 50 or over, the highest productivity resulted. For those whose fathers were professionals or who were farmers and under 50, having a teaching assistantship, graduate assistantship, or a combination of support as a graduate student enhanced communication output (Group 11). Those who received a research assistantship or a fellowship had their productivity increased if they were 40 to 50 years of age (Group 15).

For the group that did not do applied research as a graduate student, having a Ph.D. from Taiwan, the USA, England, or France increased productivity (Group 5). Those who had the Ph.D. from Japan had a higher communication output if they had not published from basic research as a graduate student (Group 7). Having published from basic research as a graduate student or finding the question not applicable and having no non-academic, or only some academic previous employment diminished academic communication output (Group 9).

A clear feature of this category is the effect that basic research as a graduate student had upon academic communication. Whether the involvement was in the research itself or in publishing from basic research, it was associated with lower productivity. Apparently, the kind of socializing influence that accompanied applied research as a graduate student was conducive to research and writing that was directed to academia but that which accompanied doing basic research was not. Also, indications are that an applied research orientation was more acceptable to academia in Taiwan than to the faculty at UMC.

Figure 37. Man-day academic communication output of the social science faculty on the UMC campus by selected structural-background-socialization-perceptual variables.



Group 1 All Social
Science Faculty

N=125, $\bar{y}=5.3^*$, Var.=2.6*

Man Day Mean 477.3

Group 15 30-39
50-59

N=11, $\bar{y}=6.4$, Var.=1.0

MD Mean 930.4

Group 8 New England
Middle Atlantic, South,
Southwest

N=14, $\bar{y}=5.2$, Var.=2.1

MD Mean 330.6

REGION OF LONGEST
CHILDHOOD RESIDENCE

Variance Exp.=3.5%

Group 12 Sixth

N=19, $\bar{y}=5.9$, Var.=.90

MD Mean 519.5

RANK FOR PROFESSIONAL
ADVANCEMENT-HELPING
PEOPLE SOLVE THEIR
PROBLEMS

Variance Exp.=1.5%

Group 9 North central,
Plains, West Coast and
other

N=37, $\bar{y}=6.2$, Var.=1.0

MD Mean 860.2

Group 13 First,
second, third, fourth,
fifth

N=18, $\bar{y}=6.6$, Var.=.90

MD Mean 1220.4

Group 3 Do research-
basic and applied
and test innovations

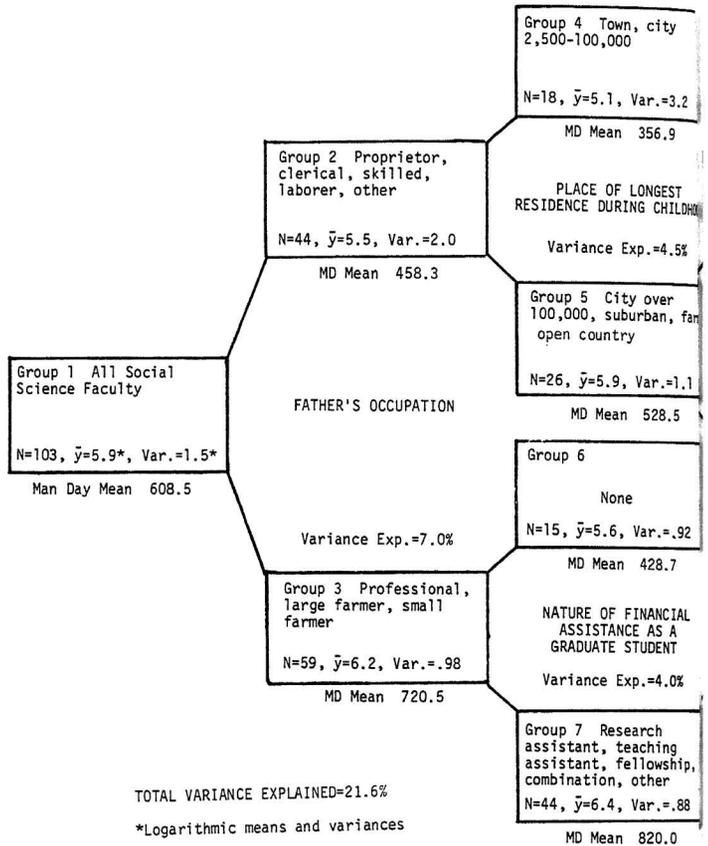
N=51, $\bar{y}=5.9$, Var.=1.5

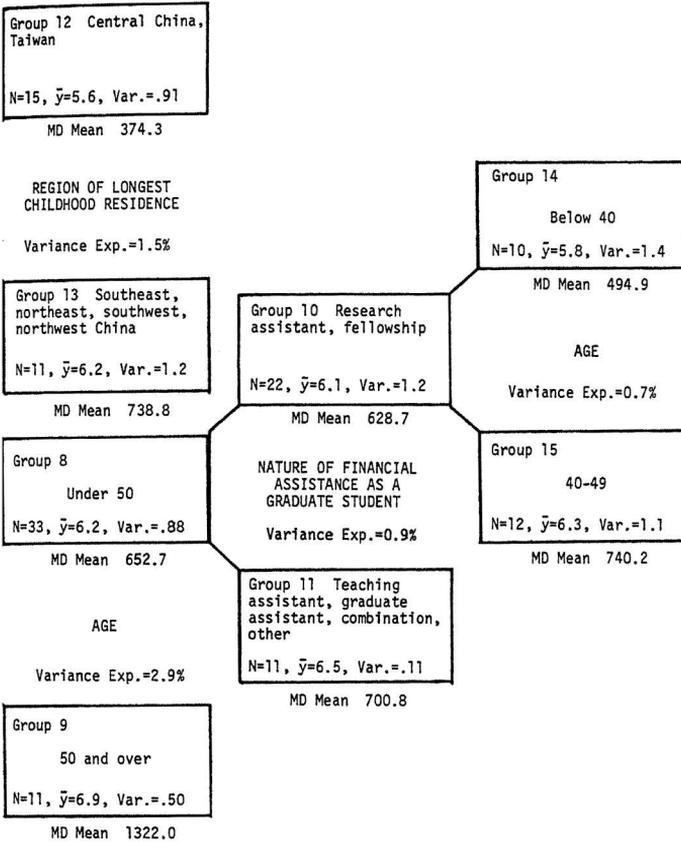
MD Mean 715.4

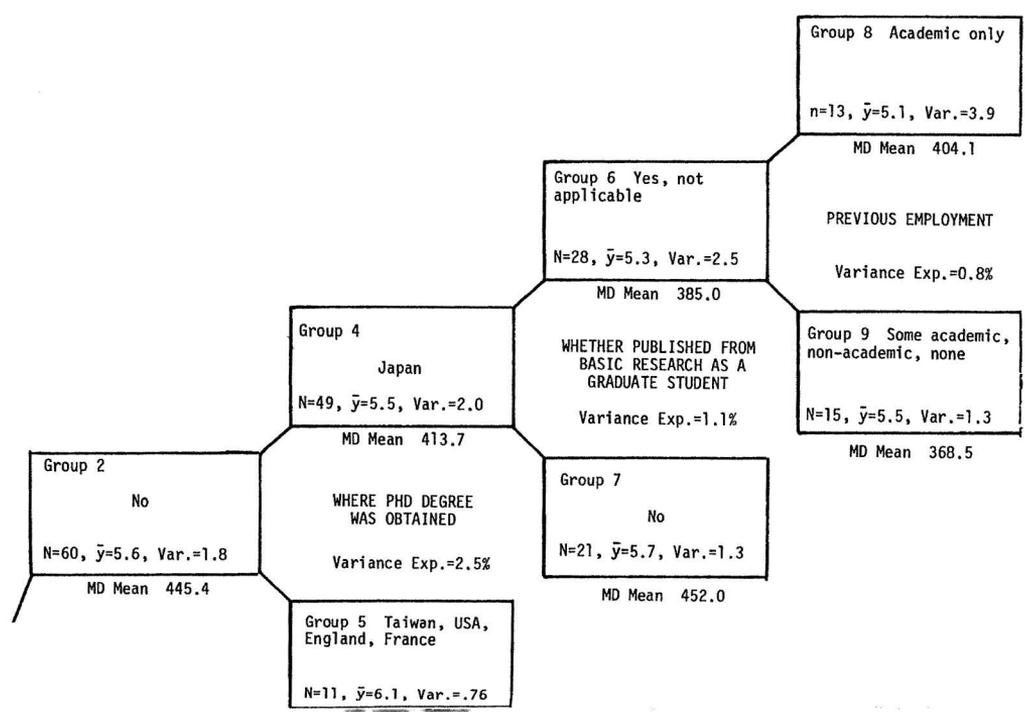
TOTAL VARIANCE EXPLAINED=39.8%

*Logarithmic means and variances

Figure 38. Man-day academic communication output of the social science faculty on the Taiwan campuses by background characteristics.







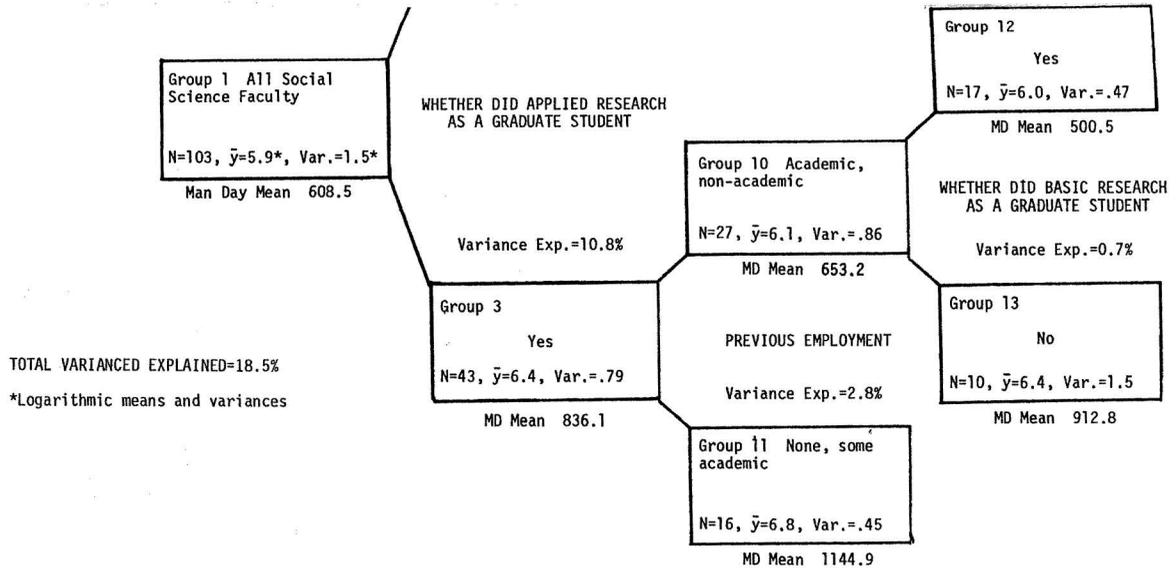
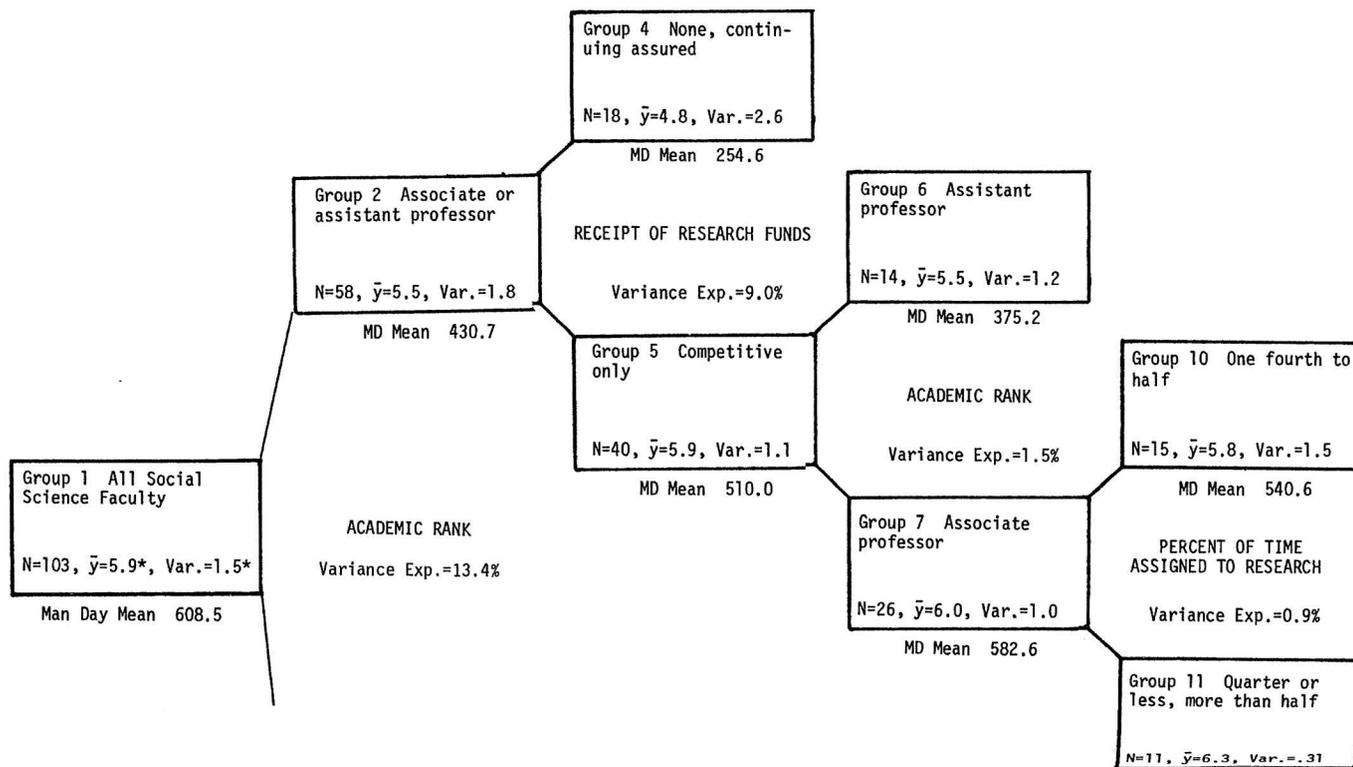


Figure 39. Man-day academic communication output of the social science faculty on the Taiwan campuses by prior socialization experiences.



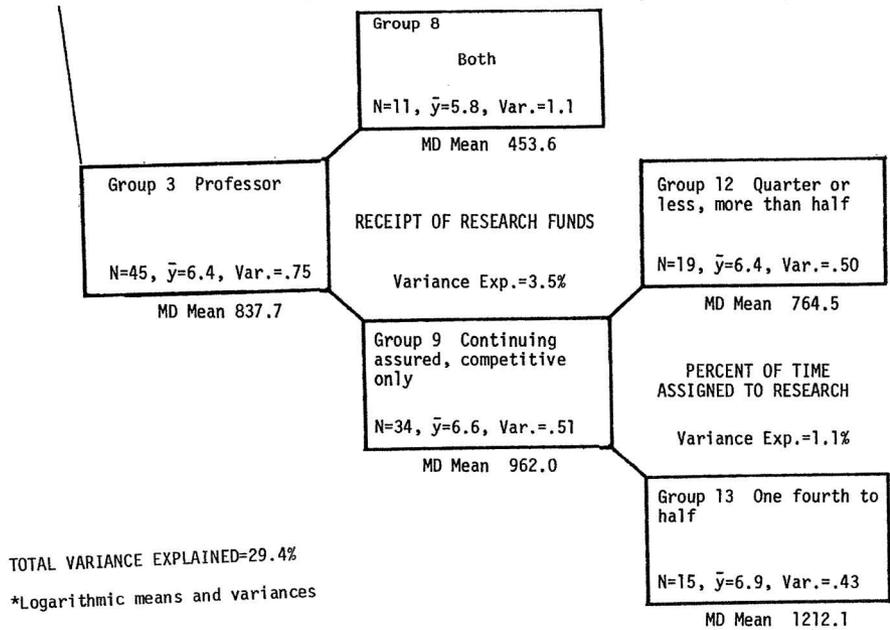


Figure 40. Man-day academic communication output of the social science faculty on the Taiwan campuses by conditions of appointment.

Conditions of Appointment

For conditions of appointment, academic rank explained the most variance. Full professors were much more productive than associate or assistant professors (Group 6). Associate professors were in turn more productive if assigned either quarter time or more than half time to research.

Academic rank of assistant or associate professors and no receipt of research funds combined to create the lowest academic communication level identified. Time assigned to the research activity appeared as a last order factor on both the low and high producing sides of the first split on academic rank. It operated differently in association with different levels of academic rank and the variable whether the research funds received were on a competitive or assured basis.

Perceptual Variables

Self perception of what a university should emphasize most provided the basis for the first split (see Figure 41 and Appendix Table 22). The faculty who felt the university should emphasize basic or applied research, teaching graduate students, the testing of innovations, and publishing for or consulting with or working with outsiders were the highest producers (Group 3). This was in contrast to extension where what self should emphasize most took precedence. Those who received a high degree of satisfaction from writing for non-academics (Group 7) showed increased output. For those who ranked this source of self satisfaction as moderate or low, feeling that they should emphasize basic research, or teaching graduates, undergraduates, or outsiders augmented academic communication output (Group 9).

Returning to the first split, a feeling that the university should emphasize teaching undergraduates or outsiders was associated with low productivity (Group 2). Group 2 members' output was increased, paradoxically, if they felt that the university should least emphasize basic or applied research, teaching students, or working with outsiders. A further increase occurred when they additionally rated helping intermediaries low as a source of self satisfaction (Group 11). Those who felt the university should least emphasize publishing for or consulting with outsiders and who emphasized teaching over research (Group 4) had the lowest academic communication output.

Perceived Reference Group Influence

Academic communication output was low in the absence of perceived reference group influence from colleagues in own academic discipline (Group 2) (see Figure 42 and Appendix Table 23). Productivity decreased even more in the absence of perceived influence from graduate students (Group 4). Conversely, perceiving at least some influence from graduate students (Group 5) and low influence from the university administration (Group 13) augmented productivity.

In the group that perceived at least some influence from colleagues in own academic discipline (Group 3), perceiving much or very much influence from undergraduate students (Group 7) and some, much, or very much influence from university colleagues (Group 9) augmented academic productivity. For those perceiving no more than some influence from the general public (Group 11) communication output was enhanced. In the other case, perceiving no influence from the general public (Group 10) detracted

from academic communication output, but this was overcome when much or very much influence was perceived from departmental colleagues (Group 15).

The importance of academic reference groups in explaining productivity was apparent. In all cases but one, perceiving influence from colleagues in own academic discipline, students, university, or departmental colleagues enhanced productivity.

Personal Satisfaction vs. Professional Advancement as Rewards

First and contributing half of the total variance explained by this category was reference group contribution to own satisfaction (see Figure 43).

