LIAISON COMMUNICATION ROLES OF PROFESSIONALS IN A RESEARCH DISSEMINATION ORGANIZATION

Thesis for the Degree of Ph. D.
MICHIGAN STATE UNIVERSITY
EDWIN H. AMEND
1971

This is to certify that the

thesis entitled

LIAISON COMMUNICATION ROLES
OF PROFESSIONALS IN A
RESEARCH DISSEMINATION ORGANIZATION

presented by

Edwin H. Amend

has been accepted towards fulfillment
of the requirements for

Ph. D. degree in Communication

Major professor

Date May 10, 1971

O-7639

LIAISON
IN A

Research rep
ropological analysis
rganization analyze
nd (2) an empirical
attern variables an

The research
pecialists in an or
nformation derived
iscussion and model
rocess, along with
rganization studied

Data were ga
seven academic depar
ersonal interview w
nstruments. Biogra
rom organizational

The first pa
he generic communic
sed did not conside
elationships. It w
ught to be," in ter

ABSTRACT

LIAISON COMMUNICATION ROLES OF PROFESSIONALS
IN A RESEARCH DISSEMINATION ORGANIZATION

by

Edwin H. Amend

Research reported here consists of a study in two parts: (1) a topological analysis of the extant communication structure of the organization analyzed along three dimensions of communication contact, and (2) an empirical analysis of relationships between communication pattern variables and communication structure.

The research is a field study conducted among subject matter specialists in an organization designed for the dissemination of information derived from research. The study includes a theoretical discussion and model of the research dissemination and utilization process, along with a description of the actual research dissemination organization studied.

Data were gathered from fifty respondents who are assigned to seven academic departments of Michigan State University. A structured personal interview was used, supplemented by ancillary self-administered instruments. Biographical data and additional information were gathered from organizational records.

The first part of the study was undertaken to provide a map of the generic communication structure of the organization. The method used did not consider hierarchical levels or formally prescribed role relationships. It was designed to show "what is," rather than "what ought to be," in terms of intra-organizational communication contact.

Results of t

espondents accordi

pes were derived o

onsidering both th

nter-group) of int

ontact so measured

The analysis

est hypothesized r

xemplified in the t

ype of liaisonness

he six independent

elated to liaisonn

2) information inp

4) network centrali

utput diversity.

Of the six h

positive correlatio

found between liais

ommunication divers

nformation output d

re also positively

level.

The findings

vious research, whic

n organization serv

the organization.

Results of the first part of the study were used to describe respondents according to typologies of communication contact. Typologies were derived on the basis of reciprocated sociometric choice, considering both the number and the location (i.e., intra-group and inter-group) of interpersonal contact. The attribute of interpersonal contact so measured was defined as liaisonness.

The analysis in the second part of the study was designed to test hypothesized relationships between communication structure, as exemplified in the typologies, and communication patterns. The attribute of liaisonness was the dependent variable in six formal hypotheses. The six independent variables which were hypothesized to be positively related to liaisonness were: (1) peer-evaluated effectiveness, (2) information input diversity, (3) peer communication diversity, (4) network centrality, (5) opinion leadership, and (6) information output diversity.

Of the six hypotheses tested, five were supported by the data. Positive correlations (at less than the .05 level of significance) were found between liaisonness and: peer-evaluated effectiveness, peer communication diversity, network centrality, opinion leadership, and information output diversity. The variables in the remaining hypothesis are also positively correlated, but not at a statistically significant level.

The findings of the present study support the findings of previous research, which suggest that a small percentage of the members of an organization serve as key linking individuals between subsystems of the organization.

of Communicat

Michigan Stat

the requirem

Guidance Com

Accepted by the faculty of the Department of Communication, College of Communication Arts, Michigan State University, in partial fulfillment of the requirements for the Doctor of Philosophy degree.

Director of Thesis

Guidance Committee: Chairman

LIAISON COMMUNICATION ROLES OF PROFESSIONALS IN A RESEARCH DISSEMINATION ORGANIZATION

by

Edwin H. Amend

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Communication

1971

To Dee,
My wife and partner,

And to our children,
Mary, Noel, Carol, and Chris.

This thesis represents the culmination of a three-year family effort. It would not have been possible without your encouragement and wholehearted cooperation.

A dissertat

The intangible port

the result of inter

to the faculty and

communication, I ex

given me to grow i

Special th

committee:

Everett Rog

meeting in Nigeria

committee chairman

Hideya Kum

cation director a

Fred Wais

me in my efforts

Eugene J

provided impetus

Mason Mi

My doctoral studi

academic stimulati

ACKNOWLEDGEMENTS

A dissertation is the tangible evidence of a study program. The intangible portion, the intellectual growth of the scholar, is the result of interaction between the student and many other people. To the faculty and my fellow graduate students in the Department of Communication, I express my thanks for the opportunities you have given me to grow intellectually.

Special thanks are extended to the members of my doctoral committee:

Everett Rogers, whom I have counted as a friend since our first meeting in Nigeria in 1965, and who served as my academic advisor and committee chairman until the time of his sabbatical leave;

Hideya Kumata, who counselled and guided me as teacher, dissertation director and acting committee chairman;

Fred Waisanen, whose classes and personal counsel have helped me in my efforts to comprehend the human condition;

Eugene Jacobson, whose intellectual stimulation and guidance provided impetus and conceptual support for this dissertation;

Mason Miller, with whom I worked as Graduate Assistant during my doctoral studies, and who provided counsel and friendship along with academic stimulation.

To my colle
this dissertation i
him with assistance
I am grateful for t
project.

Anita Immel
computerization and

A large mea
students in the Ins
have thoroughly enj
as an instructor a
my intellectual ab
personal growth.

To my fami
express my deep gr
their support and
with four teen-age
career.

To my colleague, Nemi Jain, I owe a special debt of thanks. This dissertation is part of a larger research project undertaken by him with assistance from fellow graduate students, including myself. I am grateful for the use of data which emanated from that research project.

Anita Immele provided prompt and pleasant assistance in the computerization and analysis of data. To her I express my appreciation.

A large measure of appreciation must go to my own graduate students in the Institute for Extension Personnel Development. I have thoroughly enjoyed my three years of association with them, both as an instructor and as counsellor. They have continually challenged my intellectual ability, and have provided interaction leading to personal growth. To them I say, "Thank you."

To my family, to whom this dissertation is dedicated, I express my deep gratitude. The real meaning of words acknowledging their support and cooperation can be understood only by other scholars with four teen-agers, undertaking a graduate study program in mid-career.

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd.)

TABLE

LIST OF TABLES

FIGURE

LIST OF FIGURES

LIST OF FIGURES (Cont'd.)

Purpose

The purpo

about the flow of

dissemination org

tion about patter

employees engaged

research and admi

Knowledge

better understand

Knowledge of the

viduals and sub-g

larger organizat

tion links in the

The basic

a topological, or

structure, and (2

*The "sp
subject-matter ex
Michigan Coopera
academic departme

**A resea
complex organiza
research results
clients feedback
information.

CHAPTER I

INTRODUCTION

Purpose

The purpose of the present study is to increase our knowledge about the flow of communication among specialists* in a research dissemination organization.** The study is designed to yield information about patterns of interpersonal contacts among professional employees engaged in University extension work, classroom teaching, research and administration.

Knowledge of interpersonal communication patterns will provide better understanding of the communication structure of the organization. Knowledge of the communication structure and the degree to which individuals and sub-groups of an organization are integrated into the larger organization will help us understand the function of communication links in the organization.

The basic objectives of the present work will be to (1) develop a topological, or "mapping" analysis of the extant communication structure, and (2) functionally analyze the dynamics of information

*The "specialists" in the present study are highly trained, subject-matter experts who are full-time faculty members in the Michigan Cooperative Extension Service, belonging to their respective academic departments in the university.

**A research dissemination organization is defined as a large, complex organization whose basic function is to disseminate useful research results and other innovations to clients, and to receive from clients feedback regarding research needs and their utilization of the information.

flow through the p

flow will include

measurement of the

analyzing communic

roles** in a resea

on the liaison co

will be expressed

Contribution of th

The presen

structure and flow

Michigan State Uni

within a college,

studies to compare

zations.

For exampl

tional comparative

findings. Schwar

faculty of the Co

recognized the pr

*The lia

Seashore (1951:37

as liaison person

frequent, recipro

contact group str

liaison functions

participate widel

in any simple way

**"Linki

function of faci

ledge from the r

the knowledge is

flow through the population under study. The analysis of information flow will include a search for the liaison communication role* and measurement of the liaison role with other pertinent variables. In analyzing communication patterns among specialists performing linking roles** in a research dissemination organization, the focus will be on the liaison communication role. Liaisonness in communication roles will be expressed in the form of a numerical index.

Contribution of the Study

The present study will provide a measure of the communication structure and flow among specialist staff members of a college in Michigan State University. Besides describing communication patterns within a college, the index of liaisonness might be useful in other studies to compare communication patterns between other complex organizations.

For example, Schwartz (1968:164) points out the need for additional comparative studies to validate the generalizability of his findings. Schwartz investigated liaison communication roles among the faculty of the College of Education at Michigan State University. He recognized the problem of applying statistical tests to samples and

---

*The liaison communication role was discovered by Jacobson and Seashore (1951:37) who noted that "some individuals appear to function as liaison persons between groups, and characteristically have many, frequent, reciprocated, and important contacts which cut across the contact group structure. The (liaison) persons, who appear to have liaison functions in the communication system of the organization, participate widely in the communication system but are not identifiable in any simple way with a single sub-group."

**"Linking roles," as discussed by Jain (1970:3), "perform the function of facilitating the effective communication of research knowledge from the research system to the client system in such a way that the knowledge is put to effective use."

populations derive
studies to extend
MacDonald
of the liaison con
studied the liaiso
zation within a Fe
the need for addit
especially since p
tially been case s
The presen
sion specialists i
University. It ma
pared with the fin
(1968) and MacDona
communication patt
tions.