Reference group contributions to own professional advancement provided the basis for subsequent splits (Groups 6 and 7 and 4 and 5). Given the relative positions of the two variables and the amount of variance explained by each, own satisfaction was most important in explaining academic communication.

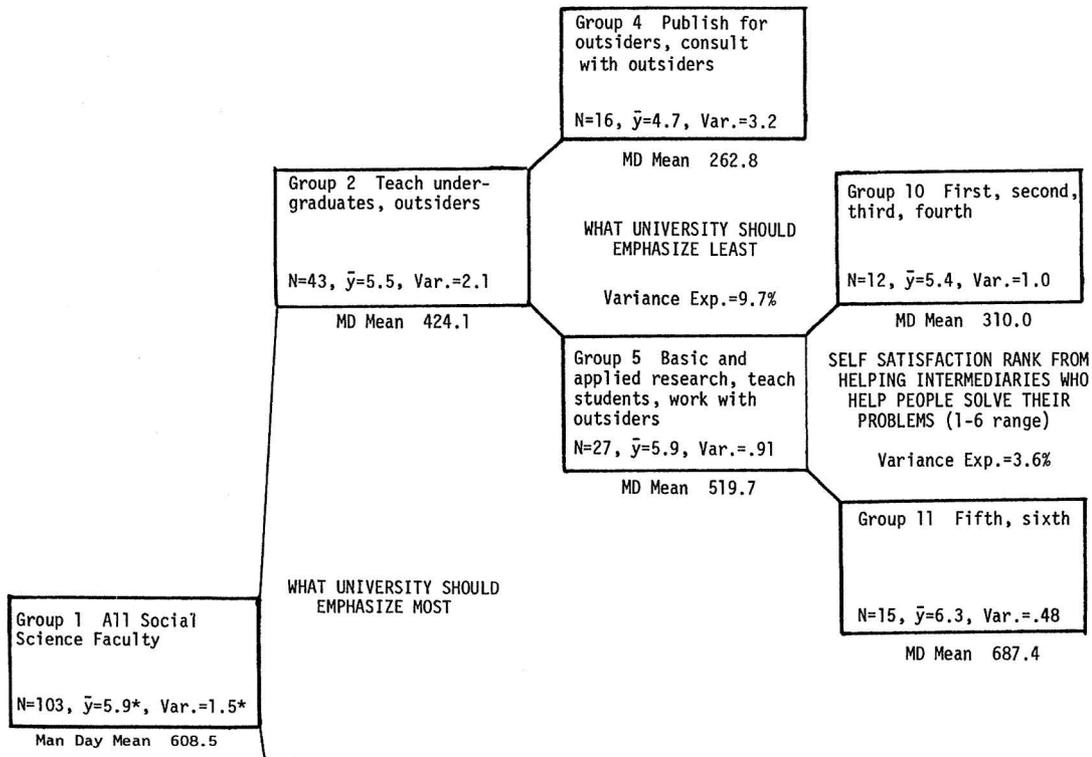
The Cross-Category Mix

Again, the issue of improvement in variance explained and relative importance of different kinds of variables are at issue. The cross-category mix explained more variance (41.6%) than any other single category. Perceptual variables explained the second most with 32.2 percent.

Academic rank, which explained 13.4 percent of the variance, provided the basis for the first split. Professors (Group 3) were about twice as productive as those of lower rank (Group 2) (see Figure 44 and Appendix Table 24). Second in variance, explaining 13.1 percent and involving about half of the faculty, all with academic rank of less than full professor, was influence of departmental colleagues. Those perceiving moderate or high influence was much more productive (Group 5). Those who additionally believed that the university should most emphasize basic research and teaching graduate students (Group 7) were even more productive. For those who were less than full professors and who thought undergraduate teaching, applied research, or education should be emphasized most in the university, moderate influence from departmental colleagues enhanced productivity (Group 11).

For full professors (Group 3), a background characteristic emerged as the basis for the second split: previous employment. For them, previous non-academic employment was a deterrent to high productivity (Group 8). Prior academic employment or none at all was conducive to high productivity (Group 9) and perceived moderate to high influence from the university administration influenced, still more communication activity (Group 13). However, the variance explained in the last split was small.

Thus, in the total mix, perceptual variables predominated over all others in the ratio of 2 to 1, with one of them explaining virtually as much of the variance as academic rank, which provided the basis for the first split. Except for previous occupational experience, background variables receded in comparison to what the faculty had come to believe as a result of prior socialization and the academic rank they had been able to achieve.



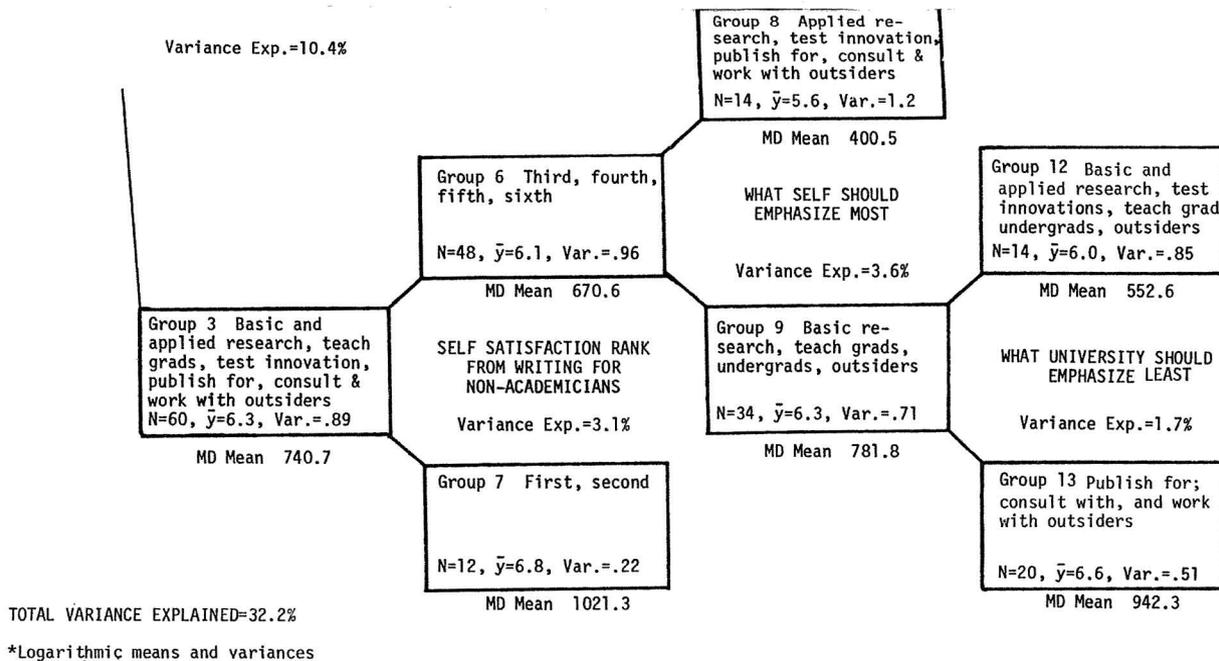
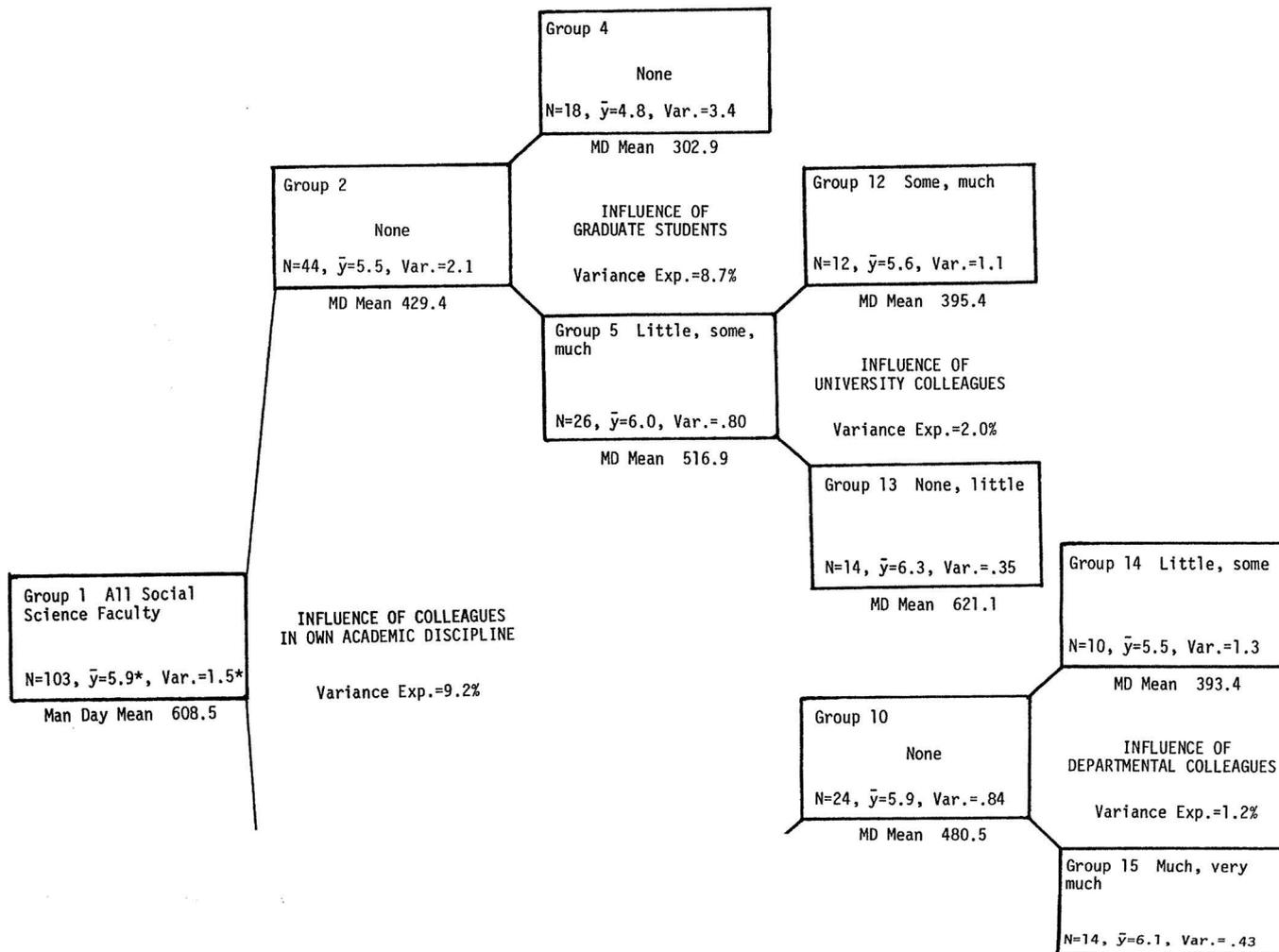


Figure 41. Man-day academic communication output of the social science faculty on the Taiwan campuses by perceptual variables.



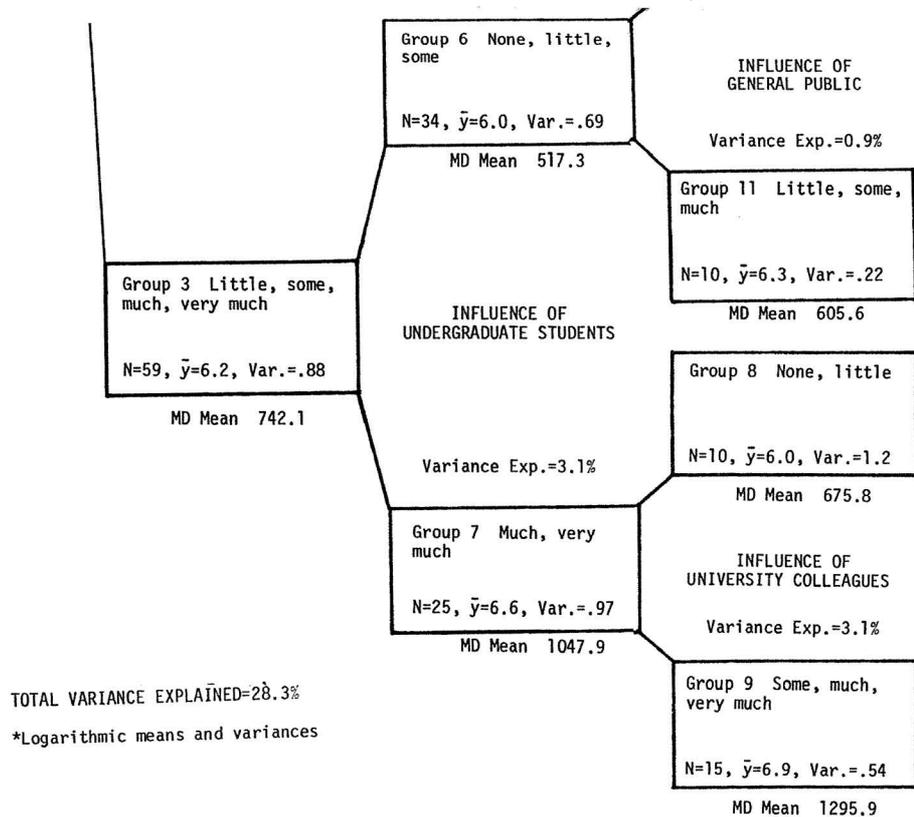


Figure 42. Man-day academic communication output of the social science faculty on the Taiwan campuses by perceived reference group influence on own work.

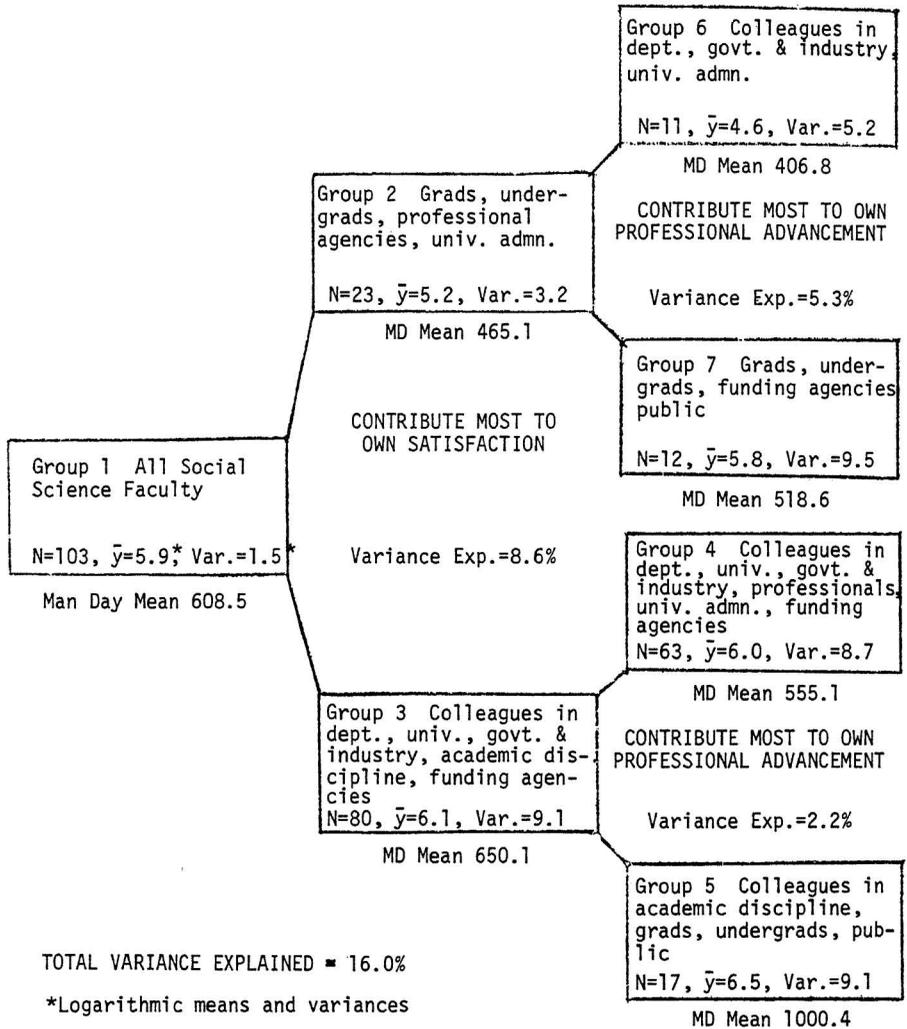


Figure 43. Relative importance of personal satisfaction and prospects for professional advancement from reference groups on the academic communication of the social science faculty on the Taiwan campuses.

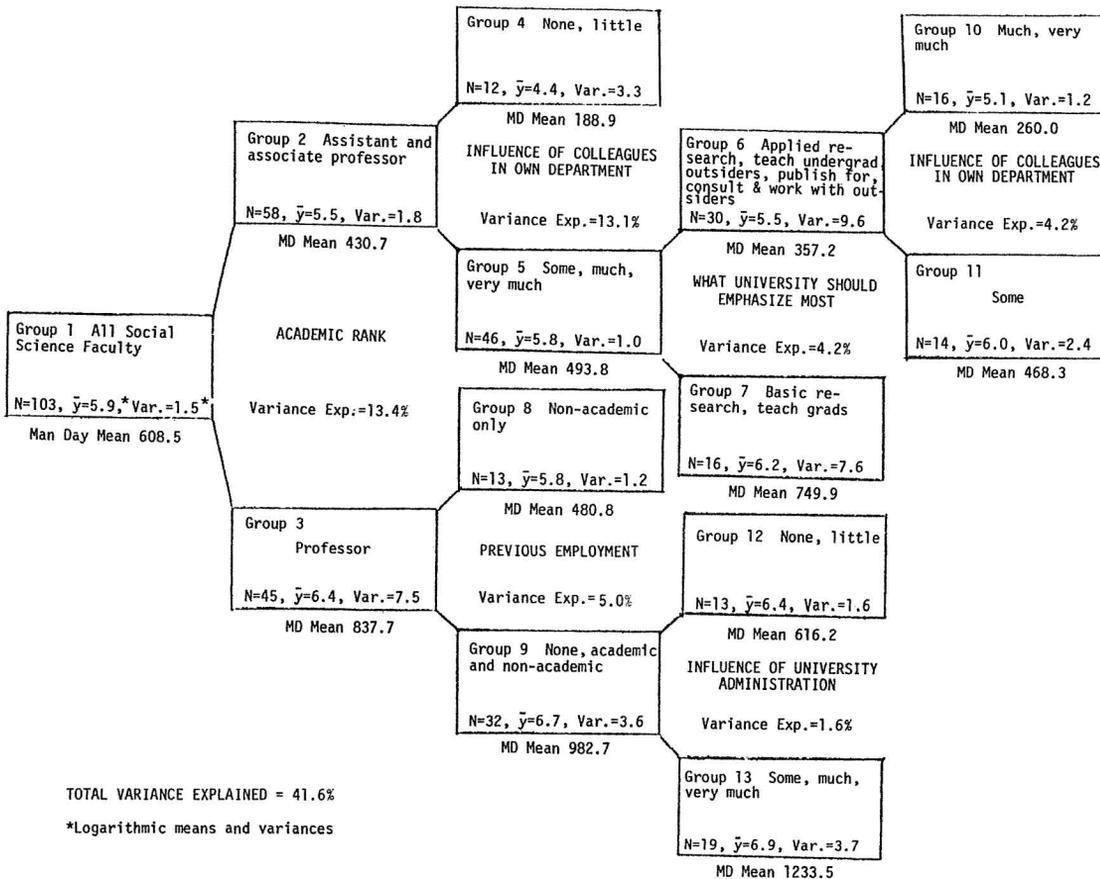


Figure 44. Man-day academic communication output of the social science faculty on the Taiwan campuses by selected structural-background-socialization-perceptual variables.

Chapter 6 Footnotes

1. The Assistant Professor designation is the United States equivalent to the rank of instructor in the Taiwan setting.

CHAPTER 7

DISCUSSION OF THE RESEARCH FINDINGS

This study was concerned with the acceptance of the concept of an information development and diffusion macrosystem role for universities by social scientists and agronomists in two social settings (a U.S. land grant university and two public universities in Taiwan). The output of communications by social scientists to academic and extension audiences was also studied.

Information macrosystem type universities (the U.S. land grant style with research, resident teaching, and extension teaching branches) are social inventions of recent origin. They have the capability of extending the frontiers of basic science knowledge, transforming some of it into usable practice and getting it disseminated to user clients. They are seen as originating in the U.S. land grant universities and having been diffused to new national and international social settings. Since they emerged mainly in the agricultural sector of land grant universities, other sectors and/or divisions of these universities are seen as lagging behind. Social scientists within the U.S. land grant universities were among the late comers and accordingly viewed as potential adopters of the operational concepts and behavior.

Although the sum of the university information macrosystem concepts is labelled as distinctive, the designation does not apply to all specific concepts. Some are as old as academia itself. Rather, it is the unique combination that is distinctive. Collectively, they provide the specifications that enable a university to operate as an information macrosystem. Some of the concepts are more immutable than others. Those that cannot be changed without fundamentally altering the nature of the social intervention are referred to as intrinsic qualities and those for which there are acceptable alternatives as extrinsic. Nevertheless, both are required.

Since information macrosystem type universities are first of all universities, some of their operational concepts are traditional university ones. As with any invention, the new and distinctive must, necessarily, be integrated into the old. Q-methodology was used to assess the nature and extent to which the new information macrosystem concepts were being integrated with the old university concepts in the minds of the social scientists and agronomists interviewed in this study. This method requires a structured, forced choice of views. Respondents are required to organize an array of views on a continuum from "strongly agree with" to "strongly disagree with." A few items are allowed on either end of the scale and progressively more are relegated to the middle range. This forms an approximate normal distribution of views.

An ideal Q-sort of land grant university concepts was constructed by faculty highly knowledgeable about what land grant universities are expected to be and do. The position of the distinctive concepts in the context of other views in the Q-distribution became reference points for assessing the acceptance of the distinctive concepts by others for whom acceptance is at issue. The total derivations of the distinctive items in comparison to their respective positions in the ideal sort provided the aggregate measure of relative acceptance. No deviation represented complete acceptance. Deviations from zero in either direction (more or

less favorable) represented magnitude of deviation and thus relative nonacceptance. Specifics, of course, can be examined by the way single item placements deviate (in magnitude and direction) from their placement in the ideal sort.

Although university information macrosystem capabilities may emerge in a variety of situations in response to needs for a continuing supply of updated specialty information, the authors were inclined to a diffusion stance concerning the acceptance of land grant university concepts by the faculties studied. Another concern of the study was to measure and explain the communication output of the social science faculty to academic (basic and applied scientists) and extension (professionals and the public) audiences. Output was measured in terms of estimated man-days required to complete each of an exhaustive list of communication activities--written and oral--ordinarily used by the faculty. A total of 64 background, prior socialization, perceptual, conditions of appointment, reference group influence, and perceived reward variables were used as independent variables. Automatic Interaction Detection Technique was employed to sort out these variables in order of their importance.

The social science and agronomy faculties on the Columbia campus of the University of Missouri (UMC) and the National Taiwan and Chungshing university campuses in Taiwan were the subjects of this part of the study.

Research Highlights

From the Diffusion of Concepts

As expected, agronomists on the Columbia campus were more acceptant of the basic concepts in terms of the aggregate measure than the social scientists on any of the three campuses. In fact, they rated some of the 16 distinctive concepts higher in importance than the experts on land grant university information macrosystems. For example, the UMC agronomists rated the view that a public university should provide for integrated research, resident teaching, and extension programs that supplement and draw upon each other higher than the experts placed in the ideal sort. They believed more strongly than their social scientist counterparts that extension, resident teaching, and research should be organizationally a part of the university and under its control. They most strongly downgraded the need for trying to understand change forces operating in society and finding solutions to major economic, social, and political problems of the day. Also, they were a little more committed than their social science counterparts to the potential abilities of "ordinary" people and college students.

Taiwan agronomists were even more deviant than UMC agronomists in accepting land grant university concepts and both groups were much more deviant than the social science faculty on the UMC campus. However, all of the deviation occurred in the context of being generally favorable to the distinctive concepts. In terms of the aggregate measure of acceptance UMC social scientists were much more receptive than the Taiwan social scientists. At the same time, they were more unified in what they thought.

The general inclination of the UMC campus faculty was to support knowledge development at the theoretical level nearly equal to the ideal followed by a progressive decline of support along the theory-to-practice continuum. Helping off-campus people with their problems was at the bottom of the priority list.

Even though the importance assigned to activities declined along the theory-to-practice continuum, the faculty in both university settings were not willing to leave such matters as continuing adult education and testing innovations for local adaptability to agencies other than the university. The UMC faculty were more willing to relinquish the adaptive testing responsibility than the Taiwan faculty. The last was actually more supportive of adaptive testing than was the ideal Q-sort. This kind of support for local adaptive testing is highly significant because this type of research tends to be most neglected by research agencies (Morss, et al., 1975: 159-175). Researchers avoid it because it provides nothing to enhance their academic status. Busy extension specialists don't want to be bothered with work that looks like research. More recently it has been labeled as a useless waste of taxpayers money by critics who do not realize what it takes to make information macrosystem type universities work effectively on behalf of potential information users (Hightower, 1973).

Another significant feature of the adoption pattern of the UMC social scientists was their commitment to making university services available to other colleges and universities, even to foreign countries. Thus, the service concept initially confined to within-state groups was extended by the social scientists to colleges and universities in other nations. UMC has defined international service as an extension of its initially assigned outreach mission (Education and World Affairs, 1965). Now under Title 12 of the Foreign Assistance Act these activities are being extended further. Surely the net effect of the emergent inter-university arrangements will be to enhance communication and idea exchange among scientists on a world-wide basis and to translate a portion of what is collectively learned to user needs.

The stronger emphasis of UMC social scientists on the functional integration of research, resident instruction, and extension, than on making these divisions an organizational part of the university and under its control has important practical implications. Functional integration is crucial (an intrinsic quality) to the operation of an information macrosystem but the way it is organized is not so important. For the performance of the essential functions there is no substitute. For organizational arrangements there are viable alternatives. This distinction is of fundamental importance to the operation of such systems and to attempts to diffuse them to new social settings. Diffusionists seem to have been overly impressed with the highly tangible organizational features and to have neglected the essential functions. A more judicious diffusion approach would have been to adapt existing organizational arrangements to provide the needed functional integration of the three services than to completely revamp existing social systems to achieve organizational control.

In a land grant university setting faculty may elect or not elect to become involved in the public service activities of the university. This option was open to the faculty at UMC, a land grant university, but on the two Taiwan campuses only a few faculty members at Chungshing University had the choice of officially participating in an extension program. The UMC campus social science faculty with service obligated appointments were understandably much more receptive of land grant (information macrosystem) concepts than those without service obligated appointments. Also, their acceptance pattern was different. The service obligated faculty accepted the distinctive concepts across the theory-to-practice continuum quite in accord with the definer's ideal. Deviations took the direction of downgrading knowledge enhancement at the theory end of the continuum and upgrading matters of direct concern to the public.

All of this was in marked contrast to the reactions of faculty that had no university related service obligations. Their priorities were distinctly reversed, very deviant from the land grant university ideal, and greatest of all for concepts having to do with the practical concerns of ordinary people and confidence in their mental abilities. They even emphasized importance of extending the frontiers of basic science knowledge more than the highly rated position assigned to it by the definers of the ideal type.

In terms of evidence from this study, which came first, employment or acceptance of the relevant concepts, remained something of an open question. But, given the opportunity to become involved in service related activities and the personal satisfaction that evolves from it, commitment seems to have followed. Also, it is significant that the faculty who got close enough to "ordinary" people to interact with them had greater faith in their abilities.

Even though the Taiwan social science faculty were distinctly less receptive of the land grant university concepts than those on the UMC campus, they were favorably disposed to all activities necessary for a public university to operate as a macrosystem of information development and flow (intrinsic qualities). They deviated from the ideal more than their Columbia campus counterparts (24.0 and 14.2 respectively). This was due more to diversity of views than to any clearly defined and strongly held alternative view.

The Taiwan faculty were favorably disposed to activities central to knowledge development and storage, particularly to the unrestrained pursuit of knowledge and truth which would permit a university to become a repository of knowledge second to none. They were most deviant in views indicative of confidence in the ability of "ordinary" people, the desirability of maintaining interaction with them, and providing off-campus adults with continuing educational opportunities. In fact, they collected 10.1 of their total 24.0 deviation from the ideal on these four concepts alone. Thus, the Taiwan social science faculty accepted the concepts necessary for a university to operate as an information macrosystem at a level comparable to the UMC faculty but with much less confidence in the potential ability of ordinary people and with much less feeling of need to interact with them. This is one indicator of the academic elitist stance that characterized the Taiwan social science faculty.

Even though they were less supportive than the ideal of the concepts concerned with helping create an understanding of change forces existing in society and "direct involvement with government agencies to improve local living conditions," the Taiwan faculty were favorably inclined to university associated service obligations. However, their service orientation was more toward social experimentation and theory testing than toward helping people directly. In marked contrast to the UMC faculty, a strong establishment orientation was indicated by their high emphasis on promoting a sense of national unity, and requiring students to participate in social and national service programs as a part of their college education. A slightly favorable stand was noted on requiring faculty to do research on problems of public concern, even though these might not be what interested them most. This orientation prevailed despite a very strong emphasis on faculty autonomy. Apparently, the faculty would exercise the autonomy upon which they strongly insisted within the context of a strongly held feeling of obligation to state and national concern.

The Taiwan faculty, like UMC faculty placed a very high emphasis on the need for integrated research, resident teaching, and extension programs that support and draw upon each other. They rated this over making the three functions organizationally a part of the university and under its control.

A second method of assessing social science faculty acceptance of land grant university concepts was to factor analyze faculty views to determine (1) whether any faculty type would emerge that closely approximated the land grant university ideal and if so (2) how many of the faculty would distinctly ascribe to that kind of thinking. Only one type emerged that approximated the land grant university ideal type: Land Grant University Traditionalizers on the UMC campus. There were only 10 of these out of the 125 total. Actually, their views more nearly approximated what land grant universities were like 50 years ago than now, hence the traditionalizer designation. The type which the authors referred to as Academic Elites predominated. Of these there were 103 faculty members. Although they were generally favorable to the educational outreach and service functions of the university, they rated these a poor second to such concepts as extending the frontiers of basic knowledge, faculty autonomy, and social critic roles. An obvious conclusion was that getting an advanced degree in a land grant university and being employed in one was indeed no assurance that the faculty would be socialized into the land grant university way of thinking.

The typologies that emerged on the Taiwan campus and the faculty classification into them indicated a more pervasive service orientation there than on the UMC campus. Only seven of the 103 were classified as Autonomous Critics, somewhat like the Academic Elites on the Columbia campus. The rest were classified as either Critical Society Servants or Subserviant Society Servants. The Subserviant Society Servants felt that a priority should be placed on promoting a sense of national unity and consciousness, that the research done by the faculty should be mostly determined by the social, political, and economic needs of the state and that a public university should preserve and promote the basic values of the society, be they political, moral, religious, or social. The Critical Society Servants were similar in service orientation but insisted on maintaining a more critical stance in carrying out their responsibilities.

From Other Conceptual Considerations

Evidence from other perceptual views of the faculty showed further support for the positive but secondary support accorded to the applied research and educational outreach activities of a public university by the UMC campus faculty and to the strong service orientation of the Taiwan social scientists. The largest percentage of faculty on both campuses thought a university should place most emphasis on teaching and advising undergraduate students and second most on teaching and supervising graduate students. Third in frequency of most emphasis mentions were a variety of activities conducive to the ability of a university to operate as a macrosystem for information development and flow. Helping off-campus people improve their living conditions got the most "do least" votes on both campuses.

But, aside from what the faculty thought should be emphasized most, there was still the question of how much the faculty thought various activities should be stressed. Although teaching efforts again got the highest percent of votes as a thing to do much or very much, most of the Taiwan Campus social science faculty also emphasized doing basic (90.1%) and applied (81.6%) research. Comparable percentages for much or very

much involvement were 56.0 percent and 33.8 percent respectively, on the UMC campus. Even though the percentages tended to decline to a low point for working with off-campus people, 28.5 percent for the UMC campus and 55.5 percent for the Taiwan campuses, faculty specified much or very much emphasis on this also. With the proportions on both campuses ranging between these high and low figures, there was a sufficient number who believed that a public university should be substantially involved in each of the activities along the theory-to-practice continuum to enable the universities to operate as information macrosystems. It is significant that the percentages were consistently higher for the Taiwan universities than for the UMC campus, a land grant university. On the Taiwan campuses there also was a close fit between what the faculty thought the university and they themselves should emphasize. The UMC faculty were inclined to emphasize status enhancing basic research and supervising of graduate students more for themselves than they would recommend for the university.

In both campus settings the faculty saw progressively fewer prospects for professional advancement through involvement in information macro-system type activities across the theory-to-practice continuum. In general, the faculty thought that activities on the theory end of the continuum would bring greater prospects for professional advancement than activities on the service end of the continuum. However, publishing for professionals was seen as something of an exception to this rule by the Columbia campus faculty. It was seen as potentially status enhancing.

From the Communication Output Analysis

Communication to fellow scientists (academic communication) is traditional and necessary for maximizing information development at the basic and applied science levels. Communication to non-academic users (extension audiences) is new by comparison and innovative in terms of university commitments. It provides the means by which educational outreach from university research sources is achieved.

Communication was more universal to academic audiences than to extension audiences for both the UMC and Taiwan social science faculties. Also, the magnitude of this communication was several times greater in both cases. Why the imbalance? One explanation might be that the faculty are indeed laggards in adopting concepts and ideas that would make extension communication possible (Rogers and Shoemaker, 1968:185). Academia is hardly noted for its innovativeness or for its ability to reward deviance (innovators) from the hard academic line (Havelock, 1971: 3-14). Yet, we have noted that the faculty was generally favorable to the new information macrosystem concepts. It was a case of being more inclined to research, social critic roles and faculty autonomy than to educational outreach and service to society. This is entirely understandable in light of the academic influences to which the faculties are subjected, the rewards they perceive as accruing from publishing for academic rather than for extension audiences, the kind of university appointments they have, and the nature of their graduate training.

Extension Communication. Although most of the social science faculty in both campus settings produced something for extension audiences, only a few produced most of it. In the aggregate, output was greater for the UMC faculty than for those on the Taiwan campuses. Nevertheless, despite the absence of any institutionalized university outreach agency for adult education, the Taiwan faculty were substantial producers. This could result from being part of a society dedicated to national planning with an expectation that public agencies, including universities, make a

contribution to the achievement of national goals and objectives. Although the social science faculty insisted on a very high degree of autonomy, they would apparently exercise this prerogative in the context of a substantial service orientation to society. Also, the norms of academia did not operate as a deterrent to extension communication in Taiwan as on the UMC campus.

In the multivariate explanation of extension communication, perceptual variables were stronger than those in any other category, particularly on the UMC campus. When combined with reference group influence, a special kind of perceptual variable, the total variance explained increased greatly. Yet all other variable categories were also involved in explaining extension communication output. A configuration of factors influencing output was manifest in both social settings. This seemed to include a humanistic orientation dating back to childhood and persisting into present university employment. This orientation, nurtured by service-oriented extracurricular activities in graduate school, was supported by structural arrangements that allowed the faculty to participate in extension either through official appointment or voluntarily with or without monetary remuneration. Finally, there was a deference to reference groups outside of academia. These groups, being the beneficiary of the faculty's services, were likely, in turn, to reciprocate by actions that contribute to the faculty's self satisfaction. Thus, self satisfaction took precedence over prospects for professional advancement as a reward for high extension communication. This seemed to provide a sustaining force for the dedicated extension faculty who might not have been appropriately rewarded otherwise within the university system. Even though most of the Columbia campus social science faculty felt their extension services were appropriately rewarded, all surely knew quite well what it took to get promotions and tenure.

In view of the innovative nature of extension communication, and the high degree of autonomy accorded the faculty, it was not particularly surprising that perceptual variables explained more variance in extension communication than any other variable category. This was by a substantially greater margin on the UMC than the Taiwan campuses. In this kind of a university setting the faculty were free to innovate by addressing extension audiences when they chose to do so. However, in neither case did high extension communication occur in the absence of perceived reference group influence from outside of academia. At UMC, campus academic reference groups had a deterring effect. On the Taiwan campuses perceived influence from academia was substantial but seemed to make no difference. Communication to extension audiences was apparently quite acceptable to academia in the Taiwan setting.

On the UMC campus in particular, high extension communication was associated with higher than average salaries and extra money from professional sources; also with above average age and high academic rank. The authors suggest that for many, security of appointment that comes with age is a requirement for high extension communication and that, in the absence of high status already achieved, one or the other of the following are requirements for high productivity.

1. Having given up on ever achieving high status in academia.
2. Being of a personality type that satisfaction from services rendered to others outweighs the slights of being bypassed for promotion and salary increases.

For the UMC campus, social scientists' involvement in church work as a graduate student took precedence over all else considered, both curricular or extracurricular, as a positive socializing influence. In Taiwan, involvement in social service took first place. When additionally fortified by involvement in church work, extension communication was greatly increased. Although on the UMC campus an interaction effect was initially suspected between rural or small town background and involvement in church work as a graduate student, it was found that the two operated independently to enhance extension communication.

A salient conclusion from this study concerning structural arrangements of a university was that substantial extension communication from the faculty can occur in the absence of an official university associated extension service. An implicit hypothesis in the study was that functional requisites, including innovation (research and development), dissemination (an extension activity), and integration (fitting the new into old social settings), are necessary for information development and flow but that there are viable organizational alternatives for performing these functions. The UMC campus, organized in typical land grant form, and two Taiwan universities, organized more in the academic tradition, would seem to be cases in point. Both accepted the functional requisites but differed a great deal organizationally.