Scope of Literatur

The genera
communication, gro
function. There e
social/psychologic
Much of the litera
formal organizatio
for the purposes o
In the are
research informati
within the boundar

populations derived from saturation sampling, and called for further studies to extend his findings.

MacDonald (1970) echoed Schwartz' call for additional studies of the liaison concept in different organizational settings. MacDonald studied the liaison role as it appeared in a large Civil Service organization within a Federal bureaucracy. He, like Schwartz, pointed out the need for additional studies in order to validate the concept, expecially since previous research using the liaison concept has essentially been case studies within complex organizations.

The present study will provide data about the Cooperative Extension specialists in the College of Agriculture at Michigan State University. It may be that findings of the present study can be compared with the findings of Jacobson and Seashore (1951), Schwartz (1968) and MacDonald (1970), thus offering a basis for comparison of communication patterns among four different types of complex organizations.

Scope of Literature Search

The general literature search was in the area of organizational communication, group dynamics, research utilization and the liaison function. There exists a large body of research literature on the social/psychological aspects of communication within organizations. Much of the literature on the phenomenon of human communication within formal organizations is directed toward the management of communication for the purposes of the organization.

In the area of group dynamics, there exists a great deal of research information about communication patterns and human interaction within the boundaries of small groups. Much laboratory research has

been done with comm

mall, closed netwo

research of this na

tory, in the "real

Part of the reason

research has been

lack of measuremen

The partic

study are those w

information from

research informat

adopters of the i

There are

designed for the

approximation is

focus of that re

which is percei

ment has been a

innovation as t

communication s

innovation have

More ge

communication

communication

research liter

there is on co

been done with communication structural and pattern variables, using small, closed networks of interacting participants. Very little research of this nature appears to have been done outside the laboratory, in the "real" world of open-system, steady-state organizations. Part of the reason for the lack of such real-life organizational research has been the difficulty of structural identification and a lack of measurement tools.

The particular types of organization pertaining to the present study are those which are established for the purpose of getting information from one sub-system to another; and more especially, getting research information disseminated to the clients who are potential adopters of the information.

There are few reports of studies conducted on such organizations designed for the dissemination of research information. The nearest approximation is the study of the diffusion of innovations. But the focus of that research tradition is on the movement of an innovation which is perceived as new through a social system over time. Measurement has been at the level of the individual, with the adoption of the innovation as the critical measurement point. The organizations or communication structures themselves which enable the diffusion of innovation have been largely ignored as objects of research.

More germane to the present study is the research literature on communication within and between groups, and methods of analyzing communication flow within an organization. There appears to be less research literature available on communication between groups than there is on communication within groups.

Previous r

present study are

are directly relat

some reports of re

the movement of i

reports bear on t

literature review

If there

suffer from a dear

methodology. The

reports dealing w

similar enough to

for the conduct o

Previous research studies which bear specifically upon the present study are scarce. Only five research reports were found which are directly related to the type of study reported here. There are some reports of research which utilized the liaison concept in tracing the movement of information through an organization. Where such reports bear on the present study, they have been referenced in the literature review or at appropriate points in the present report.

If there is one area of the literature search which does not suffer from a dearth of information, it is on the topic of research methodology. The present author found a large number of research reports dealing with a variety of methods and concepts which are similar enough to the present study to provide stimuli and rationale for the conduct of the research.

THEOR

Communica

influencing the be

organizations. Co

pendent variables,

variable, in resea

human communicatio

cation is linked w

The basic

literature relevan

organizational set

signed for the dis

ture review is a c

present study.

The chapt

theoretic and pro

with a statement

Rationale for the

Human com

elusive, concept

one of the early

within an organiz

CHAPTER II

THEORETICAL BACKGROUND AND LITERATURE REVIEW

Communication has long been recognized as a major force influencing the behavior of individuals both within and outside of organizations. Communication behaviors have been manipulated as independent variables, and measured in a variety of ways as the dependent variable, in research attempts to better understand the phenomenon of human communication. Researchers have attempted to specify how communication is linked with other aspects of human behavior in organizations.

The basic purpose of the present chapter is to discuss the literature relevant to the study of communication processes within organizational settings, with special attention to organizations designed for the dissemination of information. Contained in the literature review is a discussion of research methodology to be used in the present study.

The chapter includes a review of cogent studies which lay a theoretic and procedural foundation for the present research, and closes with a statement of hypotheses to be tested.

Rationale for the Present Study

Human communication appears to be an essential, though somewhat elusive, concept in understanding the operation of organizations. In one of the early treatises on the essential nature of communication within an organization, Barnard (1938:9) wrote:

...in a
munica
the str
tion a
tion t

To Barnar

tion, and had an

within the organi

Walton (1

accounting for th

tion system, and

by understanding

that if we can ma

between differen

to the outside wo

organization.

Bavelas a

an existing net o

is a complicated

the importance of

trolled experimen

situation.

Havelock

important. He st

motivation to com

printed form to t

scientists in one

community, the co

Scientists compet

considerations.

> ...in any exhaustive theory of organization, communication would occupy a central place, because the structure, extensiveness, and scope of organization are almost entirely determined by communication techniques.

To Barnard, communication was pervasive throughout the organization, and had an effect on both the formal and informal structures within the organization.

Walton (1963:46) contended that "...the most significant factor accounting for the total behavior of the organization is its communication system, and the dynamics of the organization can be best understood by understanding its system of communication". Deutsch (1952) observed that if we can map the pathways by which information is communicated between different parts of an organization and by which it is applied to the outside world, we will have gone far in understanding the organization.

Bavelas and Barrett (1951:37) warned that "the job of mapping an existing net of communications, even in a relatively small company, is a complicated and difficult one." Bavelas and Barrett also emphasized the importance of bridging the lacuna between the simple, directly controlled experiment and the very complex, indirectly controlled social situation.

Havelock (1969:3-14) observed that communication among peers is important. He stated that "among scientists there is a tremendous motivation to communicate, especially to disseminate one's own ideas in printed form to the relevant professional audience of other certified scientists in one's own discipline." He claimed that in the scientific community, the coin of the realm is <u>recognition</u> from colleagues. Scientists compete fiercely for it, sometimes to the exclusion of other considerations.

Such comp

cation. Interper

groups, between g

relevant, in som

behaviors vary wi

Research

trained speciali

potentially frui

system, existing

contribution to

The Stream of Hi
Communication

There ar

cation within an

of organizationa

plines, includin

relations, and o

ture is the assu

designations, hi

the persons with

is described by

A fo
invo
whic
ally
In s
seri
whic
lege
rule

Such competition may be sustained through interpersonal communication. Interpersonal communication includes communication within groups, between groups, and with persons seen by the individual as relevant, in some way, to his interests. Patterns of communication behaviors vary widely between individuals.

Research on the communication behaviors of scientifically-trained specialists in a research dissemination organization is a potentially fruitful area of investigation. Such a study, in a real system, existing in its natural settings, could make a significant contribution to the literature.

The Stream of History: Previous Research on Organization and Communication

There are a wide variety of approaches to the study of communication within an organizational setting. Literature on the elements of organizational communication is found across a wide span of disciplines, including psychology, sociology, business management, human relations, and other types of human organization. Common to the literature is the assumption that human organization is centered around role designations, hierarchical statuses, and patterned interactions among the persons within the organization. The concept of human organization is described by Merton (1949:151):

> A formal, rationally organized social structure involves clearly defined patterns of activity in which, ideally, every series of actions is functionally related to the purposes of the organization. In such an organization there is an integrated series of offices, of hierarchized statuses, in which inhere a number of obligations and privileges closely defined by limited and specific rules.

Merton's view all

interrelationship

temporarily occup

Formal vs

more simply descr

most useful conce

systems is embodi

system of conscio

persons." Consci

communicative eff

Contrasti

(1938:115) identi

"aggregate of the

groups of people.

"indefinite and r

that common resul

organization.

Mitchell

down-flow of mess

messages followed

messages could no

important fact Mi

of messages follo

message flow went

of influence and

The messa

study were those

Merton's view allows the organization to endure as a dynamic set of interrelationships, regardless of the individual persons who may temporarily occupy a role or status.

Formal vs. informal organization. The formal organization is more simply described by Barnard (1938:73), who observed that "...the most useful concept for the analysis of experience of cooperative systems is embodied in the definition of a formal organization as a system of consciously coordinated activities or forces of two or more persons." Conscious coordination of activity requires deliberate communicative efforts by the principals involved in the activity.

Contrasting the formal and informal organization, Barnard (1938:115) identified the informal organization as consisting of the "aggregate of the personal contacts and interactions and the associated groups of people." He described the informal organization as being "indefinite and rather structureless." Barnard recognized, however, that common results of important character can come from the informal organization.

Mitchell (1970:99) found in a study within a university that down-flow of messages followed the lines of authority, up-flow of messages followed the reporting function, while the cross-flow of messages could not be traced with the formal organizational chart. The important fact Mitchell pointed out is that "while the up and down flow of messages followed organizational lines, much of the more important message flow went across organizational lines by means of the routes of influence and cooperation."

The messages which followed the informal routes in Mitchell's study were those which energized the day-by-day activities of the

program under stu

reach the departm

did not know what

uncovered by Mitc

through the use o

There nee

unication syster

suggested that "c

dependent on effe

urn requires inf

found that formal

jointly active or

effective formal

A trouble

formal organizat

flat, the functi

not even approxi

As pointed out b

consists not onl

between the par

organization, b

tionships betwe

Role re

is to examine t

by custom, betw

argue that the

the unit of ana

propositions a

program under study. Since the informal messages usually did not reach the department heads, those people later complained that they did not know what was going on in the program. The clique structure uncovered by Mitchell's communication questionnaire existed mostly through the use of informal cross-flow of messages.