Academic Communication. The intricate manner in which variables combined and interrelated to explain academic communication often defied explanation. But one thing was quite clear: the 64 explanatory variables operated differently for different subgroups of the faculty. Any analytical method that would not have recognized this fundamental fact would have produced erroneous results. Despite occasional inability of the authors to explain some of the analytical detail from the AID analysis, salient findings emerged. Generally speaking, variable categories explained less variance in academic than in extension communication for the UMC campus faculty. This differential was especially great for perceptual and for reference group influence variables. This may be partly due to the deviant nature of extension communication. Communication to academia is traditional. Doubtless, the faculty were well socialized into norms of academia which specify communication with fellow scientists. As we have noted, research experiences during graduate school (applied only in Taiwan and both basic and applied in the U.S.) were positively associated with academic but not with extension communication. For the last, extracurricular activities associated with graduate training were more important. Thus, although prior socialization experience was a very important category of variables for explaining both academic and extension communication, this was so for different reasons. Curricular matters made the most difference for academic communication and extracurricular for extension.

At UMC conditions of appointment, prior socialization, and perceptual variables were of almost equally high importance in explaining academic communication and much more important by comparison than background, reference group, and perceived rewards. Prior socialization experiences that were most conducive to academic communication were related mostly to university responsibilities in which basic research and publication were central. Whenever doing basic research and/or publication from basic research appeared in the splitting process the result was positive. Prior employment was also a positive influence, even though kind made a difference. Where the Ph.D. degree was obtained also made a difference.

The really big difference occurred between whether the faculty members had a Ph.D. degree or whether they didn't. For academic

communication, the Ph.D. degree was a facilitator. For extension, it operated as a retardant. The most salient positive influences for academic communication under conditions of appointment were enabling variables like receipt of research funds and having an appointment providing for doing research. Conversely, restrictive variables like large amounts of time allocated to teaching, administration, and extra-curricular activities were retardants. Significantly, some exposure to the outside (of academia) world of reality in the form of teaching, administration, or extracurricular activities was conducive to high academic productivity. This was quite in line with earlier findings of Pelz and Andrews (1966).

In the perceptual category, what faculty members thought they should emphasize most was the major determinant of academic communication output. Those who thought that they should emphasize research (basic, applied, or local adaptive testing of innovations) were much more productive than those who thought they should most emphasize teaching or educational outreach. This perceptual variable persisted as the most important explainer of academic communication output in the cross-category mix. Although background variables explained only a moderate amount of variance, region of longest childhood residence persisted as an explanatory variable, subsequent socialization notwithstanding. Faculty from the north central, plains, and west coast areas persisted in being more productive than those from the Middle Atlantic, New England, Southern, and Southwestern parts of the United States. For a small segment of the faculty, being from an economic and socially disadvantaged group was a distinct deterrent to academic communication. This was in marked contrast to extension communication where disadvantaged status had very little influence on output.

On the Taiwan campuses it was the perceptual category that explained the most variance in academic communication. But, compared to the UMC campus, there was an important reversal. It was what faculty thought the university, not self, should emphasize that explained most of the variance. But, also in contrast to the UMC faculty, the Taiwan faculty members expressed little difference between what they thought they should emphasize most and what they thought the university should emphasize most. This again suggested an establishment orientation.

Two salient observations from the prior socialization category were (1) the manner in which applied research experience as a graduate student was associated with high academic communication output and (2) the negative influence of having done or published from basic science research as a graduate student. Under conditions of appointment, high academic rank was of first order importance and receipt of research funds second. Finally, high reference group influence from own academic discipline took distinct precedence over influence from reference groups outside of academia in academic communication. The reverse was true for explaining extension communication.

Implications

For Research

The Q-methodology used for assessing the diffusion of information macrosystem concepts could be used in other situations to define what the distinctive operational concepts of new social inventions are, the interrelated nature of the concepts, and the extent and nature of their

diffusion into new social settings. These were crucial issues in the implementation of such programs as the Intensive Agricultural Development Program in India (Expert Committee on Assessment and Evaluation, 1969) and the Pueblo Project in Mexico (Sanchez, 1975). But, let none forget, acceptance of the basic concepts is only a necessary, not a sufficient condition for successfully operating a new program.

The method could also be used to determine what people expect of their public universities and the priorities of their expectations. At the same time, elements of misunderstanding could be detected. When applied to the faculty, as an adopter clientele, the current instrument and method could be used to detect what the faculty have forgotten or never learned.

Q-methodology also could be used as an instrument to detect the degree to which graduate students working on advanced degrees in land grant universities are being socialized into the land grant university way of thinking. It could be used to assess whether their conception of how a public university should operate is different from that of advanced degree holders from other educational institutions.

Further, there are a number of conceptual diffusion research issues that Q-methodology is eminently suited to address. As in this case it can assess the nature and extent of acceptance of an interrelated aggregate of concepts into an existing idea and belief system and in a context that permits assessment of just how the new elements singly and totally are fitted into the old social setting. To this important integration issue, diffusion research has given little attention.

There is also the matter of how an innovation changes in the process of diffusion. This has been almost totally neglected in diffusion research. Thus, in the context of the present study viewed from a diffusion perspective it was apparent that many of the land grant university concepts were accepted by the Taiwan social scientists in a relative manner much as on the Columbia campus except for the downgrading of ordinary people orientation.

Finally, content of decision could be much more directly and definitively addressed by the use of "Q" than by empirical methods used heretofore. With a properly selected sample of concepts, the method would allow respondents to indicate how much they stressed each in relation to the other. It permits the investigator to assess the implications of the adoption pattern for the operation of the social system to which it relates.

For Examining the Functional Adequacy of Information Macrosystems

Wherever a social system is formed to develop, transform, and deliver science based specialty information there are certain functions that must be performed to insure delivery and use of a locally usable product. One central intent in the information macrosystems model presented in Chapter 1 was to specify what these functions were and the sequence in which they must occur. These in theory-to-practice order were postulated to be:

- | | | |
|------------|---|--|
| innovation | - | development of a potentially usable product |
| validation | - | testing the product locally to insure its adaptability |

- dissemination - delivery of the new product to potential users
- information - acquisition of information by the intended target individuals
- legitimation - becoming personally persuaded or convinced to use or accept the new product
- integration - fitting the new product into the users own social system to achieve own goals

The question of where these functions are to be performed, i.e., whether in specialized subsystems or by other arrangement is not the most central issue. Rather, it is that they must be done and that they must be properly articulated by someone. Thus, whether the information macrosystem involved is concerned with the development of science based information about educational methods in Thailand, agricultural information in Missouri, or family planning information in India, the functional requisites apply. Assessment of system adequacy would first of all require determination of whether all functions are being performed, and whether they are interactively linked along the theory-to-practice continuum. Beyond that we would suggest (1) consideration of the organizational and operational alternatives that we specify with likely consequences of each in mind and (2) an input, throughput, output assessment as suggested by Blase and Paulsen (1972). These done, long steps forward will have been taken to identify system adequacies and inadequacies in its operation. Clues will in turn emerge for improvement of its operation and output.

For Information Development and Delivery

Communication to and interaction among social scientists is, of course, a necessary condition for extending the frontiers of basic science knowledge and the development of potentially usable information for non-academics. But for a university to operate at maximum capacity as a macrosystem of information development and flow, communication probably needs to be disproportionately directed to extension audiences. Unfortunately, the reverse was occurring in both university settings, the study suggests.

The heavy imbalance in the direction of academia found in this study implies a need for enhancing extension communication output of the social science faculty. Recruitment of graduate students from rural areas and prior occupational experience outside of academia might help. But, graduate study takes time and relevant conditions may change quickly. In any case, a different kind of graduate school experience is needed. Conventional graduate programs which emphasize research and publication will not suffice. Probably the potentially high extension communicator in the social sciences comes to graduate school with a partly formed orientation to social service. Even if this kind of an orientation cannot be created in graduate school there ought to be some means by which its growth can be cultivated. This could be achieved by encouraging voluntary affiliation of graduate students with religious and civic agencies or more formally through regularly assigned and carefully supervised experiences in social service activities during graduate study. It was quite evident that a Ph.D. degree from an alledged people-oriented land grant university did not suffice. Even in land grant universities graduate students and some faculty never become involved in or even committed to the information macrosystem activities. They are truly potential adopters of

land grant university concepts. As a minimum, a conscious effort should be made during graduate training to create an understanding of the way land grant type universities can and do operate.

Since increasing extension communication output through appropriate graduate programs would be a slow process, other alternatives need to be sought. On the Columbia campus, prospects would seem to be best from the older, better paid, academically secure faculty who find it less necessary to defer to the norms of academia which specify research and publication in "the best" academic journals. Academic norms on the Taiwan campuses appear to be at least neutral to extension communication.

Some influence from reference groups outside of academia was essential to attract high extension communication in both settings. Aside from any argument of which comes first, reference group connections outside of academia should be encouraged. The early land grant university policy of requiring faculty to spend some time in the field each year, the alternate "in-field," "on-campus" arrangements in some departments of UMC, or periodic assignment of the faculty to the off-campus world of reality for reeducation as in the Peoples Republic of China are prospective facilitating mechanisms for reference group formation. In any case, it appears (1) that once mutually advantageous reference group linkages are formed they tend to sustain themselves, particularly when the reference group to which the faculty defer have the capability of rewarding in addition to making demands on them and (2) that latent possibilities for the development of active reference groups often exists well before they emerge as self conscience demanding and rewarding entities (Gallup and Dubey, 1962).

There is also the matter of rewards for becoming involved in extension work compared to teaching and research. Although most of the UMC social science faculty felt that their extension work efforts were properly rewarded, this was not the case on the Taiwan campus. Where extension is an expected university activity, social justice requires that it should be rewarded. The more conventional means of doing this are salary increases, promotion, and granting of tenure. But, a less costly means might be to maximize the personal satisfaction that a faculty member normally obtains from doing extension work. Some have been known to say, "Just knowing that something important is happening out here is good enough." Although most of the rewards that derive from personal satisfaction must continue to come from reference groups that benefit from the extension activities, there are also within-university possibilities for increasing this impact, e.g., awards and special recognition for outstanding contributions to extension work. Carefully conceived rewards of this nature could considerably enhance the personal satisfaction derived from involvement in the extension activity. As a minimum, peers could refrain from downgrading this effort as inappropriate for a public university.

Although the faculties in the two campus settings do not place an especially high priority on applied research, particularly on the UMC campus, a considerable number are involved in it and still others have sufficient interest to become involved. Even though removal of chief constraints for further involvement in applied research would not necessarily ensure additional supplies of utilitarian social science knowledge, this would be an important first step. On the UMC campus this would involve some relief from other duties. On the Taiwan campus this would mean more monetary resources allocated to research. The applied research activity is more compatible with high extension communication than teaching is. Teaching was associated with substantially lower extension communication.

We found that the communicative output to extension audiences in both university settings was substantial. An additional consideration is for whom it was being produced. This must be kept under continued surveillance. The proper operation of a public university as an information macrosystem is predicated on a strong idea and influence input from the clientele they are intended to serve. This requires interaction, not mere feedback. In the absence of such interaction with audiences, the system is likely to run in a top-down, elitist, establishment-oriented manner. Also, in the absence of this interactive relationship, the likelihood of a locally unsuited product being delivered is greatly increased (Morss, et al., 1975:159-175).

The elitist stance is probably well exemplified by the Taiwan social science faculty who had little confidence in the capabilities of ordinary people and felt little need to maintain an interactive relationship with them. Although service oriented, they apparently felt that ultimate sources of new knowledge existed mostly in academia and that the interest of society could best be served by the faculty speaking while the ordinary citizen listened. Even in situations where there are strong faculty inclinations to defer to the reference groups outside of academia, dysfunctional differentials are likely to occur through a disproportionate attention to the interests and needs of the powerful and influential elements in society. Problems of "bypassed" elements in society are likely to be neglected. Organization of them to pursue their own ends could be the first step in correcting this kind of situation.

Although information macrosystem type universities were initially perfected to serve the information needs of farmers, they are capable of relating to any situation where a continuing supply of updated scientific information is needed, e.g., public education, public health, environmental quality, community development, or simply the treatment of diseases in plants and animals. The potential for this expanded role is implicit in the pioneering efforts of UMC to service specialty information needs of nonagricultural clientele in the state (Longwell, 1970). Their potential for serving as an integrating entity in supplying information where a variety of specialty inputs are needed is very great.

Now, in addition to land grant universities, information macrosystem capabilities are quite universally built into industry and many government agencies where the development and dissemination of new technology and specialty information is needed (Havelock, 1971, Chapter 3). In industry knowledge developed for own use comes heavily from their own research and development; profit and special advantage to own agency or firm is the central objective.

Less immediately salable knowledge or that which is counter to special interests cannot be expected from private industry. This is probably even more true for information needed for social and economic planning where the public good is the central concern.

Where then do we turn? The answer seems to be to semiautonomous information macrosystem type universities where a diverse community of scientists can and do interrelate in activities across the theory-to-practice continuum.

At the theory end, the fiercely independent scientist who defines his role as extending the frontiers of science knowledge, quite aside from any utility it might have, is essential. The basic scientist must in turn interrelate with applied research concerns.

Applied scientists must be capable of drawing on relatively abstract basic science knowledge and principles. The applied researcher must interface with intermediaries who can communicate the locally validated research findings to potential users. For them, special communication skills and ability to interact both with applied researchers and potential users is necessary. Finally, all functions and all activities along the theory-to-practice continuum must be organizationally articulated in an interactive framework to insure information flow and adjustment to user needs.

All of this is embodied in public operated information macrosystem universities. Initially dedicated to the concerns of the rank and file citizens, these universities, with proper governance and appropriate inputs from the public, can provide a continuing supply of updated science-based information on virtually any subject for which demands are made. They have the capability of democratizing knowledge in society by making it freely available to all. This, as one critic has held, is their central mission (Breimeyer, 1978). But, operation in a public service oriented manner ultimately requires a public understanding of what information macrosystem type universities really are, what they can do, the resources required for them to operate, and how they can make use of the services of the university. This of course implies public acceptance of their basic operational concepts.

Although evidence from this study does not permit any conclusion on this point, the public statements of some leaders indicate that many do not understand. People who insist that universities be funded exclusively in terms of students taught and who feel that something is wrong if "all" of the money appropriated does not ultimately "get down to the students" have not accepted the information macrosystem view and probably do not understand the information developer-disseminator roles of these universities. This likely also applies to critics who object to spending public money either on local adaptive testing of innovations or highly abstract basic research. Very important questions for public resolution center around whether we as a society are willing to let the development and distribution of specialty information of direct concern to the public revert to a state of folk knowledge, and if not, from what source we would expect knowledge increments to come--private enterprise, which has its own problems or from public institutions of which universities are probably best suited. The choice seems to be one or the other.

Decisions of public support to information macrosystem type universities should be made with consideration of these issues also in mind. If they are not serving the public as they should, help from public leaders is needed and the faculty must listen. What all should recognize is that the cost of destroying the capability of these universities to operate as macrosystems of information flow may ultimately come at a very high price to society.

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APPENDIX A

VARIABLES USED TO EXPLAIN EXTENSION COMMUNICATION OUTPUT OF THE
 SOCIAL SCIENCE FACULTY CLASSIFIED BY VARIABLE TYPE, UMC AND
 TAIWAN CAMPUSES

Variable Type and Variable

I. BACKGROUND: (Socio-economic)

Whether from economically disadvantaged group
 Age
 Source of financial assistance as a graduate student
 Place of longest childhood residence
 Region of longest childhood residence
 Father's occupation

II. BACKGROUND: (Prior-socialization)

Where Ph.D. degree was obtained
 Whether did applied research as a graduate student
 Whether did basic research as a graduate student
 Whether published from applied research done as a graduate student
 Whether published from basic research done as a graduate student
 Whether participated in social service work as a graduate student
 Whether participated in social reform work as a graduate student
 Whether participated in church work as a graduate student
 Previous employment
 Degree status

III. CONDITIONS OF APPOINTMENT

Academic rank
 Whether appointment provides for doing research
 Whether appointment provides for teaching
 Receipt of research funds
 Other income from professional sources
 Type of appointment
 Percent of time assigned to research

V. PERCEIVED REFERENCE GROUP INFLUENCE ON OWN WORK

Influence of departmental colleagues
 Influence of university colleagues
 Influence of colleagues in government and industry
 Influence of colleagues in own academic discipline
 Influence of undergraduate students
 Influence of graduate students
 Influence of professionals and agencies that use social science
 information
 Influence of university administration
 Influence of funding agencies
 Influence of general public

 Variable Type and Variable

VI. RELATIVE IMPORTANCE OF PERSONAL SATISFACTION AND PROSPECTS FOR PROFESSIONAL ADVANCEMENT FROM REFERENCE GROUPS

Contribute most to own satisfaction
 Contribute most to own professional advancement

VII. STRUCTURAL-BACKGROUND-SOCIALIZATION-PERCEPTUAL (COLUMBIA)

Faculty
 Influence of colleagues in government and industry
 Influence of colleagues in own academic discipline
 Influence of undergraduate students
 Influence of graduate students
 Influence of professionals (collectively defined to also include agencies that use social science information)
 Influence of university administration
 Influence of general public
 Where Ph.D. degree was obtained
 Whether appointment provides for doing extension work
 Whether appointment provides for teaching
 Other income from professional sources
 Whether participated in church work as a graduate student
 Perceived utility of own specialty for understanding problem issues
 Whether own extension work is properly rewarded*
 Whether own research is properly rewarded
 What self should emphasize most
 What self should emphasize second most
 Greatest constraint on doing applied research
 Self satisfaction rank from doing research on current people problems
 Age
 Type of appointment
 Place of longest childhood residence
 Region of longest childhood residence
 Father's occupation

VIII. STRUCTURAL-BACKGROUND-SOCIALIZATION-PERCEPTUAL (TAIWAN)

Faculty type
 Influence of colleagues in government and industry
 Influence of professionals (collectively defined to also include agencies that use social science information)
 Influence of funding agencies
 Influence of general public
 Whether from economically disadvantaged group
 Academic rank
 Whether appointment provides for doing extension work
 Whether published from basic research done as a graduate student
 Whether participated in social service work as a graduate student
 Perceived utility of own specialty for understanding problem issues

*Operationally redefined when appropriate to mean "Relevance of appropriate reward for own extension work."

Variable Type and Variable

Relevance of appropriate reward for extension work
What self should emphasize most
What self should emphasize second most
Greatest constraint on doing applied research
Self satisfaction rank from doing research on current people
problems
Perceived rank for professional advancement for doing research on
people problems
Percent of time assigned to research
Source of financial assistance as a graduate student
Region of longest childhood residence
University (Chunghsing or National Taiwan)

APPENDIX B

OPERATIONAL MEASURES OF FACULTY COMMUNICATIVE OUTPUT

Previous rating schemes of the communicative output of university faculty members have attempted to account for either quantity or quality of output of some combination of both. The ratings directed to the first have relied mainly on accounts of events or devices, e.g., books, journal articles and extension bulletins or some weighting of these in terms of the predetermined standard. The last has relied heavily on the ratings of peers through interviews or on the basis of citations.