There need not be conflict between the formal and informal communication systems within an organization. In fact, Davis (1953a:43) suggested that "communication to the worker and from the worker is dependent on effective management communication; and clearly this in turn requires informal as well as formal channels." Davis (1953a) found that formal and informal communication systems tend to be jointly active or jointly inactive. In other words, where there was effective formal communication, there was also an active grapevine.

A troublesome aspect of organizational study is that while the formal organization may be clearly spelled out by administrative fiat, the functional communication dynamics of the organization may not even approximate the pattern specified by the organizational chart. As pointed out by Cartwright and Zander (1953) the structure of a group consists not only of differentiated parts, but also of relations between the parts. It may be one thing to identify the components of organization, but quite another thing to comprehend the dynamic relationships between the components.

Role relationships. One useful way to analyze an organization is to examine the role-relationships which exist, either by decree or by custom, between the organizational sub-units. Hage and Marwell (1968) argue that the use of role-relationships, rather than the individual, as the unit of analysis may be conducive to the generation of testable propositions at the level of role theory.

The conc

networks. Accor

set of expectati

of a person who

addition to the

communication ne

degrees of compl

Jacobson,

degree of integra

in part from the

the behavior of

went on to state

organization whe

is relatively un

may be identical

Comparin

British firm to

they did, with w

collected the re

some questions

ing observation

systematically

also noted that

gence between th

record of their

One of

cases when a su

The concept of social role appears to be cogent to the study of networks. According to Hare (1962:122), "role" refers primarily to the set of expectations which group members share concerning the behavior of a person who occupies a position in a group. Hare stated that "in addition to the specification of expected role content, the expected communication network and interaction rate may be viewed with various degrees of complexity."

Jacobson, Charters and Lieberman (1951:20) suggested that "the degree of integration existing within an organization at any time stems in part from the degree of consensus or sharing of expectations about the behavior of people who occupy various positions." These authors went on to state that "behavior can be predicted more accurately in an organization where consensus is highly developed than in one where it is relatively undeveloped, even though the formal organization charts may be identical."

Comparing roles, Burns (1954) asked a number of executives in a British firm to keep records of their own behavior: what sorts of things they did, with whom they talked, what they told others, etc. He collected the records, analyzed them and then asked the administrators some questions in order to find out what they thought they did. Comparing observation with interview, Burns found that administrators erred systematically in summarizing and describing their own behavior. He also noted that the administrators were astonished at the sharp divergence between their perceptions of what they were doing and the actual record of their own behavior.

One of Burns' noteworthy findings was that in 40 percent of the cases when a superior claimed he had given a subordinate "an instruction,"

the subordinate r

findings illustra

formal organizati

of the roles.

Weiss (19

for some, with o

most members of t

would be nonorgan

the formal struct

Reciproci

that interpersona

bound by reciproc

involves a syste

reciprocity and

suggested that "

reciprocity -- e

received by inte

(1969a:65) that

...We lack adeq

and consequence

The lin

others (1967),

organizationall

system linkages

and others (196

of formal and

that "the impor

the subordinate noted that he had merely been "given advice." Burns' findings illustrate that authority relationships as outlined in the formal organization chart may be differently perceived by the tenants of the roles.

Weiss (1956:50) succinctly observed that an individual "...works for some, with others, and is responsible for still a third group. With most members of the organization he does not work at all; to do so would be nonorganizational, an avoidance of the channels laid down by the formal structure."

Reciprocity and linkages. Sussman (1969b:19) took the view that interpersonal relationships may be studied as systems of linkages bound by reciprocity. According to Sussman's conceptualization, linkage involves a system of exchanges of unequal value within expectations of reciprocity and continuous bargaining by individuals involved. He suggested that "systems of relationships are woven into a matrix of reciprocity -- exchanges of unequal amounts and of different genus received by interacting individuals or groups." Sussman also stated (1969a:65) that "linking is undertaken by functionaries of organizations. ...We lack adequate analytic descriptions of the mechanisms, processes, and consequences of participation in such linkage systems."

The linkage concept, according to the findings of Beal and others (1967), may be applied on the individual or group level, intra-organizationally, or inter-organizationally. In a study of structural system linkages existing between organizations within a community, Beal and others (1967:23) found that there is an overlapping in memberships of formal and informal leaders of the organizations. They pointed out that "the importance of membership linkages can possibly be best

visualized in ter

lines among organ

Seal and others a

from one organiz

organizations.

Thomas (1

simple reciproci

found that mutual

respective roles

of locomotion tow

and experienced i

System re

being dynamic an

systems theory t

be viewed as "op

Katz and Kahn (1

human roles, and

and Kahn (1966:

and information

These a

the

of c

is t

sens

tion

very

tio

upo

ene

of

any

*See e

visualized in terms of their function as communication and influence lines among organizations." Such membership linkages were viewed by Beal and others as possible methods for getting information transferred from one organization to another, and thus, to the memberships of the organizations.

Thomas (1957) viewed role interdependence (more complex than simple reciprocity) as a crucial factor in group performance. He found that mutually dependent persons in the performance of their respective roles felt increased responsibility, increased their speed of locomotion toward the group goal, felt increased emotional tension, and experienced increased group cohesiveness.

System relationships. Organizations have been characterized as being dynamic and at the same time stable social institutions. Modern systems theory takes a relationship view, in which organizations may be viewed as "open, in a steady state" according to Bertalanffy (1968:3). Katz and Kahn (1966)* integrated open systems theory, the study of human roles, and the functions of communication in organizations. Katz and Kahn (1966:223) perceived an organization as consisting of energic and information systems, with the latter contolling the former.

These authors observed that:

> the closer one gets to the organizational center of control and decision-making, the more pronounced is the emphasis on information exchange. In this sense, communication -- the exchange of information and the transmission of meaning -- is the very essence of a social system or an organization. The input of physical energy is dependent upon information about it, and the input of human energy is made possible through communicative acts.
>
> Communication is thus a social process of the broadest relevance in the functioning of any group, organization or society. It is possible

*See especially Chapter 10.

to su
actio
tion,
leade

Laborato

has made unique

human communicat

"reality" of an

echoed the plain

communication in

There
tions
inclu
studi
in co
study

Neverthe

organizational s

One such method

1960:318) state

Soci
tion
and
rese
...d
tute
indi
test
trat
in
judg

Sociom

three methodol

According to t

along with con

on individual

> to subsume under it such forms of social interaction as the exertion of influence, cooperation, social contagion or imitation, and leadership.

Laboratory vs. "live organization" study. While the laboratory has made unique and significant contributions toward understanding the human communicative act in organizational settings, it lacks the "reality" of an on-going, dynamic, open system. MacDonald (1970:6) echoed the plaint of scholars who attempt to synthesize research about communication in organizations when he stated that:

> There is a dearth of studies of live organizations. Various rationales have been advanced, including the imprecision associated with field studies and experiments, cost factors involved in constructing experimental organizations for study, theoretical constraints, and others.

Nevertheless, there are some ways of approaching a real-life organizational study and still maintaining the rigor demanded by science. One such method is that of sociometry. Blake and Mouton (in Moreno, 1960:318) stated that:

> Sociometric methods of assessing social relations are shown to possess ample reliability and validity for extended use in systematic research and in social engineering. Summaries ...demonstrate that sociometric scores constitute a satisfactorily stable basis for measuring individual differences for a wide range of testing conditions, various forms of administration, different test formats, differences in population and a variety of criteria for judgments.

Sociometry, according to Cartwright and Zander (1953) is one of three methodological gains contributing to the study of group dynamics. According to these authors, sociometry takes its place in social research along with controlled observation of social interaction and experiments on individual behavior in groups.

An advan

it provides. Mo

phic maps" by fo

ndividuals. In

existed networks

borough distinct

kitchens of publ

affect, educate

works that sugge

and we may learn

A networ

concept of a gro

mber of people

with establishe

cal links among

The str

patterning of t

between merbers

organized inte

be recognized

While

obvious, they

numerous case

real."

Moreno

form of social

Tra

The

An advantage of the sociometric method is the mapping function it provides. Moreno (1960:76) developed what he called "psychogeographic maps" by following the lines of communication contact between individuals. In the development of such maps, he found that there existed networks of contact which cut across neighborhood, district and borough distinctions. Moreno (1960:78) defined such networks as "the kitchens of public opinion. It is through these channels that people affect, educate or disintegrate one another. It is through these networks that suggestion is transmitted....these networks are traceable and we may learn to control them."

A network is considered to be analogous to the sociological concept of a group, yet distinct from it, in that the term refers to a number of people who persistently interact with one another in accord with established patterns. Communication or interactions are the critical links among members of a network.

The structure of the network as a social system consists in the patterning of the relations of the individuals. The communication links between members of the network allow the development and maintenance of organized interaction among the plurality of human individuals. It must be recognized that the social structure of the network is dynamic.

While the networks formed by sociometric choice are not visually obvious, they do exist. Nehnevasja (1960:751) pointed out that, "The numerous case studies show undoubtedly that sociometric patterns are real."

Moreno (1960:71) maintained that networks represent the oldest form of social communication. According to Moreno:

> Traces of them are already in subhuman societies. They are collective formations, the individual

parti
in wi
aware
indiv
An in
as he
works
group

Walter (

large numbers of

is truly astronc

with each other

and networks are

a small fraction

according to Wal

zation is patter

Walter c

initiation to p

but overlapping

cated by the pr

and maintained

MacDona

applied to orga

permits roles t

functions rathe

sociometric or

communication

not emerge whe

It suggests de

cate or percei

> participants are unconscious of all the networks in which they partake, although they may be aware of one or another link between some of the individuals, or realize that such networks exist. An individual cannot move out of networks, just as he cannot move outside of his skin. Networks pre-exist him and pre-exist the official groups of which he is a part.