Our intent was to confine ratings to quantitative output, hopefully rated in such a manner that they would be additive across kinds of devices used. A first attempt to obtain comparative worth ratings in terms of communicative quantity from a cross section of social scientists brought a great diversity of ratings with comments indicating the use of variant value judgments, depending on kind of communication that they thought was most important. Although the average ratings assigned seemed to approximate a reasonable quantitative gradient, researchers could think of no adequate rationale for explaining the ratings obtained.

This dilemma prompted an attempt at assessment strictly in terms of estimated professional man-days taken to produce each of the communicative events or devices. The estimates were provided by a select few faculty members known to have had experience with most of the communicative devices or events to be rated. Setting limitations in this manner meant that only a few faculty members could qualify. These were quite exclusively associated with the college of agriculture, where faculty members were involved in a much broader range of communicative endeavors than those in any of the other colleges with which social science faculty members are associated in the university. The constraints further meant that raters had to be confined almost exclusively to Rural Sociologists and Agricultural Economists. Few if any other social scientists were associated directly with the College of Agriculture. Even in this college only a few could qualify in terms of the desired breadth of experience.

To enhance the validity of the estimates of the comparative professional man-days required for completing the communicative events or devices, each judge was first asked to pass judgment on an estimate of 1000 man-days to prepare a book-sized monograph requiring original work and research. The instruction was to also include the estimated man-days required to do the supportive research as part of the monograph writing endeavors. Those who had not had such experience were asked to estimate time required in terms of observed time taken by others with whom they were acquainted and to do so with the book (monographic) writing effort as a point of comparison. The idea was to key every estimate either to the research monograph anchor point or to a professional time estimate required for the more familiar journal article. If the rater thought that the 1000 man-day estimate was too high, as a few did, he was asked to supply his own time estimate. The next step was to clearly establish the time requirement relationship between such a monographic book and a journal article. Thus, either the book-sized monograph or the journal article became the anchor point for making time estimates for all of the other communicative events or devices listed. Table I presents the final man-day estimates assigned to each communicative activity.

APPENDIX B TABLE. MAN-DAY EQUIVALENTS ASSIGNED TO COMMUNICATIVE
ACTIVITIES BY THE PANEL OF FACULTY JUDGES ON THE
UMC AND TAIWAN CAMPUSES

Communicative Activities	Average Man-Day UMC Campus	Estimate Taiwan Campuses
PUBLICATIONS (FORMAL)		
Book sized monograph (original work)	800	1000
Book (general integrative, e.g., a textbook)	700	830
Edited book	290	350
Article in refereed journal	120	120
Book chapter	70	69
Research bulletin or monograph	110	225
Extension bulletin or circular	42	42
Report in conference proceedings	38	24
Book review	8	9
PROFESSIONAL SOCIETY ACTIVITIES		
Attend meeting	4	6
Read paper	64	59
Serve on committee	7	14
Hold an office (elected)	26	19
Serve as a discussant of a paper or section chairman	5	5
EXTRA UNIVERSITY (INFORMAL)		
Special paper--not for publication	9	3
Participate in symposia, seminar, forum--no prepared paper	2	1
Participate in short course and/or workshop	3	2
Speech--no formal paper	2	2
Consultant (1 day, 1 unit)	3	3
Radio talk	1	1
Television appearance	2	-
News release to mass media	1	1
Answer to letter of inquiry	1/3	1/3
Serve on state or local committee	6	11
Serve on regional committee	6	11
Serve on national or international committee	7	11

In the rating process some uniform rules became necessary. These were:

1. Estimated time will include time to do the research as part of the monograph, article, or research bulletin undertaking, or for papers prepared for and read at professional society meetings.
2. Estimate time for book chapters, extension bulletins, and special papers on the basis of research already done and knowledge already in possession of the writer. Reasoning was that most of these were requested from persons with prior knowledge and expertise in the field at issue.
3. Include the time required for reading the book as well as writing in the case of book reviews.
4. In estimating time required for serving on the professional society committees, average out such assignments in terms of own experiences or the observed time required on the part of others.
5. Do the same for holding an office. A distinction was quite universally made between being president of a society and holding other offices. In one case, the estimated range was from 100 man-days for being president of a society to one man-day on a relatively inactive committee.
6. Include the increment resulting from jointness in estimating time required for joint research projects. For projects of more than a year's duration, respondents were asked to make estimates in terms of one year.
7. Make no assessment where the rater had had no experience or first hand knowledge of time taken by others.

To determine which part of the faculty's communication output could be labeled extension and which part academic, the faculty were asked to indicate to which of four audiences their communication activities were aimed. These four audiences were: basic scientists, applied scientists, professionals, and the general public. Academic communication was operationally defined as that communication aimed at the first two audiences, while extension communication was that aimed at the last two.

APPENDIX C. APPENDIX TABLES

Appendix Table 1. AVERAGE Q-SORT RATINGS ASSIGNED TO UNIVERSITY ROLE AND FUNCTION VIEWS BY THE SOCIAL SCIENCE AND AGRONOMY FACULTIES ON THE COLUMBIA AND TWO TAIWAN CAMPUSES

University Role and Function Views (Type and Specifics)	Land Grant University Ideal Rating Average (N=8)	Columbia Campus		Two Taiwan Campuses	
		Social Science Faculty Average (N=125)	Agronomy Faculty Average (N=29)	Social Science Faculty Average (N=103)	Agronomy Faculty Average (N=18)
IVORY TOWER (ACADEMIC)					
1. Universities must be free from the service and instrumental demands of society so they can objectively pursue knowledge and truth.	5.1	6.2	6.1	7.1	6.8
2. Professional schools concerned with certification are in conflict with intellectual inquiry and therefore should not be part of a university system.	4.9	5.4	4.9	5.9	5.8
3. The university should be a sanctuary for the greatest diversity of thought, the freest exchange of ideas, the most painstaking search for truth and thus a repository of scientific knowledge second to none.	12.1	11.9	10.7	10.7	10.3
4. A university at its best has to be indulgent, amused, seeking to know, but not to moralize somehow vague rather than ready with absolute answers.	6.6	7.4	6.5	3.2	4.1
5. Protect radical elements within from reactionary forces--inside and out.	5.9	6.9	4.0	5.1	4.6
6. Be concerned only with highly competent students, academically. It is a waste of resources to try to educate the less capable students in a university.	2.8	4.2	3.9	5.4	4.6
7. Be discriminating appraisers and critics of society and its basic values.	9.1	9.7	7.1	8.8	7.9
8. Take a stand on major public policy issues.	4.6	5.7	4.0	7.8	7.1
9. Help preserve and communicate directly the basic values of the society--religious, moral, social economic and political.	8.4	6.8	8.1	7.7	7.3
10. Scholars in a university should be expected to work on research projects of applied concern even though the needed research is not what challenges them most.	7.4	5.8	7.3	7.9	8.6
11. Be guided in policy and action mainly by the humanitarian considerations.	8.6	8.0	7.3	7.4	7.3
12. Art, music and drama should be available at the university for students who can afford such amenities, but university resources should not be spent on extending these to the public.	5.5	5.0	5.7	4.5	4.6
GOVERNANCE					
13. Should operate in accord with its own self-determined missions and responsibilities, subject only to general guidelines of public responsibility.	7.9	8.5	8.3	8.3	7.1
14. The faculty should remember they are employees of the university, and should be guided accordingly.	8.5	6.4	8.6	6.2	6.4
15. Each department should have maximum autonomy to develop its own programs, subject only to generally imposed quality and operational requirements.	7.1	8.4	8.0	9.9	10.4
16. When universities incur public disfavor, they should invoke their autonomy and insularity privileges for their protection rather than resorting to a show down power struggle.	5.5	6.5	5.7	7.7	6.9
17. Accept research moneys from the military and private interests even though this may be regarded by some as an unacceptable biasing influence.	7.6	6.7	8.1	6.8	7.7
18. Exercise control over the personal lives of students, somewhat comparable to what parents would expect.	5.3	3.6	4.3	5.2	5.7

Appendix Table 1 (cont.)

University Role and Function Views (Type and Specifics)	Land Grant University Ideal Rating Average (N=8)	Columbia Campus		Two Taiwan Campuses	
		Social Science Faculty Average (N=125)	Agronomy Faculty Average (N=29)	Social Science Faculty Average (N=103)	Agronomy Faculty Average (N=18)
19. Dominance--submission relationships within universities are incompatible with educational purposes and should be removed.	5.3	7.4	6.5	6.9	6.3
20. External examinations of students should be provided as a means of exerting pressure to maintain quality academic standards.	4.6	6.7	6.2	4.3	4.2
21. The faculty should devise and administer its own rules of conduct subject to no other code than the law of the land.	5.6	7.0	5.9	6.9	6.6
22. Participatory democracy (in which everybody affected by a decision must have their say) creates a kind of instant and chronic politics that makes serious teaching and study impossible.	5.5	6.2	5.6	5.2	5.3
23. Students should remember their business at a university is to learn. University government should be left to the faculty and the university administration.	7.0	5.7	7.1	7.6	7.6
24. In the final analysis, the people that pay the bills of a university should--through their representatives govern the campus.	6.6	5.4	7.1	2.2	2.9
EDUCATOR					
25. The need for teaching occupational skills is so great that we can't afford to worry about "trade school" criticisms.	7.6	6.1	6.4	6.0	6.7
26. Be much like an industrial firm with students as customers, and degrees for sale. If degrees are what students need, that is what universities ought to provide.	3.6	3.4	3.6	2.4	2.7
27. By their emphasis on physical science and technology universities have contributed heavily in creating environmental quality and resource utilization problems. Now they must require these sciences and technologies to solve these problems.	7.5	8.0	7.4	7.6	7.7
28. Undergraduate education should not be pre-anything. It should aim at educating the whole man, i.e., for education in the broadest sense.	7.8	8.4	6.9	8.2	7.5
29. Students should be required to participate in social and national service programs as a required part of their education.	6.4	6.1	5.3	8.5	8.9
30. Mass media and their agents are most capable in helping people understand the here and now. Universities should concern themselves with matters of more fundamental importance.	5.3	5.9	5.8	7.5	8.3
31. Inculcate a sympathetic understanding of the cultures and peoples of the world.	9.6	10.0	8.8	8.9	8.2
32. Be without walls, open to all who wish to enter or leave as they choose, to study what they wish, to propose and even receive credit for courses of their own making.	4.3	6.1	4.7	4.8	4.9
33. Promote a sense of national unity and national consciousness.	6.6	6.0	7.6	8.9	8.9
34. Be committed to the proposition that there are extraordinary possibilities in ordinary people.	11.1	9.6	10.1	8.0	7.9
35. Be mostly concerned in teaching with the "now happenings," real experience, genuine life and the like.	5.0	5.4	5.6	8.7	8.7
36. Universities should teach facts, and let students develop their own values.	6.6	6.1	8.0	8.8	8.5

Appendix Table 1 (cont.)

University Role and Function Views (Type and Specifics)	Land Grant Uni- versity Ideal Rating Average (N=8)	Columbia Campus		Two Taiwan Campuses	
		Social Science Faculty Average (N=125)	Agronomy Faculty Average (N=29)	Social Science Faculty Average (N=103)	Agronomy Faculty Average (N=18)
INFORMATION MACROSYSTEM					
37. Provide for integrated research, resident teaching and extension programs that supplement and draw upon each other.	10.9	10.0	11.4	10.1	11.1
38. Provide people in each department who can apply at the point of social action (or use) that which scientists in the university have discovered.	8.5	8.2	8.6	8.4	8.4
39. Provide two-way traffic of ideas and influence between the university and the people of the state largely through contacts with them both direct and indirect.	10.9	9.7	10.9	8.6	8.2
40. Leave testing of innovations for local adaptability to persons and agencies. It is a waste of university faculty time to be concerned with such matters.	4.8	5.6	5.4	4.4	4.4
41. Every university faculty member should be a teacher, researcher and extension worker.	6.1	5.9	5.3	7.9	7.8
42. Universities must be a true knowledge system, in which highly abstract information developed in the university is transformed and flows downward to all points of practical concern to people.	10.5	9.7	10.1	8.9	8.2
43. Such things as extension work, resource utilization and community development, in which the university has special expertise, should be under its direction, not under some government department or agency.	8.3	8.3	8.7	5.7	5.8
44. Extension, research and resident teaching must be organizationally a part of the university and under its control.	10.3	8.9	9.8	8.9	9.3
45. Participate in creating a system of communication and idea exchange among basic scientists throughout the world. It is at this level of knowledge and theory that cross-cultural transfer of ideas is most possible.	10.3	10.3	10.5	9.8	9.6
46. Universities should recognize the writing on the wall. It's goodbye to departments--the future is with interdisciplinary concepts and institutes.	6.1	5.8	4.9	7.0	6.8
47. Make the university and its staff available to other colleges and universities in the state and nation; perhaps, even in some cases to universities in foreign countries.	9.6	9.4	9.2	7.8	6.4
48. Should not provide continuing education for adults outside the university. This should be left to other agencies.	2.8	4.7	4.2	4.9	4.6
CHANGE AGENT					
49. Experiment boldly in the whole area of human relations, seeking to modify existing institutions and to discover workable new ones.	7.6	8.7	7.8	9.2	9.3
50. Find solutions to the major economic, social and political problems of the day and provide guidance for future policies and action.	10.1	9.2	8.5	9.6	8.7
51. Serve as a staging area of revolution and revolutionaries.	3.0	2.7	1.5	4.3	5.4
52. Require professors to spend some time every few years in the field, as a part of their continuing education and orientation.	7.0	7.6	8.1	8.7	9.7
53. Operate as an instrument of government to promote the national and state plans (or objectives) and national unity.	4.6	3.3	4.6	4.6	5.2

Appendix Table 1 (cont.)

University Role and Function Views (Type and Specifics)	Land Grant University Ideal Rating Average (N=8)	Columbia Campus		Two Taiwan Campuses	
		Social Science Faculty Average (N=125)	Agronomy Faculty Average (N=29)	Social Science Faculty Average (N=103)	Agronomy Faculty Average (N=18)
54. People should be cautious of advice from university professors on general issues of the day, for, professors are generally not sufficiently informed about things outside of their own specialty.	6.6	6.9	6.7	6.6	7.2
55. Provide counsel and service on matters of university expertise, but limit them to professionals who are working with people concerned with their problems.	4.6	6.2	6.5	6.8	6.4
56. Participate with state and federal agencies in helping communities improve their economic and social conditions.	9.9	9.2	9.3	8.3	7.7
57. Educational requirements and standards in the university should be the same for all students. Special aid and help for the economically or educationally deprived as a means of minimizing social injustices has no place in a university.	4.5	5.2	6.0	5.2	5.9
58. Create an understanding of the change forces and conditions that are operating in our society and the consequences of what we seem to be inadvertently becoming.	10.6	10.5	9.2	9.0	8.4
59. Develop and test theories of change and development.	9.1	9.9	9.8	9.7	9.2
60. Limit university efforts in bringing about economic and social change to teaching and research on important problem issues of the day.	5.0	6.1	5.6	5.3	6.2
SERVICE					
61. Provide on-campus opportunities for corporations and government agencies to recruit graduates quite aside from the moral issues that some may think are involved.	7.9	7.6	8.3	6.4	5.9
62. Provide specialized advisory services for all those who ask for it, but be little concerned about those who don't.	4.8	5.2	5.3	4.7	5.8
63. Information derived from its research should be freely accessible to all. Limited access agreements have no place in a university.	10.3	10.4	9.8	8.6	8.5
64. University research and activities should be determined mainly by the social, political and economic needs of the state.	7.8	6.2	7.6	3.4	9.1
65. Has a special obligation to extend its knowledge and services to economically disadvantaged areas and people in the state.	9.6	8.9	8.7	7.7	7.3
66. Sell its programs and services to the public (potential users) making use of communication and persuasion arts and skills as may be necessary.	6.4	6.5	7.8	6.6	7.0
67. Should be essentially a training and research resource for the great professions like law and medicine; also the specialized manpower needs of society.	5.6	5.1	6.1	7.6	7.6
68. Limit services to the public primarily to cultural events, e.g., concerts, and speakers on public issues.	4.8	4.7	4.4	4.4	4.1
69. Have strong competitive athletic programs which create esprit de corps and pride among students and the public.	5.8	6.0	6.8	6.9	7.3
70. Provide ROTC or cadet training as an option open to all students.	8.3	7.4	8.3	4.6	5.3
71. Universities have no business sending faculty members to other countries to help them with their problems. We have plenty of our own for them to work on.	5.3	4.4	4.4	4.9	4.2
72. Provide highly specialized services to the public, like rabies tests and specialized medical services on a cost basis when they are badly needed and not otherwise available.	7.5	7.3	6.9	7.0	7.2

Appendix Table 2. PROPORTION OF VARIANCE IN EXTENSION COMMUNICATION OUTPUT OF THE COLUMBIA CAMPUS SOCIAL SCIENCE FACULTY EXPLAINED BY EACH BACKGROUND VARIABLE IN THE AID PRODUCED GROUPS

Background Characteristics	AID Produced Groups														
	1	2	3	4	5*	6*	7	8	9	10*	11*	12*	13	14*	15*
Whether from an economically disadvantaged group	.005	.006	.013	.000	-	-	.000	-	(.007)	-	-	-	.012	↑	↑
Age	.084	.005	.069	.009	-	-	(.006)	↑	.003	-	-	-	(.007)	-	-
Source of financial assistance as a graduate student	.028	(.047)	.013	.043	-	-	.000	-	.003	-	-	-	.000	-	-
Place of longest childhood residence	.142	.015	.011	.002	-	-	.001	-	.003	-	-	-	.000	-	-
Region of longest childhood residence	.064	.049	(.023)	.016	↑	-	.004	-	.010	-	-	↓	.000	-	-
Father's occupation	(.125)	.010	.011	(.023)	-	-	.035	-	.005	↓	↓	-	.000	-	-
N	125	64	61	45	19	12	33	13	48	20	13	11	37	13	24

* Final group: variance not computed.
 _____↑ indicates variable on which split occurred
 () indicates competing variable

Appendix Table 3. PROPORTION OF VARIANCE IN EXTENSION COMMUNICATION OUTPUT OF THE COLUMBIA CAMPUS SOCIAL SCIENCE FACULTY EXPLAINED BY EACH PRIOR SOCIALIZATION EXPERIENCE IN THE AID PRODUCED GROUP

Prior Socialization Experiences	AID Produced Groups														
	1	2	3	4	5	6*	7	8*	9*	10*	11*	12*	13	14*	15*
Where Ph.D. degree was obtained	(.052)	.026	(.018)	.002	.000	-	.009	-	-	-	-	-	.022	↑	↑
Whether did applied research as a graduate student	.011	.077	.015	(.022)	.003	-	.051	-	-	↑	↑	-	.002	-	-
Whether did basic research as a graduate student	.042	.012	.003	.015	.003	-	.008	-	-	-	-	-	.000	-	-
Whether published from applied research as a graduate student	.005	.008	.010	.003	.016	-	.008	-	-	-	-	-	.000	-	-
Whether published from basic research as a graduate student	.034	.014	.008	.012	(.006)	-	(.016)	-	-	-	-	-	(.010)	-	-
Whether participated in social service work as a graduate student	.039	.000	.003	.000	.000	-	.000	-	-	-	-	-	.006	-	-
Whether participated in social reform work as a graduate student	.003	.003	.000	.000	.000	-	.000	-	-	-	-	-	.000	-	-
Whether participated in church work as a graduate student	.138	.000	.000	.000	.000	-	.000	-	-	-	-	-	.000	-	-
Previous employment	.035	.008	.036	.024	.005	↓	.006	-	-	-	-	-	.004	-	-
Degree status	.044	(.019)	.000	.000	.000	-	.000	-	-	-	-	-	.000	-	-
N	125	84	41	46	38	13	33	12	26	14	19	11	30	18	12

* Final group: variance not computed.
 _____↑ indicates variable on which split occurred
 () indicates competing variable

Appendix Table 4. PROPORTION OF VARIANCE IN EXTENSION COMMUNICATION OUTPUT OF THE COLUMBIA CAMPUS SOCIAL SCIENCE FACULTY EXPLAINED BY EACH CONDITION OF APPOINTMENT IN THE AID PRODUCED GROUPS

Conditions of Appointment	AID Produced Groups												
	1	2	3*	4	5	6	7*	8	9*	10*	11*	12*	13*
Academic rank	.035	.018	-	.007	(.023)	.004	-	.003	-	-	-	-	-
Whether appointment provides for doing research	.019	.011	-	.003	.009	.003	-	.008	-	-	↑	↑	-
Whether appointment provides for doing extension work	.216	.009	-	.019	.002	.002	-	.001	-	-	-	-	-
Whether appointment provides for teaching	.063	.012	-	.013	.000	.031	-	.000	-	-	-	-	-
Professional income from other sources	.075	.062	-	.000	.008	.000	-	.000	-	-	-	-	-
Type of appointment	(.141)	(.053)	-	.023	.022	.001	-	.001	-	-	-	-	-
Percent of time assigned to research	.016	.017	-	.010	.001	.009	-	.003	-	-	-	-	-
Percent of time assigned to teaching	.041	.001	-	.003	.004	(.016)	-	.001	-	-	-	-	-
Percent of time spent on administrative and extra-curricular activities	.079	.011	-	(.025)	.009	.010	-	.000	-	-	-	-	-
Basic annual salary	.059	.049	-	.004	.031	.004	-	(.004)	-	-	-	↑	↑
Receipt of research funds	.023	.023	-	.037	.003	.000	-	.002	-	-	-	-	-
N	125	89	36	60	29	45	15	34	11	14	20	15	14

* Final group: variance not computed.

↑ indicates variable on which split occurred.

() indicates competing variable.

Appendix Table 5. PROPORTION OF VARIANCE IN EXTENSION COMMUNICATION OUTPUT OF THE COLUMBIA CAMPUS SOCIAL SCIENCE FACULTY EXPLAINED BY EACH PERCEPTUAL VARIABLE IN THE AID PRODUCED GROUPS

Perceptual Variables	AID Produced Groups																
	1	2	3	4	5	6	7	8*	9*	10*	11*	12*	13*	14	15*	16*	17*
Faculty type	.155	.003	.005	.008	.003	(.013)	.000	-	-	-	-	-	-	.000	-	-	-
Perceived utility of own specialty for understanding problem issues	.054	.048	.002	(.036)	.000	.004	.000	-	-	-	-	-	-	.000	-	-	-
Perceived utility of own specialty for solving current problem issues	.046	.027	.000	.014	.038	.007	.005	-	-	-	-	-	-	.000	-	-	-
Whether own teaching is properly rewarded	.079	.019	.005	.002	.000	.000	.004	-	-	-	-	-	-	.000	-	-	-
Whether own extension work is properly rewarded	.297	.011	.001	.000	.000	.000	.000	-	-	-	-	-	-	.000	-	-	-
Whether own research is properly rewarded	.054	.004	.005	.005	.000	.002	.000	-	-	-	-	-	-	.000	-	-	-
What university should emphasize most	.064	.010	.004	.001	.009	.003	.001	-	-	-	-	-	-	.000	-	-	-
What university should emphasize second most	.017	.006	.006	.026	.018	(.013)	.013	-	-	-	-	-	-	.010	-	-	-
What university should emphasize least	.036	.023	.003	.005	.000	.000	.012	-	-	-	-	-	-	.000	-	-	-
What self should emphasize most	(.210)	.068	.012	.000	.000	.002	.001	-	-	-	-	-	-	.000	-	-	-
What self should emphasize second most	.140	.032	(.012)	.010	(.028)	.000	.049	-	-	-	-	-	-	.000	-	-	-
What self should emphasize least	.086	.004	.004	.005	.000	.004	.002	-	-	-	-	-	-	.000	-	-	-

Appendix Table 5. PROPORTION OF VARIANCE IN EXTENSION COMMUNICATION OUTPUT OF THE COLUMBIA CAMPUS SOCIAL SCIENCE FACULTY EXPLAINED BY EACH PERCEPTUAL VARIABLE IN THE AID PRODUCED GROUPS

Perceptual Variables	AID Produced Groups																
	1	2	3	4	5	6	7	8*	9*	10*	11*	12*	13*	14	15*	16*	17*
Greatest constraint on doing applied research	.084	.035	.001	.020	.000	.014	(.025)	-	-	-	-	-	-	.000	-	-	-
Self satisfaction rank from doing creative work and publishing results	.115	.008	.009	.000	.012	.005	.000	-	-	-	-	-	-	.000	-	-	-
Self satisfaction rank from helping people solve their problems	.051	.002	.007	.005	.013	.001	.000	-	-	-	-	-	-	.000	-	-	-
Self satisfaction rank from writing for non-academicians who can use what is known	.043	.002	.008	.004	.001	.001	.003	-	-	-	-	-	-	(.005)	-	-	-
Self satisfaction rank from helping intermediaries who help people solve their problems	.050	.005	.009	.003	.003	(.013)	.003	-	-	-	-	-	-	.000	-	-	-
Self satisfaction rank from teaching students	.076	(.067)	.007	.078	.001	.000	.000	-	-	-	-	-	-	.000	-	-	-
Self satisfaction rank from doing research on current people problems	.029	.000	.005	.000	.000	.000	.000	-	-	-	-	-	-	.000	-	-	-
Perceived rank for professional advancement from doing creative work and publishing results	.026	.027	.001	.008	(.027)	.011	.016	-	-	-	-	-	-	.000	-	-	-

Perceived rank for professional advancement from helping people solve their problems	.073	.004	.010	.001	.001	.000	.001	-	-	-	-	-	-	.000	-	-	-
Perceived rank for professional advancement from writing for non-academicians	.026	.016	.000	.007	.006	.010	.000	-	-	-	-	-	-	.000	-	-	-
Perceived rank for professional advancement from helping intermediaries who help people solve their problems	.009	.001	.004	.002	.000	.001	.002	-	-	-	-	-	-	(.005)	-	-	-
Perceived rank for professional advancement from teaching students	.036	.012	.001	.003	.000	.007	.000	-	-	-	-	-	-	.000	-	-	-
Perceived rank for professional advancement from doing research on current people problems	.033	.030	.004	.033	(.021)	.001	.014	-	-	-	-	-	-	.000	-	-	-
N	125	81	44	56	25	29	27	10	15	16	13	13	14	21	23	10	11

* Final split: variance not computed.

↑ indicates variable upon which split occurred.

() indicates competing variable.

Appendix Table 6. PROPORTION OF VARIANCE IN EXTENSION COMMUNICATION OUTPUT OF THE COLUMBIA CAMPUS SOCIAL SCIENCE FACULTY EXPLAINED BY EACH REFERENCE GROUP IN THE AID PRODUCED GROUPS

Reference Group Influence	AID Produced Groups														
	1	2*	3	4	5	6	7*	8*	9	10*	11*	12	13*	14*	15*
Influence of departmental colleagues	.009	-	.017	(.053)	.000	.002	-	-	.000	-	-	(.081)	-	-	-
Influence of university colleagues	.002	-	.005	.004	.018	.009	-	-	.000	-	-	.005	-	-	-
Influence of colleagues in government and industry	.100	↑	(.069)	.000	.023	.001	-	-	.000	-	-	.000	-	-	-
Influence of colleagues in own academic discipline	(.073)	-	.089	.009	.017	.000	-	-	.000	-	-	.003	-	-	-
Influence of undergraduate students	.066	-	.053	.024	(.071)	.068	-	↑	.007	-	-	.053	-	-	-
Influence of graduate students	.064	-	.049	.047	.014	.018	-	-	.000	-	-	.000	-	-	-
Influence of professionals and agencies that use social science information	(.088)	-	(.071)	.040	.129	.001	↑	-	.000	-	-	.000	-	-	-
Influence of university administration	.059	-	.052	(.053)	.043	(.041)	-	-	.036	↑	↑	.214	-	↑	↑
Influence of funding agencies	.010	-	.004	.035	.013	.018	-	-	(.019)	-	-	.000	-	-	-
Influence of general public	.047	-	.027	.054	.010	.004	-	-	.008	-	-	.014	↑	-	-
N	125	19	106	52	54	42	12	11	31	18	13	28	24	16	12

* Final group variance not computed.

↑ indicates variable on which split occurred.

() indicates competing variable.

Appendix Table 7. PROPORTION OF VARIANCE IN EXTENSION COMMUNICATION OUTPUT OF THE COLUMBIA CAMPUS SOCIAL SCIENCE FACULTY EXPLAINED BY EACH SELECTED VARIABLE IN THE AID PRODUCED GROUPS

Selected Variables	AID Produced Groups														
	1	2	3	4	5	6*	7	8*	9*	10*	11*	12*	13	14*	15*
Faculty type	.009	.015	.011	.000	.000	-	.000	-	-	-	-	-	.000	-	-
Influence of colleagues in government and industry	.104	.032	.002	.015	.008	-	.001	-	-	-	-	-	.000	-	-
Influence of colleagues in own academic discipline	.074	.039	.001	.009	.021	-	.000	-	-	-	-	-	.001	-	-
Influence of undergraduate students	.066	.010	.003	.020	.005	-	.001	-	-	-	-	-	.001	-	-
Influence of graduate students	.064	.006	.008	.000	.000	-	.001	-	-	-	-	-	.000	-	-
Influence of professionals	.087	.004	.000	.002	.004	-	.090	-	-	-	-	-	.003	-	-
Influence of university administration	.060	.044	.001	.014	.017	-	.008	-	-	-	-	-	(.005)	-	-
Influence of general public	.047	.007	(.012)	.005	.000	-	.008	-	-	-	-	-	.000	-	-
Where Ph.D. degree was obtained	.052	.043	.011	.009	.015	-	.002	-	-	-	-	-	.000	-	-
Whether appointment provides for doing extension work	(.216)	.011	.001	.001	.000	-	.015	-	-	-	-	-	.090	-	-
Whether appointment provides for teaching	.063	.001	.004	.000	.000	-	.000	-	-	-	-	-	.000	-	-
Other income from professional sources	.075	(.080)	.005	.021	.070	-	.000	-	-	-	-	-	.001	-	-
Whether participated in church work as a graduate student	.138	.034	.008	.000	.001	-	.000	-	-	-	-	-	.000	-	-
Perceived utility of own specialty for understanding problem issues	.054	.048	.002	.045	.008	-	.000	-	-	-	-	-	.000	-	-
Whether own extension work is properly rewarded	.297	.011	.001	.000	.000	-	.000	-	-	-	-	-	.000	-	-
Whether own research is properly rewarded	.054	.004	.005	(.044)	.000	-	.025	-	-	-	-	-	.001	-	-
What self should emphasize most	(.210)	.068	.012	.009	(.061)	-	.007	-	-	-	-	-	.000	-	-
What self should emphasize second most	.140	.032	(.012)	.023	.014	-	.041	-	-	-	-	-	.000	-	-
Greatest constraint on doing applied research	.084	.035	.001	.007	.000	-	.016	-	-	-	-	-	.001	-	-
Self satisfaction rank from doing research on current people problems	.076	.067	.007	.036	.025	-	(.032)	-	-	-	-	-	.000	-	-
Age	.084	.031	.009	.036	.022	-	.000	-	-	-	-	-	.009	-	-
Type of appointment	.141	.032	.000	.003	.012	-	.015	-	-	-	-	-	.000	-	-

Appendix Table 7. PROPORTION OF VARIANCE IN EXTENSION COMMUNICATION OUTPUT OF THE COLUMBIA CAMPUS SOCIAL SCIENCE FACULTY EXPLAINED BY EACH SELECTED VARIABLE IN THE AID PRODUCED GROUPS

Selected Variables	AID Produced Groups														
	1	2	3	4	5	6*	7	8*	9*	10*	11*	12*	13	14*	15*
Place of longest childhood residence	.142	.081	.001	.001	.006	-	.007	-	-	-	-	.000	-	-	-
Region of longest childhood residence	.064	.042	.002	.033	.010	-	.025	-	-	-	-	.000	-	-	-
Father's occupation	.125	.060	.001	.017	.014	-	.029	-	-	-	-	.000	-	-	-
N	125	81	44	49	32	15	34	16	18	19	13	21	23	13	10

* Final split: variance not computed.

_____↑ indicates variable on which split occurs.

() indicates competing variables.

Appendix Table 8. PROPORTION OF VARIANCE IN EXTENSION COMMUNICATION OUTPUT OF THE TAIWAN CAMPUSES SOCIAL SCIENCE FACULTY EXPLAINED BY EACH BACKGROUND CHARACTERISTIC IN THE AID PRODUCED GROUPS

Background Characteristics	AID Produced Groups												
	1	2	3	4	5*	6	7*	8*	9*	10	11*	12*	13*
Whether from an economically disadvantaged group	.009	.021	.000	(.031)	-	.000	-	-	-	.000	-	-	-
Age	.027	(.029)	.004	.020	-	(.010)	-	-	-	.002	-	-	-
Source of financial assistance as a graduate student	.093	(.029)	.003	.000	-	.001	-	-	-	.002	-	-	-
Place of longest residence during childhood	(.054)	.031	.011	.003	-	.003	-	-	-	.000	-	-	-
Region of longest childhood residence	.009	.025	(.019)	.018	-	.016	-	-	-	.000	↓	-	-
Father's occupation	.011	.018	.030	.054	-	.004	↑	↓	↓	.010	-	↑	↑
N	103	44	59	33	11	44	15	17	16	31	13	15	16

* Final group variance not computed.

_____↑ indicates variable on which split occurred.

() indicates competing variable.

Appendix Table 9. PROPORTION OF VARIANCE IN EXTENSION COMMUNICATION OUTPUT OF THE TAIWAN CAMPUSES SOCIAL SCIENCE FACULTY EXPLAINED BY EACH PRIOR SOCIALIZATION EXPERIENCE IN THE AID PRODUCED GROUPS

Prior Socialization Experiences	AID Produced Groups										
	1	2	3	4	5*	6	7*	8*	9*	10*	11*
Where Ph.D. degree was obtained	.011	(.012)	.000	.000	-	.000	-	-	-	-	-
Whether did applied research as a graduate student	.048	.007	.000	.000	-	.000	-	-	-	-	-
Whether did basic research as a graduate student	.049	.004	.000	.005	-	.009	↑	↑	-	-	-
Whether published from applied research as a graduate student	.042	.004	.000	.000	-	.001	-	-	-	-	-
Whether published from basic research as a graduate student	(.077)	.015	.000	.000	-	.000	-	-	-	-	-
Whether participated in social service work as a graduate student	.102	.003	.000	.000	-	.000	-	-	-	-	-
Whether participated in social reform work as a graduate student	.059	.003	(.006)	.000	-	.000	-	-	-	-	-
Whether participated in church work as a graduate student	.055	.003	.009	.003	-	.000	-	-	-	↑	↑
Previous employment	.007	.007	.002	.017	-	.000	↑	-	-	-	-
Degree status	.000	.005	.000	.000	-	.000	-	-	-	-	-
N	103	76	27	50	26	23	27	13	10	17	10

* Final group variance not computed.

↑ indicates variable on which split occurred.

() indicates competing variable.

Appendix Table 10. PROPORTION OF VARIANCE IN EXTENSION COMMUNICATION OUTPUT OF THE TAIWAN CAMPUSES SOCIAL SCIENCE FACULTY EXPLAINED BY EACH CONDITION OF APPOINTMENT IN THE AID PRODUCED GROUPS

Conditions of Appointment	AID Produced Groups														
	1	2	3*	4	5	6*	7	8	9*	10*	11*	12*	13	14*	15*
Academic Rank	.031	.020	-	.012	.021	-	.002	.020	-	↑	↑	-	.000	-	-
Whether appointment provides for doing research	.004	.000	-	.007	.001	-	.000	.000	-	-	-	-	.000	-	-
Whether appointment provides for joint extension work	.086	.004	↑	.004	.000	-	.000	.001	-	-	-	-	.000	-	-
Whether appointment provides for teaching	.000	.000	-	.000	.000	-	.000	.000	-	-	-	-	.000	-	-
Receipt of research funds	.001	.003	-	.000	.003	-	.004	.000	-	-	-	-	.005	-	-
Other income from professional sources	.012	.017	-	.011	.032	-	.006	.010	-	-	-	-	.000	-	-
Type of appointment	.003	.014	-	.000	.002	-	.000	.000	-	-	-	-	.000	-	-
Percent of time assigned to research	.056	.043	-	.000	.000	-	.000	.000	-	-	-	-	.000	-	-
Percent of time assigned to teaching	.013	.012	-	.005	.009	-	.008	.004	-	-	-	-	.008	↑	↑
Percent of time spent on administrative and extra-curricular activities	.005	.003	-	.000	.005	-	.000	.000	-	-	-	-	.000	-	-
Basic annual salary	.002	.000	-	.025	.022	-	.009	.000	↑	-	-	↓	.000	-	-
N	103	89	14	39	50	14	36	29	10	10	19	11	25	13	12

* Final group variance not computed.
 ↑ indicates variable on which split occurred.
 () indicates competing variable.