Walter (1964) observed that in actual organizations employing large numbers of people, the number of possible communication channels is truly astronomical, assuming that each person is free to communicate with each other person. But Walter also pointed out that some channels and networks are never used at all; some are used frequently; and only a small fraction of those possible are used at all heavily. Thus, according to Walter (1963:9), "the flow of communications in an organization is patterned, and whatever is patterned can be mapped."

Walter observed that as communications are traced from point of initiation to point of reception, they tend to describe two distinct but overlapping networks of channels: the hierarchical paths authenticated by the prescriptive organization chart, and the webbing established and maintained by tacit convention.

MacDonald (1970:12) noted that "the sociometric research stream applied to organizational communication by Jacobson and Seashore (1951) permits roles to emerge from process, in terms of some set of operating functions rather than by fiat." In short, according to MacDonald, the sociometric organizational model assumes that an adequate description of communication relationships -- hence of organizational structure -- will not emerge when only formal relationships or positions are considered. It suggests defining "what is" by inquiring how people actually communicate or perceive that they communicate.

In discus

Jacobson and Sea

As th
tiona
clear
of in
the o
conce
relat
fabri
offic

It appea

tic of organizati

tion, role relat

individuals, wit

appears that the

cation pattern i

structure.

Research Dissem

The sea

set of procedur

in the results

of "scientific

oriented member

Less we

are interprete

There is growi

tion process,

of knowledge m

Dissem

accidental. T

In discussing the analysis of sociometric data derived from the Jacobson and Seashore (1951) study, Weiss (1956:53) reported that:

> As the study developed, the concept of organizational structure was further defined. It seemed clear that the working relationships between pairs of individuals would be the basis for describing the organization's structure, and the structure concept was therefore stated in terms of role relationships. The structure was now seen as a fabric of reliable role relationships among offices.

It appears from previous research that an essential characteristic of organizational communication is an exchange, linking, reciprocation, role relationship or other human interaction between two or more individuals, within and between organizational sub-systems. It further appears that the sociometric method is capable of revealing such communication pattern information within the context of an extant organizational structure.

Research Dissemination and Utilization

The search for and acquisition of new knowledge is guided by a set of procedures designed to increase the confidence society can place in the results of research. The procedures, under the general rubric of "scientific method," are commonly known and accepted by the research-oriented members of the scientific community.

Less well known are the methods by which the results of research are interpreted and placed into practice by members of the larger society. There is growing concern for understanding the dissemination and utilization process, so that practical application of the rapidly growing body of knowledge may reach societal fruition.

Dissemination and utilization of scientific research is not accidental. The process of interpretation and application of new

knowledge must b

optimum returns.

Infor
be wa
cerne
into
tion
tion'

A major

society lies in t

the mental effor

Bridg
gener
will
into
latte
simpl
canno

Organiz

tate the dissemi

the same general

"marketing" of a

"product" is kno

But the organiza

zations composed

organizational s

Weiss

institution whi

individuals in

(1) T

functional acti

(2) T

the organizatio

knowledge must be consciously and deliberately undertaken to achieve optimum returns. Etzioni (1967) offered the generalization that:

> Information that has been processed might still be wasted as far as the societal unit is concerned if it is not systematically introduced into the unit's decision-making and implementation overlayer where the main societal 'consumption' of information takes place.

A major barrier in communicating research results to the larger society lies in the willingness of the scientist and the layman to make the mental efforts required by each. Selye (1958:146) observed that:

> Bridging the gap between the scientist and the general public will not be easy. The former will have to learn to translate his problems into a language meaningful to the layman; the latter will have to realize that, however simplified, the essence of basic research cannot be assimilated without mental effort.

Organizational constraints. Organizations designed to facilitate the dissemination and utilization of research results are subject to the same general constraints of human organizations dealing with the "marketing" of a "product." In the case of research dissemination, the "product" is knowledge, and the "consumer" is the receiver of knowledge. But the organizational processes themselves are similar to other organizations composed of individuals interacting with each other through organizational subsystems.

Weiss (1956) pointed out that the organization, as a social institution which achieves its goals through the coordinated effort of individuals in offices, faces three basic problems:

(1) The problem of allocation of responsibility for particular functional activities to particular members of the organization;

(2) The problem of acceptance of responsibility by members of the organization (the problem of adaptation); and,

(3) The

the members of th

The meth

as the processes

that "the problem

ous, and that any

Therefore, the or

The orga

the members to wo

from some people

according to pres

a constraint on t

the problem of m

Weiss suggested

(as it does in t

organization the

assume importanc

organization."

Organiz

indicate that tw

form a greater s

between the two

out of each to

from the other

created between

Sussma

operate within

(3) The problem of coordination of the functional activities of the members of the organization.

The methods by which these problems are solved are characterized as the processes of organization. Weiss (1956:6) made the assumption that "the problems of allocation, adaptation and coordination are continuous, and that any breakdown in the way they are met would be disastrous." Therefore, the organization must be constantly concerned with them.

The organization avoids conflict among its members by requiring the members to work with some people and not with others, to take orders from some people and to give orders to others, and in general to behave according to prescribed roles. Since the organization is formulated as a constraint on the individual, "the social scientist is apt to consider the problem of making the organization more democratic" (Weiss 1956:2). Weiss suggested that when the problem concerns the organization itself (as it does in the present study), "then it is preferable to make the organization the figure and let the rest, including the individual, assume importance only as it contributes to the definition of the organization."

Organizations as linkage systems. Linkage is a term used to indicate that two (or more) systems are connected by messages so as to form a greater system. Havelock (1969:2-10) noted that "if the barriers between the two systems are permeable enough so that messages can flow out of each to the other and so that response messages can flow into each from the other (feedback) then a link or a state of linkage has been created between the two."

Sussman (1969a) pointed out that linkage mechanisms and processes operate within a two-way funnel system between structures. His concern is

the linkage betw

organization as

"linkage mechani

actional relatio

within and betwe

ment involving s

interstructure r

The pri

(1969b), is to r

cratic organizat

tion and interac

Organiz

community, there

Not all members

vated to partic

Compto

formal conferen

provide suffici

it upon themsel

session. Garve

ly small numbe

communication

The p

logy was viewe

social system

These authors

of scientific

the linkage between a family as one social system and a bureaucratic organization as another social system. Sussman (1969a:62) observed that "linkage mechanisms involve communication between structures and interactional relationships of 'linkers' such as child, parent, or teacher within and between both structures." He further observed that "Rapprochment involving shared responsibilities...is a necessary condition of interstructure relationships."

The principal function of linkage groups, according to Sussman (1969b), is to reduce the social distance between the family and bureaucratic organizations through the establishment of effective communication and interaction networks.

Organizing for information exchange. Within the scientific community, there appears to be an impelling force to exchange information. Not all members of the scientific community, however, are equally motivated to participate in such exchange.

Compton and Garvey (1967) noted that when presentations at a formal conference of an international meeting of scientists failed to provide sufficient information exchange, a few of the participants took it upon themselves to organize a small supplementary special interest session. Garvey and Griffith (1965) pointed out that there is a relatively small number of psychologists who are extremely active in scientific communication within psychology.

The process of dissemination of scientific information in psychology was viewed by Garvey and Compton (1967) as occurring in a large social system composed of a variety of formal and informal elements. These authors studied the production, transmission and storage, and use of scientific information exchange.

The conc

way, or reciproca

considered as th

chain studied by

ized the feedbac

dilemmas facing

scientific resea

Researc

comprehensive co

that with the exc

which have estab

whose responsibi

the producer and

The not

network of exte

land-grant univ

the state land-

education at po

system is infor

to clients, a

back to the uni

Wilke

representative

lating of inno

of the cliente

Two f

dissemination

are those of e

The concept of exchange includes the notion of more-than-one-way, or reciprocal, transaction. Feedback of research findings was considered as the transmission-reception link in the research utilization chain studied by Chesler and Flanders (1967). These authors conceptualized the feedback process as a series of force fields representing the dilemmas facing practitioners in their postures toward scientists and scientific researchers, and vice versa.

Research on dissemination systems. Havelock (1969) presented a comprehensive compendium of studies on research utilization. He observed that with the exception of agriculture, there are very few if any fields which have established formal dissemination and utilization systems, whose responsibility it is to serve as an interpretative link between the producer and consumer of information.

✓ The noteworthy dissemination system mentioned by Havelock is the network of extension offices, as local contact points for the nation's land-grant universities. Extension, as an integral educational unit of the state land-grant university, has been concerned with continuing adult education at points away from campus. The essence of the extension system is information flow; basically that of interpreting research results to clients, and serving as the channel for clients to communicate needs back to the university's research section.

Wilkening (1956) found that the county agent, as the local representative of the extension system, was a crucial figure in the translating of innovations into practice and adapting them to the personal use of the clientele.

Two fields which are apparently taking steps toward establishing dissemination systems, according to findings reported by Havelock (1969), are those of education and medicine.

In the f

shown that much c

medicine is diss

hospital system.

have more specia

others.

Research Dissemi

The lite

systems is scarc

themselves few.

a dim understand

useful. There e

interpreted and

Accord

development and

orderly process

tion and utili

tion of knowle

ment which goe

grant universi

model is syste

which he descr

knowledge to t

The R

the orderly tr

diffusion and

noted that:

In the field of medicine, a recent study by Morris (1970) has shown that much of the available information about current advances in medicine is disseminated by those who are centrally involved in the hospital system. These key individuals spend more time in the hospital, have more specialized skills, and have strong attitudes toward teaching others.

Research Dissemination and Utilization: The Extension Model

The literature on research within knowledge dissemination systems is scarce. Probably this is so because such formal systems are themselves few. As Havelock (1969) has observed, usually there is only a dim understanding of how new knowledge gets transformed into something useful. There exists a firm belief that somehow new information becomes interpreted and filters through the social system to its application.

According to Havelock (1969:2-42), "Agricultural research, development and dissemination in the United States seems to follow an orderly process which most clearly exemplifies the research, dissemination and utilization model." Havelock (1969) discussed the transformation of knowledge from basic research to applied research and development which goes on in the agriculture-related departments of the land grant universities. The research and development process in Havelock's model is systematically linked with the Cooperative Extension Service, which he described as "an elaborate mechanism which diffuses the developed knowledge to the farmer."

The Extension system, taken as a whole, appears to exemplify the orderly transition of knowledge from research to development to diffusion and finally to adoption by the consumer. Havelock (1969:2-42) noted that:

> ...because this agricultural model appears to be so elegantly mapped out and so successful, it has been used as an exemplar of how knowledge dissemination and utilization should take place in other fields, including industrial technology, medicine and education.

The four stages in the transition of knowledge from discovery to application, viz., research, to development, to diffusion, to adoption suggests four comparable roles. Havelock (1969:2-32) proposed that the knowledge flow system could be subdivided in a parallel fashion, i.e., basic researcher, researcher-developer, practitioner, and consumer. Havelock further proposed that in the society at large each of these role types is likely to be represented by separate organizational and institutional forms.

The conceptual framework of the cooperative extension model would focus on the two center roles described above, i.e., the researcher-developer who is a state extension specialist, and the practitioner, who is a county agent. The basic researcher would be the university-based research scientist, and the consumer would be the out-state resident who is the client for new knowledge so developed and disseminated.

Cooper (1966) offered the view that the activities of an institutional change agent are basically no different from those of an individual change agent. Such a simplistic view may be extreme in that it does not consider the many complexities of institutional organizations. Nevertheless, there may be enough similarity so that the successful activities of countless county agents and their supporting state specialists in agricultural extension services should be worth the study of those interested in organizational improvement.

The conceptual model upon which extension is based assumes a movement of information through social systems. As Tully (1966) pointed

out, extension as

others. Amend (1

instrument of co

audience. The v

extension servic

over its clientel

Speakin

of exploding tec

als are more con

than with their r

further observed

in their areas of

audiences."

Ratchfo

matter is to occ

different sub-sy

ing to Rogers wi

between two or m

(2) the primary

cal linkages.

With re

sub-systems, the

much like the o

a research-spon

cation. As Wei

great value on

talked over, ch

out, extension assumes the diffusion of information from innovators to others. Amend (1968b:12) observed that cooperative extension, as an instrument of continuing adult education, is concerned with a voluntary audience. The very nature of the dissemination organization which is the extension service, consists of education without compulsion or control over its clientele.

Speaking on the decline of local community and the consequences of exploding technology, Ratchford (1969:3) pointed out that "professionals are more concerned about their colleagues elsewhere in the country than with their neighbors in the local community." Ratchford (1969:9) further observed that "often, subject matter specialists are so engrossed in their areas of expertise that they neglect to consider their potential audiences."

Ratchford's observations suggest that if diffusion of subject-matter is to occur, there must be free interaction between members of different sub-systems, who exchange information. Change agents, according to Rogers with Svenning (1969:174), "...serve as a linkage or liaison between two or more social systems: (1) the client social system, and (2) the primary innovation source." The liaison notion implies reciprocal linkages.

With respect to the free flow of information within and across sub-systems, the extension model which has been discussed appears to be much like the organization Weiss (1956) analyzed. That organization was a research-sponsoring agency, which had great freedom of internal communication. As Weiss (1956:9) noted, "...the scientists in the Bureau place great value on free internal communication. When a problem must be talked over, channels become of secondary importance."

Data

Seash

to a

very

that

Soci

study

neir

Kaha

reti

cont

the

mati

to a

bil

Meth

Has

str

Vil

Data Collection

Data collection using the sociometric method, as Jacobson and Seashore (1951) did, is straightforward. Subjects are asked to respond to a question, naming others with whom they interact on a given topic.

The nature of the sociometric questioning technique provides a very flexible method of social inquiry. Guimaraes (1970:15) observed that:

> Questions may vary as regards topic, frequency of communication, etc., and may be either open or closed, but no matter its form, a sociometric question always retains its interpersonal character. This factor makes the sociometric question an excellent measurement device for communication network studies.

The sociometric method is not without its problems, however. Sociometric investigations have historically implied a census, or case study approach. In order for the results to be meaningful, the sociometric method imposes limitations on its use. As Massarik, Tannenbaum, Kahane and Weschler (1960:159) noted, "The need for a virtually complete return of replies in a sociometric investigation is apparent. High nonresponse would leave such gaps in the matrix as to diminish greatly the value of the data."

Additionally, the method is limited in generalizability. Information derived from a census or case study approach does not lend itself to analysis by inferential statistics. Hence, in terms of generalizability to a larger population, the method is not as strong as sampling methods which allow mathematical inference to a larger universe.

The sociometric method has some other strengths, however. It has been successfully used as a technique for identifying the power structure of communities in the United States (Hunter 1953), for locating village leaders in Nigeria (Keith 1968), and to determine organizational

interac

Data A

and ea

the re

(1949:

device

out th

handl

tions

group

metri

stric

Pest

Forsy

Famil

Metr

was

show

desc

interaction in Michigan's Upper Peninsula (Anderson 1969).

Data Analysis and Display

While sociometric measurement has been one of the most popular and easy to use devices in the field of social psychology, analysis of the resulting data has not been so easy. Writing in 1949, Festinger (1949:153) stated that "...there is, at present, no adequate analytical device for handling (sociometric) data..." Festinger went on to point out that "...without any adequate representational techniques for handling such data, the analysis of the exact patterns of interconnections among members of a group is virtually impossible, unless the group is very small."

Fortunately for social scientists interested in using the sociometric technique, Festinger and other researchers have made great strides in the development of analytical techniques for such data. Festinger (1949:154) noted that "a large step forward was taken by Forsyth and Katz in suggesting the use of a matrix and some of the manipulations of matrix algebra for the analysis of sociometric patterns."

Forsyth and Katz (1946) proposed a method of presenting sociometric data in which a complete matrix of positive and negative choices was utilized. Within the matrix, the choices were then arranged to show reciprocation occurring in clusters. Forsyth and Katz (1949:341) described their method:

> In essence the method of manipulating the matrix consists of re-arranging the rows and columns in a systematic manner to produce a new matrix which exhibits the group structure graphically in a standard form. From the standpoints of construction and of interpretation this form of presentation of sociometric data is superior to the sociogram.

Enlarging upon the Forsyth and Katz method, Festinger (1949) applied matrix algebra to sociometric data for further clarification of contact groups within the matrix. Rogers and Jain (1968:7) observed that "matrix multiplication locates (on the diagonal of the matrix with successive self-multiplication) the 'liaison' individuals who link two or more cliques (if such linkage occurs in a system)".

The sociogram is still perhaps the most popular and useful method of displaying sociometric data.* Nehnevasja (1960:737) stated that "the sociogram is, of course, the most famous sociometric chart. In existence since the early days of sociometry as a method of portraying data, the sociogram is, indeed, a widely used instrument."

The sociogram, noted Guimaraes (1960:32), "is a representational device used to illustrate certain types of relations between pairs of individuals in a social system. Often, however, these diagrams become confusing to the reader." In fact, a major problem with the use of the sociogram is that there are no rules for ordering the presentation of data. The researcher arranges the diagram so it appears to make visual sense. Obviously, he must faithfully represent the reciprocated contacts between respondents. Equally obviously, lines between symbols representing contacts between individuals, can develop into such a tangle as to be unintelligible. This limitation of the sociogram prompted work on matrix presentation of sociometric data. The development of matrix techniques has expedited sociometric analysis, but the sociogram still finds application as a method of visually displaying analyzed data.

---

*For details on the construction of sociograms, see Zerka (1948).

Another problem with the analysis of sociometric data is the detailed, time-consuming and potentially error-laden handling of information. If computerized techniques can be developed for data analysis, they will greatly simplify the problem. This is especially true where research is done in complex organizations, with a large number of respondents.*

Mitchell (1970) used a computerized technique of sociometric data manipulation to perform a communication network analysis. Most of the literature on sociometric data analysis, however, gives little encouragement toward immediate computerization of such analyses.

Regardless of whether data are manually or machine manipulated, the essence of sociometric analysis consists of network identification, followed by network analysis. MacKenzie (1967) demonstrated with graph theory how networks can be decomposed into subnetworks. The decomposition of networks led Jacobson and Seashore (1951) to the discovery of the liaison role concept. Weiss (1956:viii), in developing a refined method of sociometric analysis of the Jacobson and Seashore data, further developed the concept of the liaison as a key linking person in the organization.

Sociometric Networks and the Liaison Role

A variety of methods have been proposed as ways to look at communication networks and their interrelationships. Common to the

---

*At present, work is being done to computerize sociometric data analysis for identifying the liaison role (Jacobson and Seashore, 1951: Weiss and Jacobson, 1955; Weiss, 1956; Schwartz, 1968; MacDonald, 1970; Amend, 1971). The computer program is being developed by Bill Richards, a student in the Department of Communication, Michigan State University, under the guidance of Dr. R. V. Farace.

Detailed instructions for another computerized method of processing sociometric data are available from Alexander (1963). Dr. Alexander is now with the Department of Sociology at Stanford University.

literat

resolve

betwee

face o

the do

locke

predi

and p

early

impo

figu

and

peop

may

num

lin

low

sta

tic

org

ele

fur

literature on networks is the notion that communication within networks resolves to dyadic, interpersonal contact, and that communication between networks reduces to dyadic interpersonal contact at the interface of the two subsystems. With the notion of dyadic interaction as the dominant characteristic of communication networks, researchers have looked for personal characteristics and other determinants which embody predictive power regarding network formation.

Barnlund and Harland (1963:478) showed that physical setting and prestige are both important in the formation of networks. In the early stages of social acquaintance, physical propinquity plays a very important role, which reduces as acquaintances strengthen and high status figures emerge. The present author wonders whether mobility, both social and physical, may not be closely related to propinquity. That is, when people are not free to move, either socially or physically, propinquity may play a greater part in communication interactions.