Appendix Table 11. PROPORTION OF VARIANCE IN EXTENSION COMMUNICATION OUTPUT OF THE TAIWAN CAMPUSES SOCIAL SCIENCE FACULTY EXPLAINED BY EACH PERCEPTUAL VARIABLE IN THE AID PRODUCED GROUPS

Perceptual Variables	AID Produced Groups												
	1	2	3*	4	5	6	7*	8*	9*	10	11*	12*	13*
Faculty type	.011	.001	-	.003	.007	.000	-	-	-	.000	-	-	-
Perceived utility of own specialty for understanding problem issues	.013	.013	-	.022	.001	.010	-	-	-	.000	-	-	-
Perceived utility of own specialty for solving current problem issues	.002	.009	-	.013	.015	.025	-	-	-	.000	-	-	-
Whether own teaching is properly rewarded	.008	.021	-	.022	.005	.035	-	-	-	.000	-	-	-
Whether own extension work is properly rewarded	.108	.000	-	.000	.000	.000	-	-	-	.000	-	-	-
What university should emphasize most	.033	.037	-	.000	.001	.000	-	-	-	.000	-	-	-
What university should emphasize second most	.021	.013	-	.026	.007	.032	-	-	-	.000	-	-	-
What university should emphasize least	.017	.008	-	.019	.018	.004	-	-	-	.000	-	-	-
What self should emphasize most	.064	.069	-	.000	.010	.000	-	-	-	.000	-	-	-
What self should emphasize second most	(.075)	.046	-	(.080)	(.030)	.034	-	-	-	.000	-	-	-
What self should emphasize least	.005	.002	-	.007	.006	.015	-	-	-	.000	-	-	-
Greatest constraint on doing applied research	.052	(.051)	-	.082	.025	.000	-	-	-	.000	-	-	-
Self satisfaction rank from doing creative research	.021	.010	-	.008	.007	.009	-	-	-	.000	-	-	-
Self satisfaction rank from helping people solve their problems	.012	.005	-	.007	.013	.000	-	-	-	.005	-	-	-
Self satisfaction rank from writing for non-academics who can use what is known	.002	.002	-	.003	.001	.001	-	-	-	.000	-	-	-
Self satisfaction rank from helping intermediaries who help people solve their problems	.039	.017	-	.025	.000	.028	-	-	-	.000	-	-	-
Self satisfaction rank from teaching students	.027	.037	-	.017	.006	(.052)	-	-	-	.000	-	-	-
Self satisfaction rank from doing research on current people problems	.056	(.051)	-	.062	.006	.053	-	-	-	.000	-	-	-
Perceived rank for professional advancement from doing creative work and publishing results	.003	.000	-	.000	.005	.000	-	-	-	.000	-	-	-

Appendix Table 11. PROPORTION OF VARIANCE IN EXTENSION COMMUNICATION OUTPUT OF THE TAIWAN CAMPUSES SOCIAL SCIENCE FACULTY EXPLAINED BY EACH PERCEPTUAL VARIABLE IN THE AID PRODUCED GROUPS

Perceptual Variables	AID Produced Groups												
	1	2	3*	4	5	6	7*	8*	9*	10	11*	12*	13*
Perceived rank for professional advancement from helping people solve their problems	.002	.002	-	.010	.021	.019	-	-	-	.000	-	-	-
Perceived rank for professional advancement from writing for non-academicians	.012	.031	-	.009	.017	.000	-	-	-	.000	-	-	-
Perceived rank for professional advancement from helping intermediaries who help people solve their problems	.006	.015	-	.002	.033	.000	-	-	-	.000	-	-	-
Perceived rank for professional advancement from teaching students	.012	.006	-	.000	.011	.000	-	-	-	.019	-	-	-
Perceived rank for professional advancement from doing research on current people problems	.007	.010	-	.005	.006	.001	-	-	-	.000	-	-	-
N	103	86	17	44	42	34	10	19	15	23	19	10	13

* Final group variance not computed.

↑ indicates variable on which split occurred.

() indicates competing variable.

Appendix Table 12. PROPORTION OF VARIANCE IN EXTENSION COMMUNICATION OUTPUT OF THE TAIWAN CAMPUSES SOCIAL SCIENCE FACULTY EXPLAINED BY EACH REFERENCE GROUP IN THE AID PRODUCED GROUPS

Reference Group Influence	AID Produced Groups														
	1	2	3	4	5	6*	7	8*	9*	10	11*	12*	13*	14*	15*
Influence of departmental colleagues	.027	.000	.003	.002	.000	-	.000	-	-	.000	-	-	-	-	-
Influence of university colleagues	.071	.046	.000	.011	.000	-	.000	-	-	.000	-	-	-	-	-
Influence of colleagues in government and industry	(.102)	(.056)	.001	.026	(.013)		↑	↑	.001	-	-	.000	-	-	-
Influence of colleagues in own academic discipline	.059	.013	.005	.013	.000	-	(.014)	-	-	.001	-	-	-	-	-
Influence of undergraduate students	.031	.004	.004	.002	.002	-	.000	-	-	.002	-	-	-	-	-
Influence of graduate students	.003	.007	.016	.002	.007	-	.000	-	-	.002	↑	-	-	-	-
Influence of professionals and agencies that use social science information	.158	.057	.007	(.020)	.000	-	.001	-	-	.001	-	-	-	-	-
Influence of university administration	.087	.011	.002	.008	.000	-	.000	-	-	.003	-	-	-	-	-
Influence of funding agencies	.030	.048	(.010)	.008	.023	-	.049	↑	↑	.011	-	↓	↓	↑	↑
Influence of general public	.055	.026	.006	.000	.000	-	.000	-	-	(.006)	-	-	-	-	-
N	103	63	40	35	28	12	23	17	11	28	12	11	12	16	12

* Final group variance not computed.

↑ indicates variable on which split occurred.

() indicates competing variable.

Appendix Table 13. PROPORTION OF VARIANCE IN EXTENSION COMMUNICATION OF THE TAIWAN CAMPUSES SOCIAL SCIENCE FACULTY EXPLAINED BY EACH SELECTED STRUCTURAL-BACKGROUND-SOCIALIZATION-PERCEPTUAL VARIABLE IN THE AID PRODUCED GROUP

Selected Variables	AID Produced Groups												
	1	2	3	4	5	6*	7*	8*	9*	10	11*	12*	13*
Faculty type	.011	.000	.003	.021	.011	-	-	-	-	.000	-	-	-
Influence of colleagues in government and industry	(.102)	.056	.001	(.045)	.002	-	-	-	-	.000	-	-	-
Influence of professionals and agencies that use social science information	.158	.057	.007	.016	.061	-	-	-	-	.000	-	-	-
Influence of funding agencies	.030	.048	.010	.013	.000	-	-	-	-	.000	-	-	-
Influence of general public	.055	.026	.006	.006	.036	-	-	-	-	.003	-	-	-
Whether from economically disadvantaged group	.009	.004	.021	.012	.003	-	-	-	-	.031	-	↑	↑
Academic rank	.031	.021	.005	.007	.003	-	-	-	-	.000	-	-	-
Whether academic appointment provides for extension work	.086	.045	.035	.007	.061	-	-	-	-	.000	↑	-	-
Whether published from basic research as a graduate student	.077	.048	.028	.003	.033	-	-	-	-	.000	-	-	-
Whether participated in social service work as a graduate student	(.102)	.039	.025	.005	.000	-	-	-	-	(.022)	-	-	-
Perceived utility of own specialty for understanding problem issues	.013	.014	.003	.000	.000	-	-	-	-	.000	-	-	-
Relevance of appropriate reward for extension work	(.108)	.000	.021	.000	.000	-	-	-	-	.000	-	-	-
What self should emphasize most	.064	(.070)	.012	.027	.048	-	-	-	-	.000	-	-	-
What self should emphasize second most	.075	.018	(.034)	.007	.026	-	-	-	-	.021	-	-	-
Greatest constraint on doing applied research	.052	.044	.000	.020	.000	-	-	-	-	.000	-	-	-
Self satisfaction rank from doing research on current people problems	.056	.057	.004	.006	(.054)	-	-	-	-	.006	-	-	-
Perceived rank for professional advancement from doing research on current people problems	.007	.004	.002	.014	.013	-	-	-	-	.000	-	-	-
Percent of time assigned to research	.056	.047	.004	.051	.013	↑	↑	-	-	.000	-	-	-
Source of financial assistance as a graduate student	.093	.071	.009	.000	.003	-	-	-	-	.000	-	-	-
Region of longest childhood residence	.009	.024	.020	.007	.000	-	-	-	-	.000	-	-	-
University (Chunghsing or National Taiwan)	.000	.005	.014	.002	.000	-	-	-	-	.000	-	-	-
N	103	63	40	33	30	17	16	11	19	21	19	11	10

* Final group variance not computed.

↑ indicates variable on which split occurred.

() indicates competing variable.

Appendix Table 14. PROPORTION OF VARIANCE IN ACADEMIC COMMUNICATION OUTPUT OF THE COLUMBIA CAMPUS SOCIAL SCIENCE FACULTY EXPLAINED BY EACH BACKGROUND CHARACTERISTIC IN THE AID PRODUCED GROUP

Background Characteristics	AID Produced Groups										
	1	2	3	4*	5	6	7*	8*	9*	10*	11*
Whether from economically disadvantaged background	.025	.000	.047	-	.000	.000	-	-	-	-	-
Age	.023	(.022)	.034	-	.036	.004	-	-	-	-	-
Source of financial assistance as a graduate student	.027	.004	.011	-	.011	.009	-	-	-	-	-
Place of longest childhood residence	.014	.024	.019	-	.012	.011	-	-	-	-	-
Region of longest childhood residence	.039	.006	.008	-	.009	.004	-	-	-	-	-
Father's occupation	(.032)	.013	(.042)	-	(.036)	(.029)	-	-	-	-	-
N	125	32	93	27	66	56	10	16	16	28	28

* Final group: variance not computed.
 _____↑ indicates variable on which split occurred.
 () indicates competing variable.

Appendix Table 15. PROPORTION OF VARIANCE IN ACADEMIC COMMUNICATION OUTPUT OF THE COLUMBIA CAMPUS SOCIAL SCIENCE FACULTY EXPLAINED BY EACH PRIOR SOCIALIZATION EXPERIENCE IN THE AID PRODUCED GROUPS

Prior Socialization Experiences	AID Produced Groups														
	1	2	3	4*	5	6*	7	8	9	10*	11*	12*	13*	14*	15*
Where Ph.D. was obtained	.056	.064	(.046)	-	.022	-	.000	.000	.000	-	-	-	-	-	-
Whether did applied research as a graduate student	.020	.018	.007	-	.005	-	.000	.001	.007	-	-	-	-	-	-
Whether did basic research as a graduate student	.036	.002	.001	-	.001	-	.000	.007	.000	-	-	-	-	-	-
Whether published from applied research as a graduate student	.037	.032	.014	-	.002	-	.001	(.007)	.012	-	-	-	-	-	-
Whether published from basic research done as a graduate student	.080	.000	.012	-	.005	-	.000	(.007)	.031	-	-	-	-	-	-
Whether participated in social service work as a graduate student	.005	.000	.008	-	.001	-	.000	.000	.000	-	-	-	-	-	-
Whether participated in social reform work as a graduate student	.010	.000	.015	-	.000	-	.000	.000	.000	-	-	-	-	-	-
Whether participated in church work as a graduate student	.001	.027	.011	-	.004	-	.000	.002	.000	-	-	-	-	-	-
Previous employment	.043	.019	.101	-	.008	-	.016	.003	(.016)	-	-	-	-	-	-
Degree status	(.073)	(.045)	.000	-	.000	-	.000	.000	.000	-	-	-	-	-	-
N	125	40	85	14	71	18	22	32	39	18	21	22	10	11	11

* Final group: variance not computed.
 _____↑ indicates variable on which split occurred.
 () indicates competing variables.

Appendix Table 16. PROPORTION OF VARIANCE IN ACADEMIC COMMUNICATION OUTPUT OF THE COLUMBIA CAMPUS SOCIAL SCIENCE FACULTY EXPLAINED BY EACH CONDITION OF APPOINTMENT IN THE AID PRODUCED GROUPS

Conditions of Appointment	AID Produced Groups																
	1	2	3	4*	5	6	7*	8	9*	10	11*	12	13*	14*	15*	16*	17*
Academic rank	.069	.095	.001	-	.000	.003	-	.009	-	.000	-	.020	-	-	-	-	-
Whether appointment provides for doing research	(.073)	.035	.002	-	.040	.002	-	.000	-	.000	-	.000	-	-	-	-	-
Whether appointment provides for doing extension work	.014	.013	.008	-	.008	.001	-	.001	-	.002	-	.002	-	-	-	-	-
Whether appointment provides for doing teaching	.012	.051	.000	-	.006	.007	-	.000	-	.000	-	.000	-	-	-	-	-
Receipt of research funds	.103	.000	.001	-	.000	.000	-	.000	-	.000	-	.000	-	-	-	-	-
Other income from professional sources	.068	.041	.013	-	.023	.000	-	.000	-	.000	-	.000	-	-	-	-	-
Type of appointment	.004	.021	.000	-	.000	.000	-	.000	-	.000	-	.000	-	-	-	-	-
Percent of time assigned to research	.010	.001	.006	-	.000	.002	-	(.011)	-	.000	-	.000	-	-	-	-	-
Percent of time assigned to teaching	.020	.023	.004	-	.016	(.006)	-	.013	-	.014	-	.000	-	-	-	-	-
Percent of time spent on administrative and extra-curricular activities	.002	.014	.039	-	.005	(.007)	-	.000	-	.002	-	.000	-	-	-	-	-
Basic annual salary	.072	(.071)	.002	-	.001	.004	-	.011	-	(.010)	-	.000	-	-	-	-	-
	N	125	67	58	19	48	37	11	38	20	22	15	22	16	11	11	11

* Final group: variance not computed.

↑ indicates variable on which split occurred.

() indicates competing variable.

Appendix Table 17, PROPORTION OF VARIANCE IN ACADEMIC COMMUNICATION OUTPUT OF THE COLUMBIA CAMPUS SOCIAL SCIENCE FACULTY EXPLAINED BY EACH PERCEPTUAL VARIABLE IN THE AID PRODUCED GROUPS

Perceptual Variables	AID Produced Groups																		
	1	2	3	4	5	6	7*	8*	9	10	11	12*	13*	14*	15*	16*	17*	18*	19*
Faculty type	.057	.012	.000	.018	.000	.004	-	-	.000	.000	.000	-	-	-	-	-	-	-	-
Perceived utility of own specialty for understanding problem issues	.031	.013	.009	.029	.000	.016	-	-	.000	.000	.000	-	-	-	-	-	-	-	-
Perceived utility of own specialty for solving current problem issues	.018	.022	.007	.026	.000	.019	-	-	.000	.000	.011	-	-	-	-	-	-	-	-
Whether own teaching is properly rewarded	.009	.013	.009	.020	.000	.050	-	-	.000	.000	.001	-	-	-	-	-	-	-	-
Whether own research is properly rewarded	.058	(.051)	.017	(.051)	.000	.063	-	-	.000	.000	.003	-	-	-	-	-	-	-	-
Whether own extension work is properly rewarded	.008	.017	.003	.020	.005	.007	-	-	.000	.000	.001	-	-	-	-	-	-	-	-
What university should emphasize most	.006	.001	.008	.003	.000	.000	-	-	.000	(.017)	.000	-	-	-	-	-	-	-	-
What university should emphasize second most	.002	.012	.007	.040	.017	.041	-	-	.002	.010	(.010)	-	-	-	-	-	-	-	-
What university should emphasize least	.022	.006	.009	.016	(.012)	.017	-	-	.000	.000	.004	-	-	-	-	-	-	-	-
What self should emphasize most	.119	.013	.001	.013	.005	.005	-	-	(.010)	.000	.000	-	-	-	-	-	-	-	-
What self should emphasize second most	.018	.025	.013	.007	.009	.041	-	-	.000	.009	.000	-	-	-	-	-	-	-	-
What self should emphasize least	.044	.012	.013	.016	.016	.023	-	-	.000	.000	.004	-	-	-	-	-	-	-	-
Greatest constrain on doing applied research	.029	.020	.006	.028	.000	.004	-	-	.008	.000	.004	-	-	-	-	-	-	-	-
Self satisfaction rank from doing creative work and publishing results	.012	.002	.009	.015	.010	.005	-	-	.002	.000	.000	-	-	-	-	-	-	-	-
Self satisfaction rank from helping people solve their problems	.004	.003	.006	.000	.000	.006	-	-	.000	.002	.000	-	-	-	-	-	-	-	-
Self satisfaction rank from writing for non-academics who can use what is known	.037	.024	.012	.019	.009	.019	-	-	.000	.021	.000	-	-	-	-	-	-	-	-

Appendix Table 17, PROPORTION OF VARIANCE IN ACADEMIC COMMUNICATION OUTPUT OF THE COLUMBIA CAMPUS SOCIAL SCIENCE FACULTY EXPLAINED BY EACH PERCEPTUAL VARIABLE IN THE AID PRODUCED GROUPS

Perceptual Variables	AID Produced Groups																		
	1	2	3	4	5	6	7*	8*	9	10	11	12*	13*	14*	15*	16*	17*	18*	19*
Self satisfaction rank from helping intermediaries who help people solve their problems	.066	.018 (.020)	.033	.003	.026	-	-	.012	.011	.000	-	-	-	-	-	-	-	-	-
Self satisfaction rank from teaching students	.024	.009	.004	.010	.001	.000	-	-	.000	.011	.000	-	-	-	-	-	-	-	-
Self satisfaction rank from doing research on current people problems	.000	.006	.000	.000	.000	.000	-	-	.000	.000	.000	-	-	-	-	-	-	-	-
Perceived rank for professional advancement from doing creative work and publishing results	.006	.007	.024	.005	.006 (.057)	-	-	.000	.000	.000	-	-	-	-	-	-	-	-	-
Perceived rank for professional advancement from helping people solve their problems	.028	.035	.001	.063	.001	.000	-	.000	.000	.001	-	-	-	-	-	-	-	-	-
Perceived rank for professional advancement from writing for non-academics	.002	.001	.001	.008 (.012)	.000	-	-	.000	.000	.000	-	-	-	-	-	-	-	-	-
Perceived rank for professional advancement from helping intermediaries who help people solve their problems	.009	.007	.005	.020	.002	.033	-	.000	.001	.000	-	-	-	-	-	-	-	-	-
Perceived rank for professional advancement from teaching students	.002	.019	.007	.016	.001	.017	-	.000	.007	.000	-	-	-	-	-	-	-	-	-
Perceived rank for professional advancement from doing research on current people problems	(.101)	.083	.010	.000	.010	.000	-	.000	.000	(.010)	-	-	-	-	-	-	-	-	-
N	125	74	51	47	27	32	15	11	21	28	23	16	11	14	14	11	10	12	11

* Final group: variance not computed.

↑ indicates variable upon which split occurred.

() indicates competing variable.