Beal and others (1967:25) concluded that "a relatively small number of persons could account for a major proportion of the membership linkages in a community." These researchers found that leaders of lower status organizations are likely to possess memberships in higher status organizations also, while the leaders of higher status organizations are likely to possess memberships only in other higher status organizations. The important point to note here is that the leadership elements, in both cases, were those who also performed the liaison function among the organizations studied in the community.

Guimaraes (1970:26) observed that:

> The number of possible roles an individual may perform...is limited by his own values, needs, skills, etc., as he moves from one system to

dual p

the in

person

can b

Walto

tic c

showe

centu

orga

from

impo

the

repo

> another. The role he assumes in any given system is determined also by the nature of the signal inputs, i.e., in one system an individual may be a receiver and execute direction, but in another he may be the originator of directions.

Guimaraes' observation suggests the possibility of an individual playing different roles, depending upon the system he is in. If the individual is part of two interacting systems, he becomes a liaison person between systems.

Walton (1963:46) contended that the dynamics of the organization can be best understood by understanding its system of communication. Walton hypothesized that a communication system is dominated by "magnetic centers" which tend to draw messages unto them. His research showed that "centrals," or individuals who occupied the "magnetic centers" did feel that they had a greater voice in the affairs of the organization than did the "peripherals," or individuals farther removed from the communication magnetic center.

Weiss (1956) identified liaisons as being persons who were important in the over-all operation of the organization. Discussing the coordination and structure of an organization, Weiss (1956:53) reported that:

> Two offices whose occupants customarily worked together were thought of as forming a coordinative link and this link, taken together with all the others in the organization, as forming the structure. A ...coordinative link ...was identified ... with a mutually reported close working relationship.

Further describing the liaison, Weiss (1956:54) stated:

> The coordinators of the separate work groups, important people in the over-all operation of the organization, are termed liaison individuals. Many of them have group membership, i.e., even though they coordinate their activities with

> the members of many groups, their closest relationships are all with the members of a single group, and they may be thought of as liaison members of this group.
>
> Other liaison individuals work very closely with each other, and so form a work group of their own, except that their group cannot be separated from other groups. This situation is resolved by considering that they belong to a liaison set, i.e., a kind of work group where members work closely with members of other work groups.

While the focus of interest has been on the liaison person, who has many contacts both within and between systems, there also exists another type, viz., the person who has very few or no contacts within the system. Study of this type of individual may be equally fruitful in terms of understanding the organization. Katz (1960:245) stated that "in the context of the group and the specified activity, an individual is said to be an isolate if he is chosen by none of his fellow group members."

Jennings (1960:92) commented:

> Both leadership and isolation in official groups appear as phenomena which arise out of individual differences in interpersonal capacity for participation as phenomena which are indigenous to the specific milieu in which they are produced.

Comparison of the liaison and isolate type might be revealing. Criswell (1960) noted that the typical sociometric experiment which is aimed at two-way reciprocable interpersonal relations commonly fails to fully explore the data obtained. She observed (1960:142) that:

> The group structure is either not plotted or is plotted and then largely ignored, little attention being paid to specific connections existing between overchosen individuals, overchosen and underchosen, between members of different cliques, etc. Opportunities to enlarge the experiment by obtaining group morale indices or production records are frequently passed up.

A problem with such enlarged studies is assigning value to sociometric choices. Campbell (1960:137) suggested a rationale for assigning score values to sociometric nominees. He pointed out that a recurring problem is "the differential weighting of the first, second, and third choices in a sociometric or nominations setup. Good standard procedure is to disregard the order of choice and use the total of all mentions." Furthermore, according to Campbell (1960:137):

> A more consistent rationale can be developed by assuming that what a nominations ballot or sociometric questionnaire asks for is the first few rankings of a potential ranking of all personnel aboard. The best guess as to the value assigned a nonmentioned person is the average of the unused ranks. (Italics in original).

MacDonald (1970) and Mitchell (1970) each used the number of sociometric contacts as the operationalization of the liaison concept. MacDonald (1970:114) pointed out that "while the definition of the liaison role demands sociometrically diverse contacts, it does not specify that liaison persons will contact more other people." To MacDonald, as to other researchers on the liaison role, the strategic location of the communication contact is important to the liaison concept. To arrive at the reciprocated dyads used in his study, MacDonald (1970:71) operationalized reciprocation as "mutual listing on the Checklists, regardless of reported contact frequency or of discrepancy between reported contact frequencies."

Mitchell (1970:123) noted that "persons with links to a number of groups are thus liaison persons. Those having the most links are the most important as group liaisons, since each link connects with a totally communicant group." In the Mitchell study (1970:129):

> Liaison role individuals were selected as indicated by the number of contacts these persons had between groups. Liaison persons are defined, for this purpose, as those with three or more reciprocated contacts between groups after the groups were collapsed by the method discussed above. Persons with one or two between-groups contacts were ignored in this determination, as suggested by Weiss (1956) as being 'bridge persons.' They are important in the total communication structure, but are not considered to hold a true liaison role.

Research Foundations: Selected References

Guimaraes (1970) pointed out that the bulk of the literature on communication network studies is derived from laboratory conditions which usually do not reflect real life situations. The present research is a departure from laboratory study in an attempt to examine communication patterns and participant behavior in a "real world" setting.

Couch and Bebermeyer (1964:4) suggested that "at the present time one of the major problems of our society is the difficulty of transmitting innovations to potential adopters." The lack of knowledge about the research dissemination and utilization process was cited as one reason for the difficulty. Couch and Bebermeyer (1964:4) stated that "There have been relatively few research endeavors to document the relevance of different forms of communicative relationships and variation in inventiveness." They claimed that research on communication and change has failed to give enough attention to interpersonal communication within "patterned and institutionalized systems." They argued for a systematic examination by research of patterned and institutionalized communicative contacts.

"Patterned" and "institutionalized" suggest structural arrangements of some kind. If such structures exist, it is logical to assume that there is a bridge of some sort between them to allow messages to

flow b

with f

sider

the s

viewe

syste

funct

(2) p

or a

Grou

dif

Car

ref

str

Cal

per

the

ex

tha

flow between the structure, or subsystems. Since we are concerned here with functions of individuals within organizations, it is logical to consider the individual as providing the communication bridge, or linking the subsystems together in communication networks.

A social actor in the communication linking role might then be viewed either as a bridge (facilitating link) or as a barrier to intersystem communication. Havelock (1969:2-23) commented that individuals functioning as barriers are observed in the relations between (1) research, (2) practice organizations, and (3) professions. He stated that:

> Researchers can dismiss practice information on the basis that practitioners do not understand what it means to collect valid and reliable information. The practitioner likewise may reject research sources because 'they don't care about practical problems.' Real or imagined, these value differences probably constitute the major barrier to inter-system knowledge linkage.

Regardless whether the intersystem links function as "bridges," or as "barriers," it is generally assumed that such links do exist. Group theory suggests that the structure of a group consists not only of differentiated parts, but also of relations between the parts. Cartwright and Zander (1953) pointed out that the relationship, commonly referred to as "links" or as "bonds," exists between any two parts of the structure.

For any specific pair of parts, this relationship may be symmetrical, asymmetrical, or absent. Message content, frequency of contact, personal satisfaction with contacts, status and other variables may affect the relationship between parts, according to Berkowitz and Bennis (1961).

There appears to be general agreement that linkages between parts exist as a function of interpersonal contact. Boyd (1965:33) pointed out that "an analysis of inter-departmental communication immediately reveals

that i

nigues

need f

(1965)

feeds

deper

hais

funct

the r

who c

C; (

A, B,

L.

func

appe

subg

cati

zati

(e.g
twee
196

mut

that it is an inter-personal problem. No setting down of rules or techniques can be of much value to an individual until he recognizes the need for good communication." "Good" communication, according to Boyd (1965), revolves around personal contact. Personal contact apparently feeds information back and forth between systems.

The person making the inter-system contact plays different roles, depending upon the system (or subsystem). An individual can become a liaison person* between two or more systems or cliques.** The liaison function may be illustrated as shown in Figure 1.

In the paradigm shown as Figure 1, the subgroups are formed as the result of sociometric choices. The direction of the arrow indicates who chooses whom. For example, in the paradigm, A chooses C; B chooses C; C chooses A, B, and D; D chooses C and D has been chosen by L. Thus, A, B, C, and D form a subgroup.

Persons E, F, G, H and L constitute a subgroup, as do I, J, K and L. The unique characteristic of the liaison person, L, is the linking function he performs among subgroups.

If L were removed from the communication system, the result would appear as shown in Figure 2. Now, in the absence of "liaison" L, we see subgroups ABCD and IJK. Individuals E, F, G, and H are left as communication "isolates" who have no means of contact with others in the organization except through L.

---

*A liaison is a person who interconnects two or more subsystems (e.g. cliques) in the communication system and serves as a channel between them (Jacobson and Seashore 1951; Weiss and Jacobson 1955: Schwartz 1968; MacDonald 1970; Mitchell 1970).

**Clique is defined as a subsystem of three or more elements in mutual interaction with each other (Festinger and others 1950).