Appendix Table 18. PROPORTION OF VARIANCE IN ACADEMIC COMMUNICATION OUTPUT OF THE COLUMBIA CAMPUS SOCIAL SCIENCE FACULTY EXPLAINED BY EACH REFERENCE GROUP IN THE AID PRODUCED GROUPS

Perceived Reference Group Influence on Own Work	AID Produced Groups																
	1	2	3	4	5*	6	7*	8	9	10*	11	12*	13*	14*	15*	16*	17*
Influence of departmental colleagues	.009	.018	.012	.010	-	.000	-	.000	.000	-	.002	-	-	-	-	-	-
Influence of university colleagues	.005	.000	.001	.004	-	.002	-	.000	.000	-	.000	-	-	-	-	-	-
Influence of colleagues in government and industry	.007	.005	.012	.001	-	.005	-	.000	.000	-	.002	-	-	-	-	-	-
Influence of colleagues in own academic discipline	.018	.000	.009	.008	-	(.013)	-	.001	.031	-	.000	-	-	-	-	-	-
Influence of undergraduate students	.014	.000	.006	.004	-	.003	-	.010	.020	-	.000	-	-	-	-	-	-
Influence of graduate students	.006	.006	.011	.006	-	.003	-	.003	.004	-	.012	-	-	-	-	-	-
Influence of professionals and agencies that use social science information	.007	.002	.011	.007	-	.005	-	.001	.002	-	.002	-	-	-	-	-	-
Influence of university administration	(.032)	.003	.045	(.015)	-	.020	-	.002	.000	-	.005	-	-	-	-	-	-
Influence of funding agencies	.038	.000	.007	(.015)	-	.004	-	.005	.000	-	.001	-	-	-	-	-	-
Influence of general public	.027	.006	.021	.018	-	.001	-	.000	.002	-	.000	-	-	-	-	-	-
N	125	24	101	87	14	77	10	48	29	11	37	24	13	13	16	10	14

* Final: variance not computed.
 ↑ indicates variable on which split occurred.
 () indicates competing variable.

Appendix Table 19. PROPORTION OF VARIANCE IN ACADEMIC COMMUNICATION OUTPUT OF THE COLUMBIA CAMPUS SOCIAL SCIENCE FACULTY EXPLAINED BY EACH SELECTED VARIABLE IN THE AID PRODUCED GROUPS

Selected Structural- Background-Socializa- tion-Perceptual Variables	AID Produced Groups														
	1	2	3	4*	5	6	7	8*	9	10*	11*	12*	13*	14*	15*
Faculty type	.047	.056	.000	-	.000	.000	.000	-	.000	-	-	-	-	-	-
Influence of colleagues in own academic disci- pline	.018	.001	.008	-	.005	.000	.000	-	.001	-	-	-	-	-	-
Influence of funding agencies	.038	.002	.027	-	.009	.021	.000	-	.006	-	-	-	-	-	-
Where Ph.D. degree was obtained	.056	.088	.015	-	.010	.000	.003	-	.014	-	-	-	-	-	-
Whether from economic- ally disadvantaged group	.025	.011	.000	-	.009	.003	.000	-	.000	-	-	-	-	-	-
Academic rank	.069	.083	.014	-	.047	.000	.000	-	.005	-	-	-	-	-	-
Whether appointment pro- vides for doing research	.073	(.087)	.007	-	(.067)	.007	.000	-	.000	-	-	-	-	-	-
Receipt of research funds	(.103)	(.085)	.004	-	.075	.000	.000	-	.000	-	-	-	-	-	-
Whether published from basic research as a graduate student	.080	.034	.011	-	.018	.017	.000	-	.000	-	-	-	-	-	-
Previous employment	.043	.045	.004	-	.058	.026	(.011)	-	.003	-	-	-	-	-	-
Whether own research is properly rewarded	.058	.051	.017	-	.000	.000	.000	-	.002	-	-	-	-	-	-
What university should emphasize most	.002	.012	.007	-	.012	.011	.006	-	(.012)	-	-	-	-	-	-
What self should empha- size most	.119	.013	.001	-	.024	.052	.003	-	.000	-	-	-	-	-	-
Self satisfaction rank from teaching students	.066	.018	.020	-	.036	.014	.007	-	(.013)	-	-	-	-	-	-
Perceived rank for pro- fessional advancement from helping people solve their problems	.006	.007	.024	-	.002	.002	.004	-	.015	-	-	-	-	-	-
Perceived rank for pro- fessional advancement from writing for non- academicians	.028	.035	.001	-	.040	.000	.005	-	.002	-	-	-	-	-	-
Perceived rank for pro- fessional advancement from doing research on current people problems	.002	.019	.007	-	.003	.003	.001	-	.003	-	-	-	-	-	-
Age	.023	.029	.008	-	.020	.006	.014	-	.009	-	-	-	-	-	-
Percent of time spent on administrative and extra- curricular activities	.002	.003	.009	-	.002	.002	.004	-	.005	-	-	-	-	-	-
Region of longest child- hood residence	.039	.035	.035	-	.065	.041	.007	-	.000	-	-	-	-	-	-
Father's occupation	.032	.023	.009	-	.034	.008	.000	-	.004	-	-	-	-	-	-
N	125	74	51	17	57	33	24	14	37	17	16	19	18	13	11

* Final group: variance not computed.

↑ indicates variable on which split occurred.

() indicates competing variable.

Appendix Table 20. PROPORTION OF VARIANCE IN ACADEMIC COMMUNICATION OUTPUT OF THE TAIWAN CAMPUSES SOCIAL SCIENCE FACULTY EXPLAINED BY EACH BACKGROUND CHARACTERISTIC IN THE AID PRODUCED GROUPS

Background Characteristics	AID Produced Groups														
	1	2	3	4*	5	6*	7	8	9*	10	11*	12*	13*	14*	15*
Whether from an economically disadvantaged group	(.035)	.001	.031	-	.000	-	.004	(.007)	-	.000	-	-	-	-	-
Age	.019	.015	.004	-	(.011)	-	.029	.005	↑	.007	-	-	-	↑	↑
Source of financial assistance as a graduate student	.029	.006	.040	-	.000	↑	.010	.009	-	.000	↑	-	-	-	-
Place of longest residence during childhood	.019	.045	.004	↑	.004	-	.004	.000	-	.000	-	-	-	-	-
Region of longest childhood residence	.028	(.028)	.015	-	.015	-	(.016)	.000	-	.000	-	↑	↑	-	-
Father's occupation	.070	.001	.007	-	.000	-	.004	.004	-	.002	-	-	-	-	-
N	103	44	59	18	26	15	44	33	11	22	11	15	11	10	12

* Final group variance not computed.
 ↑ indicates variable on which split occurred.
 () indicates competing variable.

Appendix Table 21. PROPORTION OF VARIANCE IN ACADEMIC COMMUNICATION OUTPUT OF THE TAIWAN CAMPUSES SOCIAL SCIENCE FACULTY EXPLAINED BY EACH PRIOR SOCIALIZATION EXPERIENCE IN THE AID PRODUCED GROUPS

Prior Socialization Experiences	AID Produced Groups												
	1	2	3	4	5*	6	7*	8*	9*	10	11*	12*	13*
Where Ph.D. was obtained	.035	.025	.009	.000	↑	.000	-	-	-	.000	-	-	-
Whether did applied research as a graduate student	.108	(.018)	.000	(.007)	-	.000	-	-	-	.000	-	-	-
Whether did basic research as a graduate student	(.070)	(.018)	.000	(.007)	-	.000	-	-	-	.007	-	↑	↑
Whether published from applied research as a graduate student	.051	.010	.005	.002	-	.000	-	-	-	.000	-	-	-
Whether published from basic research as a graduate student	.051	.010	.001	.011	-	.000	↑	-	-	.002	-	-	-
Whether participated in social service work as a graduate student	.063	(.018)	.001	(.007)	-	.000	-	-	-	(.004)	-	-	-
Whether participated in social reform work as a graduate student	.063	(.018)	.000	(.007)	-	.000	-	-	-	.000	-	-	-
Whether participated in church work as a graduate student	.063	(.018)	.000	(.007)	-	.000	-	-	-	.000	-	-	-
Previous employment	.035	.003	.028	.004	-	.008	-	↓	↓	.001	↑	-	-
Degree status	.017	.011	.000	.000	-	.000	-	-	-	.000	-	-	-
N	103	60	43	49	11	28	21	13	15	27	16	17	10

* Final group variance not computed.
 ↑ indicates variable on which split occurred.
 () indicates competing variable.

Appendix Table 22. PROPORTION OF VARIANCE IN ACADEMIC COMMUNICATION OUTPUT OF THE TAIWAN CAMPUSES SOCIAL SCIENCE FACULTY EXPLAINED BY EACH CONDITION OF APPOINTMENT IN THE AID PRODUCED GROUPS

Conditions of Appointment	AID Produced Groups												
	1	2	3	4*	5	6*	7	8*	9	10*	11*	12*	13*
Academic rank	.134	.015	.000	-	.015	-	.000	-	.000	-	-	-	-
Whether appointment provides for doing research	.001	.001	.001	-	.000	-	.000	-	.000	-	-	-	-
Whether appointment provides for doing extension work	.005	.003	.006	-	.000	-	.000	-	.007	-	-	-	-
Whether appointment provides for teaching	.000	.000	.000	-	.000	-	.000	-	.000	-	-	-	-
Receipt of research funds	.104	.090	.035	-	.000	-	.000	-	.000	-	-	-	-
Other income from professional sources	.109	.017	.034	-	.000	-	.000	-	.008	-	-	-	-
Type of appointment	.001	.001	.000	-	.000	-	.000	-	.000	-	-	-	-
Percent of time assigned to research	.021	.028	.002	-	.004	-	.009	-	.011	-	-	-	-
Percent of time assigned to teaching	.049	.020	.017	-	.004	-	.009	-	.007	-	-	-	-
Percent of time spent on administrative and extra-curricular activities	.003	.014	.000	-	.002	-	.003	-	.000	-	-	-	-
Basic annual salary	.026	.000	.007	-	.000	-	.000	-	.004	-	-	-	-
N	103	58	45	18	40	14	26	11	34	15	11	19	15

* Final group variance not computed.

↑ indicates variable on which split occurred.

() indicates competing variable.

Appendix Table 23. PROPORTION OF VARIANCE IN ACADEMIC COMMUNICATION OUTPUT OF THE TAIWAN CAMPUSES SOCIAL SCIENCE FACULTY EXPLAINED BY EACH PERCEPTUAL VARIABLE IN THE AID PRODUCED GROUPS

Perceptual Variables	AID Produced Groups												
	1	2	3	4*	5	6	7*	8*	9	10*	11*	12*	13*
Faculty type	.029	.014	.002	-	.002	.001	-	-	.002	-	-	-	-
Perceived utility of own specialty for understanding problem issues	.026	.011	.011	-	.000	.007	-	-	.000	-	-	-	-
Perceived utility of own specialty for solving current problem issues	.053	.031	.010	-	(.017)	.014	-	-	.008	-	-	-	-
Whether own teaching is properly rewarded	.019	.002	.015	-	.000	.010	rewarded	-	.015	-	-	-	-
Whether own extension work is properly rewarded	.000	.000	.000	-	.000	.000	-	-	.000	-	-	-	-
Whether own research is properly rewarded	.022	.042	.018	-	.000	.014	-	-	.003	-	-	-	-
What university should emphasize most	.104	.000	.013	-	.000	.005	-	-	.000	-	-	-	-
What university should emphasize second most	.018	.013	.013	-	.011	.012	second	-	.008	-	-	-	-
What university should emphasize least	.056	.097	.014	-	.005	.008	-	-	.017	-	-	-	-
What self should emphasize most	.068	.000	(.030)	-	.000	.036	-	-	.000	-	-	-	-
What self should emphasize second most	.027	.015	.006	-	.006	.007	-	-	.007	-	-	-	-
What self should emphasize least	(.083)	(.085)	.016	-	.015	.009	-	-	.009	-	-	-	-
Greatest constraint on doing research	.032	.007	.011	-	.005	.020	research	-	.005	-	-	-	-
Self satisfaction rank from doing creative research	.031	.012	.003	-	.016	.001	-	-	.008	-	-	-	-
Self satisfaction rank from helping people solve their problems	.004	.006	.010	-	.010	.005	-	-	.000	-	-	-	-
Self satisfaction rank from writing for non-academicians who can use what is known	.018	.014	.031	-	.014	.006	-	-	.000	-	-	-	-
Self satisfaction rank from helping intermediaries who help people solve their problems	.003	.004	.000	-	.036	.001	-	-	(.016)	-	-	-	-
Self satisfaction rank from teaching students	.046	.036	.001	-	.000	.001	-	-	.008	-	-	-	-
Self satisfaction rank from doing research on current people problems	.017	.036	.000	-	(.017)	.001	-	-	.002	-	-	-	-
Perceived rank for professional advancement from doing creative work and publishing results	.038	.020	.001	-	.000	.000	-	-	.012	-	-	-	-

Appendix Table 23. PROPORTION OF VARIANCE IN ACADEMIC COMMUNICATION OUTPUT OF THE TAIWAN CAMPUSES SOCIAL SCIENCE FACULTY EXPLAINED BY EACH PERCEPTUAL VARIABLE IN THE AID PRODUCED GROUPS

Perceptual Variables	AID Produced Groups												
	1	2	3	4*	5	6	7*	8*	9	10*	11*	12*	13*
Perceived rank for professional advancement from helping people solve their problems	.021	.017	.003	-	.002	.002	-	-	.005	-	-	-	-
Perceived rank for professional advancement from writing for non-academicians	.009	.025	.001	-	.000	.003	-	-	.001	-	-	-	-
Perceived rank for professional advancement from helping intermediaries who help people solve their problems	.009	.005	.028	- /	.000	.006	-	-	.000	-	-	-	-
Perceived rank for professional advancement from teaching students	.004	.002	.008	-	.000	.005	-	-	.000	-	-	-	-
Perceived rank for professional advancement from doing research on current people problems	.033	.017	.023	-	.007	(.022)	-	-	.005	-	-	-	-
N	103	43	60	16	27	48	12	14	34	12	15	14	20

* Final group variance not computed.

↑ indicates variable on which split occurred.

() indicates competing variable.

Appendix Table 24. PROPORTION OF VARIANCE IN ACADEMIC COMMUNICATION OUTPUT OF THE TAIWAN CAMPUSES SOCIAL SCIENCE FACULTY EXPLAINED BY EACH REFERENCE GROUP IN THE AID PRODUCED GROUPS

Reference Group Influence	AID Produced Groups														
	1	2	3	4*	5	6	7	8*	9*	10	11*	12*	13*	14*	15*
Influence of departmental colleagues	(.091)	(.062)	.014	-	.000	.004	.000	-	-	.012	-	-	-	-	-
Influence of university colleagues	.067	.001	(.028)	-	.020	.005	.031	-	-	.004	-	-	-	-	-
Influence of colleagues in government and industry	.071	.042	.000	-	.000	.001	.000	-	-	.000	-	-	-	-	-
Influence of colleagues in own academic discipline	.092	.000	.025	-	.001	.000	.000	-	-	.000	-	-	-	-	-
Influence of undergraduate students	.007	.036	.031	-	.000	(.006)	.000	-	-	.000	-	-	-	-	-
Influence of graduate students	.057	.087	.005	-	.000	.000	.006	-	-	.001	-	-	-	-	-
Influence of professionals and agencies that use social science information	.059	.000	.014	-	.000	.005	.001	-	-	.002	-	-	-	-	-
Influence of university administration	.054	.023	.018	-	.006	.000	.019	-	-	.002	-	-	-	-	-
Influence of funding agencies	.048	.004	.014	-	.000	.000	.005	-	-	.002	-	-	-	-	-
Influence of general public	.038	.001	.019	-	.005	.009	.003	-	-	.001	-	-	-	-	-
N	103	44	59	18	26	34	25	10	15	24	10	12	14	10	14

* Final group variance not computed.

↑ indicates variable on which split occurred.

() indicates competing variables.

Appendix Table 25. PROPORTION OF VARIANCE IN ACADEMIC COMMUNICATION OUTPUT OF THE TAIWAN CAMPUSES SOCIAL SCIENCE FACULTY EXPLAINED BY EACH SELECTED STRUCTURAL-BACKGROUND-SOCIALIZATION-PERCEPTUAL VARIABLE IN THE AID ANALYSIS

Selected Variables	AID Produced Groups												
	1	2	3	4*	5	6	7*	8*	9	10*	11*	12*	13*
Faculty type	.029	.024	.001	-	.008	.004	-	-	.003	-	-	-	-
Influence of departmental colleagues	.091	.131	.001	↑	.009	.042	-	-	.003	↑	↑	-	-
Influence of colleagues in own academic discipline	.092	.046	.023	-	.011	.002	-	-	.014	-	-	-	-
Influence of graduate students	.057	.067	.002	-	.007	.008	-	-	.004	-	-	-	-
Influence of university administration	.054	.049	.017	-	.001	.012	-	-	.016	-	-	↑	↑
Academic rank	.134	.015	.000	-	.012	.005	-	-	.000	-	-	-	-
Receipt of research funds	(.104)	.090	(.035)	-	.017	.000	-	-	.000	-	-	-	-
Other income from professional sources	(.109)	.017	(.034)	-	.000	.000	-	-	(.013)	-	-	-	-
Whether did applied research as a graduate student	(.108)	.064	(.034)	-	.026	.029	-	-	.007	-	-	-	-
Whether did basic research as a graduate student	.070	.015	.013	-	.012	.008	-	-	.001	-	-	-	-
Whether participated in social service work as a graduate student	.063	.032	(.035)	-	.012	.000	-	-	.000	-	-	-	-
Previous employment	.035	.010	.050	-	.003	.002	-	↑	.004	-	-	-	-
Perceived utility of own specialty for solving current problem issues	.053	.027	.015	-	.001	.003	-	-	.000	-	-	-	-
What university should emphasize most	(.104)	(.109)	.008	-	.042	.006	-	-	.001	-	-	-	-
What university should emphasize second most	.018	.017	.009	-	.020	.018	-	-	.005	-	-	-	-
What university should emphasize least	.056	.049	.014	-	.022	(.032)	-	-	.002	-	-	-	-
What self should emphasize least	.083	.064	.005	-	.022	(.032)	-	-	.001	-	-	-	-
Greatest constraint on doing applied research	.032	.009	.010	-	.026	.000	-	-	.001	-	-	-	-
Perceived rank for professional advancement from doing creative work and publishing results	.038	.064	.001	-	.006	.001	-	-	.003	-	-	-	-
Age	.019	.008	.006	-	.007	.010	-	-	.004	-	-	-	-
Percent of time assigned to teaching	.049	.020	.017	-	.003	.008	-	-	.000	-	-	-	-
Source of financial assistance as a graduate student	.029	.008	.029	-	.022	.018	-	-	.003	-	-	-	-
Father's occupation	.070	(.104)	.006	-	(.042)	.021	-	-	.006	-	-	-	-
University (Chunghsing or National Taiwan)	.049	.055	.003	-	.000	.000	-	-	.000	-	-	-	-
N	103	58	45	12	46	30	16	13	32	16	14	13	19

* Final split - variance not computed.

↑ indicates variable on which split occurred.

() indicates competing variable.