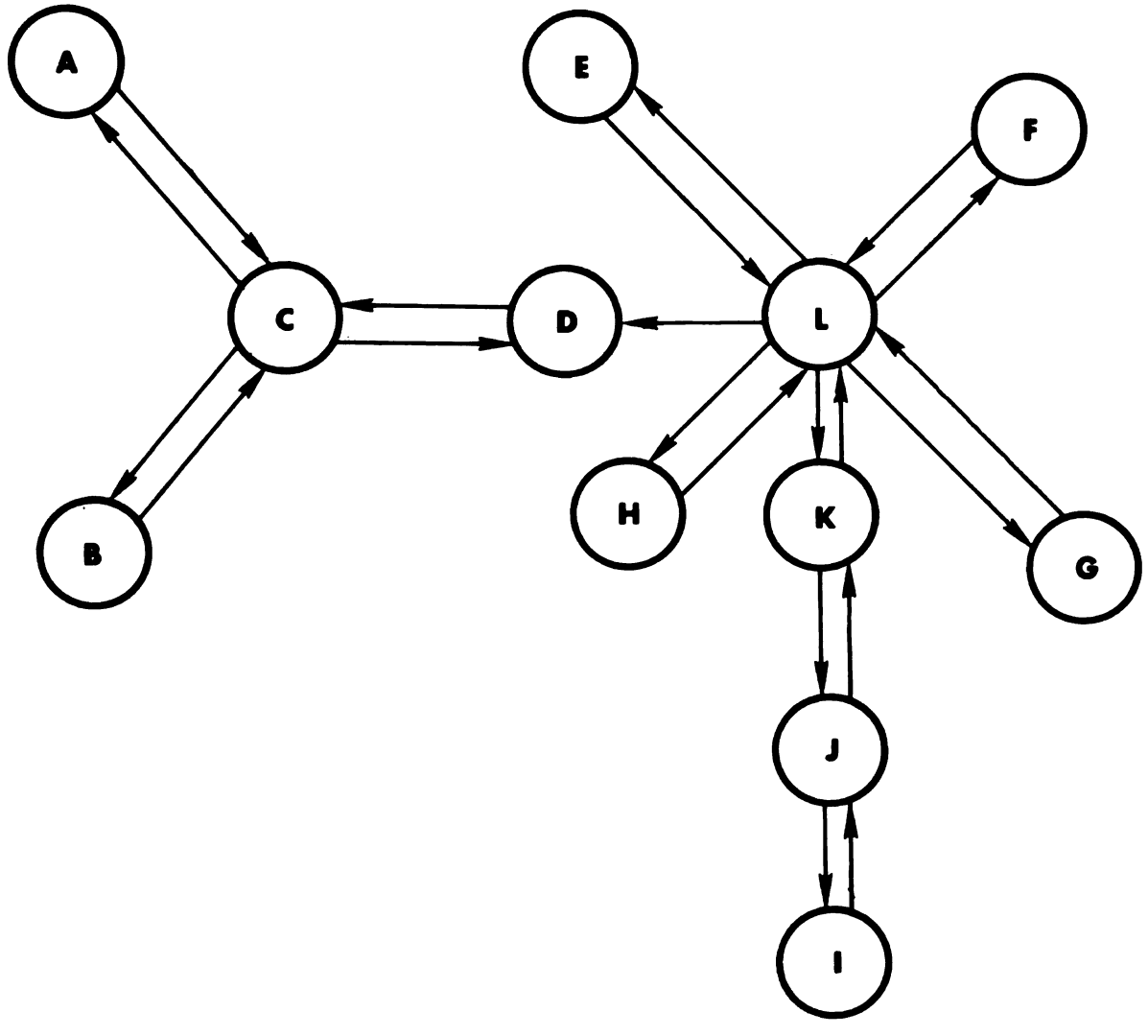


Figure 1. The linking function performed by L, the liaison person.

Figures 1 and 2 show how a member of more than one subsystem may function as a liaison person between the subsystems. A person may also perform the liaison role without being a member of a subgroup or clique. Not every person, however, plays the liaison role to the same degree. Nor does a liaison person between a specific pair of subsystems automatically function also as a liaison person between other pairs of subsystems, according to Jacobson and Seashore (1951).

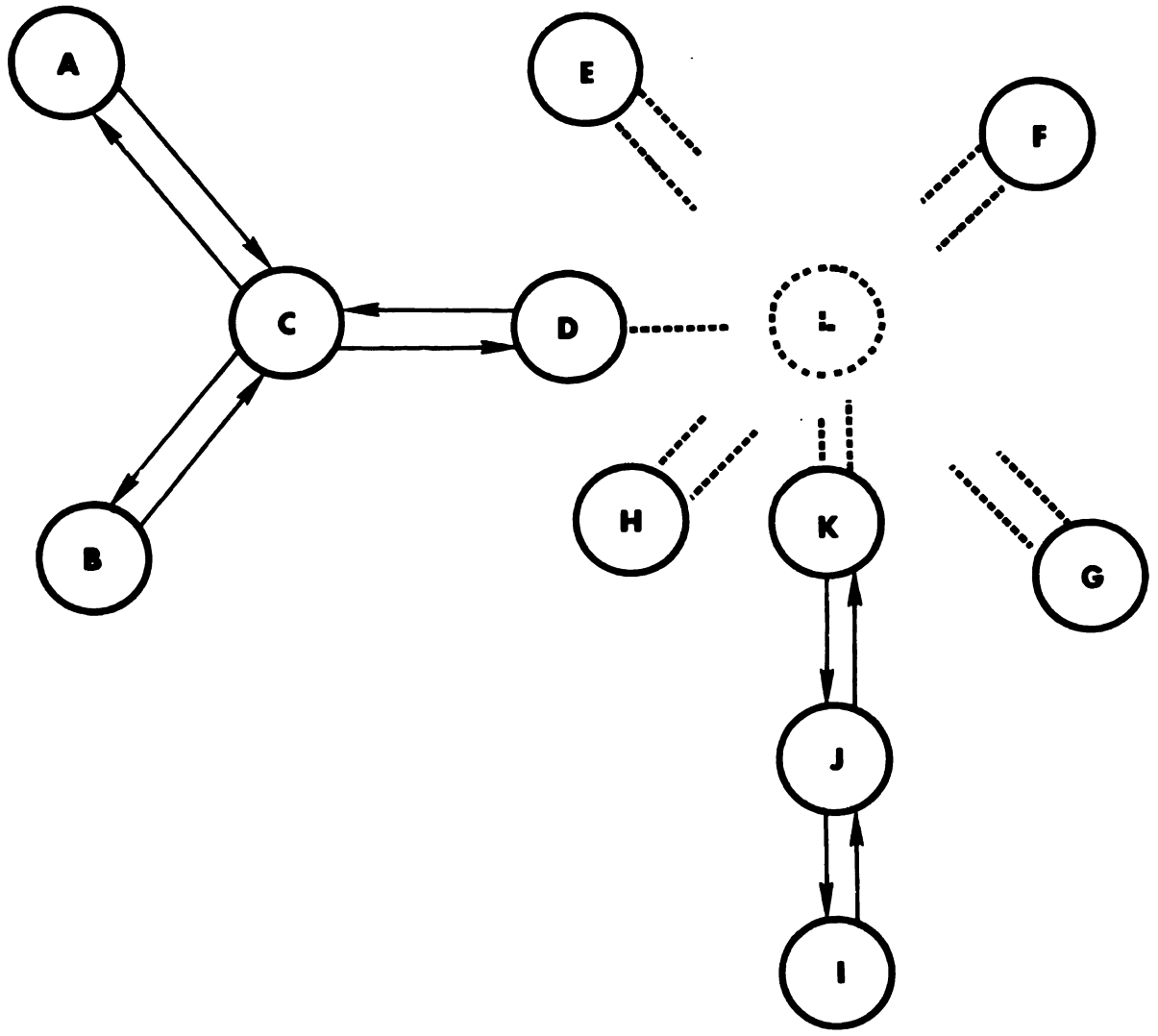


Figure 2. The communication system, with "liaison" L removed.

The liaison person does apparently play a key role in the communication patterns of organizations, because he may significantly influence or control communications to and from different groups. Jacobson and Seashore (1951:37) pointed out that the liaisons "characteristically have many, frequent, reciprocated, and important contacts which cut across the contact group structure."

Ross and Harary (1955:253) observed that the liaison person, or articulation point* has special static and dynamic properties. They stated:

> From the static point of view, the liaison is crucial, because his loss destroys the connected unity of the organization. From the dynamic view, his non-substitutability in paths influences the flow functions of an organization.

Curiously, the individuals who become liaison persons constitute only a small percentage of a total group. Others in the group who receive information do not pass it on, but act instead merely as passive receivers. Davis (1953a:45) reported that "those liaison individuals who told the news to more than one other person amounted to less than 10 percent of the 67 executives in each case." Why? What is characteristic about those few by which they differ from their work associates?

Davis (1953a) found no evidence that any one group of people consistently acted as liaison persons; instead, different types of information passed through different liaison persons. However, some individuals were invariably communication "isolates" who received and transmitted information poorly or not at all. Again, why? What is different about the key liaison person as compared with the communication isolate? Are there identifiable or predictable characteristics between individuals by which the differences may be explained?

More knowledge about the behaviors of persons in such roles would help in understanding the behavior of the larger group. Study of the "overlapping" positions or communication integration** between

---

*"Articulation point" is a graph theory term. Removing an articulation point of a connected graph results in a disconnected graph.

**Guimaraes (1970:68) defined "communication integration" as "the degree to which interpersonal contacts permeate a social system."

network subsystems might provide some clues for the improvement of system operations.

Rogers and Jain (1969:7) pleaded for even more comprehensive information for understanding the process of research dissemination and utilization. They said, "We need studies in which the entire cycle of utilization is described, by tracing a specific innovation or innovations from clients' needs, to research, through linkers* to clients." The linking system** was perceived by Jain and Amend (1969) to be of major significance in comprehending message flow between a research system and a client system.

Liaison roles become especially crucial when the subsystems under consideration are not bound by organizational structure. For example, in the conduct of continuing adult education through the cooperative extension service of a university, the client system is composed of voluntary individuals and organizations (Amend, 1968b; Beal and others, 1967). In such a situation, where the clientele are not bound to the organization and where the "product" or "output" of the institution and its representatives consists essentially of information, communication and communication processes are even more important in understanding the function and interrelationships between the systems.

A serendipitous finding which emerged from the analysis was the identification of the liaison role (Jacobson 1970). While Jacobson and

---

*Linkers are individuals performing communication linking roles within the linking system.

**Linking system is defined by Jain (1970:2) as "a social system specifically designed to facilitate effective communication between researchers and clients in a given field."

Seashore (1951) were looking primarily for indicants of groupness,* their additional finding of the liaison role has made it possible to trace differential influences through an organization, via the linking role individuals.

In further analysis of the same data, Weiss and Jacobson (1955) developed a method for the analysis of the structure of complex organizations.** They assumed that a complex organization has a fabric of roles which constitutes the structure of the organization. Organizational structure is assumed to remain relatively stable, regardless of personnel changes.

Reducing their sociometric data to graphic form, Weiss and Jacobson (1955) were able to break the original matrix into its structural components. Having identified work groups, they were then able to isolate the separate work groups by removing liaison persons from the matrix and omitting contacts between groups. In this manner, they showed how the organization co-ordination structure was established through the activities of liaison persons and the existence of the contacts between groups. The analysis allowed Weiss and Jacobson (1955: 667) not only to describe the organizational structure, but also to look for relationships such as:

---

*"Groupness" means the clustering of individuals into sets, each set having some specified high degree of internal communication and some specified low degree of external communication (Jacobson and Seashore (1951:36).

**Weiss and Jacobson (1955:661) suggested that complex organizations are bodies such as a government agency, a labor union, a church, a military unit, a school, or an industrial plant. Individual members of complex organizations contribute in accordance with the prescriptions of the roles they perform and co-ordinate their activities with each other in accordance with the relationships of their roles to other roles in the structure.

> (a) The relationship between the position of an individual in the organization and the organization's goals; (b) the relationship between the goals and methods of operation of a work group or larger segment of the organization, on the one hand, and the structure of that work group or segment.

According to Davis (1953a:46) liaison individuals tend to act in predictable ways. For example:

> If an individual's unit of information concerns a job function in which he is interested he is likely to tell others. If his information is about a person with whom he is associated socially, he is likely to tell others. Furthermore, the sooner he knows of an event after it happens, the more likely he is to tell others.

Davis also suggested that if a liaison individual happens to receive information relatively late, he is not likely to tell others, in order not to reveal his late receipt of news.

Schwartz (1968:102) analyzed liaison communication roles among faculty members of a university college. Using sociometric measures and analysis, he separated from a 142 X 142 matrix 29 work groups and a tentative list of 27 liaison persons. Through a topological analysis, he identified "22 liaison persons (15.49 percent of the study population), 18 isolates (12.68 percent) and 102 non-liaison persons (71.83 percent), 100 of whom were members of 29 separate groups of varying size."

One interesting finding which Schwartz did not comment further upon, was with respect to publication* as a common professional evaluative measure: he found that there were only slight publication differences among the three types of respondents, with non-liaisons having the

---

*Information output in the form of publication is viewed with favor in the scientific community as an indicant of effectiveness. Publication appears to be a measure of prestige among scientific peers.

highest book and article publication average and isolates the smallest average.

Schwartz (1969) further found that: (a) liaison persons were perceived as having more structurally diverse contacts and a greater number of communication contacts than do non-liaison persons; (b) liaison persons are more likely to serve as first sources of organization-related information than are non-liaison persons; and (c) liaison persons are perceived to have more important secondary contacts in the organization than are non-liaison persons.

In the discussion of his study, Schwartz (1969) called for additional comparative studies to validate the generalizability of his findings, to extend those findings, and to compare findings across different types and sizes of organizations.

In a study of professional subject matter specialists in an educational organization, Jain (1970) found no relationship between peer-evaluated effectiveness and the individual's (a) information input amount; (b) information input diversity; (c) amount of peer communication; or (d) amount of information output. His data did, however, support four of his hypotheses, showing that there is a significant positive relationship between peer-evaluated effectiveness and (a) peer-communication diversity; (b) network centrality; (c) opinion leadership; and (d) information output diversity.

These findings cause one to speculate on the communication characteristics of the individuals in Jain's study as they relate to subsystem contacts. Jain's (1970)findings suggest that individuals rated high by their peers would likely display some of the behaviors characteristic

of liaison individuals, while the lower-rated individuals would tend to behave more like non-liaison or isolate individuals.

Jain's (1970) analysis did not attempt to identify sociometric choices, create sociograms or sociomatrices, or identify liaison or other types of roles. However, the data gathered by Jain and his associates, including the present author, contain questions which lend themselves to sociometric analysis.

In the present study, sociometric questions (Jacobson and Seashore, 1951; Hunter, 1953; Weiss and Jacobson, 1955; Moreno, 1960; Couch and Bebermeyer, 1964; Kerlinger, 1966; Oppenheim, 1966; Schwartz, 1969; Guimaraes, 1970) and peer-rating questions (Jain, 1970) provide the basic data.

From these data, the communication behaviors of respondents will be mapped in sociometric form to provide a picture of the extant communication structure. The "map" will then be differentiated to identify characteristics of the respondents. Following the mapping and differentiation processes, an attempt will be made to relate communication roles with pattern variables.

Hypotheses

In the present study, it is assumed that the liaison role will emerge, as it has in previous studies of complex organization. It will then be tested with other variables in six formal hypotheses.

The variables of primary interest are liaisonness, peer-evaluated effectiveness, information input diversity, peer-communication diversity, linker network centrality, opinion leadership, and information output diversity. Each variable will be constitutively defined as it appears

in a statement of hypothesis, and operationally defined in the discussion of research methodology, Chapter III.

Liaisonness. It is anticipated that the present research will succeed in the identification, mapping, and quantification of the liaison role. A major limitation in the attempt to derive meaningful, descriptive hypotheses concerning the communication liaison role is the dearth of previous research using the liaison role as a structural concept.

Schwartz (1968:33) pointed out that there was "no exact analogue in previous research to this structural concept." Identified in a study of a complex organization by Jacobson and Seashore (1951), the liaison concept was further explored by Weiss and Jacobson (1955). A method of data analysis for seeking the liaison role was devised by Weiss (1956).

The concept lay dormant as a research variable until it was revived in a series of studies by Schwartz (1968), Mitchell (1970), MacDonald (1970), and the present author. The definition of a liaison is consistent with the definition used by the previously named researchers: a liaison is a person who interconnects two or more subsystems in the communication system and serves as a channel between them.

In the present study, the liaison concept is quantified to yield varying degrees of liaisonness. In the hypotheses which follow, liaisonness appears as the dependent variable. Liaisonness is defined as the condition or quality of functioning like a liaison.

Peer-evaluated effectiveness. Peer-evaluated effectiveness is the performance rating of an individual as judged by his peers* in the

*A peer is defined as a person of the same rank or ability. As used in the present paper, the term "peer" means that general collectivity of professional persons who are members of the scientific community.

same organization. The peer evaluation method of rating individuals is a comprehensive measure of the effectiveness of individuals within an organization.

Liaison individuals have high communication contact with their fellows within and between subsystems of the organization. It is expected that high communication contact and high information handling are closely associated. Small group network research (Shaw 1954) has shown that high information handling is related to emergent leadership. It is expected that the liaison person, who makes frequent interpersonal contacts and handles a great deal of information, will be seen by his peers as having leadership qualities and as being an effective person. It is therefore hypothesized that:

H_1: Peer-evaluated effectiveness is positively related to liaisonness.

Information input diversity. Information input diversity is the extent to which a liaison person uses different information sources and channels in acquiring the needed information for performing his role. Information input is a very important communication function performed by a specialist in a linking role (Jain 1970:42). A specialist, in performing his role of linking researchers with clients, must acquire a variety of information from different sources and channels. In order to acquire information, his pattern of input should extend beyond narrow limits.

Schwartz (1968) found that liaison persons are perceived to have more structurally diverse communication contacts in the organization than do non-liaison persons. It is reasonable to assume that a specialist would have structurally diverse patterns of input from both within and outside the organization. We therefore hypothesize that:

H_2: Information input diversity is positively related to liaisonness.

Peer communication diversity. Peer communication diversity is the extent to which an individual communicates with different peers. A specialist might spend most of his available time with a very few of his peers, or he might "spread out" what time he has over a variety of peer contacts. The peer concept is larger than just the employment system or subsystem of which the specialist is a member.

Jain (1970) found that peer-communication diversity and peer-rated effectiveness are positively correlated. Pelz (1956) reported that a diversity of professional contacts was associated with higher productivity among medical scientists working in a governmental research context. It is therefore hypothesized that:

H_3: Peer communication diversity is positively related to liaisonness.

Linker network centrality. Linker network centrality is the degree to which an individual occupies the center position in the communication network of linkers working within an organization. The concept of communication network centrality focuses on the number of individuals who communicate with a specialist (or "linker" as previously defined). Centrality, as construed in the present hypothesis, is a centrality in the network of specialists. The concept of centrality is not as broad as the concept of peer association discussed in hypothesis 3.

Shaw's (1954) experimental studies with small group networks* showed that individual morale, number of items transmitted by an

*For a summary of small group communication network studies, see Amend (1970), Glanzer and Glaser (1961), Hare (1962), Golembiewski (1962), Guetzkow (1965).

individual in a position, and the probability that an individual in that position will be chosen as a leader vary directly with individual centrality. It is therefore hypothesized that:

H_4: Network centrality is positively related to liaisonness.

Opinion leadership. Opinion leadership was defined by Rogers with Svenning (1969) as the ability to influence others' opinions consistently in a desired way. General findings from diffusion research (Katz and Lazarsfeld 1955; Rogers 1962; Rogers with Svenning 1969) have consistently shown opinion leaders to be mobile, relatively early adopters of innovations, and cosmopolite in activity and contacts. The liaison individual in an organization is mobile, cosmopolite in his contacts, and high in activity. Because of wide contact and information handling, the liaison may also be a relatively early adopter of innovations.

Jacobson and Seashore (1951) note that because of the strategic position of the liaison individual he has a high potential to influence communication to and from groups. It is therefore hypothesized that:

H_5: Opinion leadership is positively related to liaisonness.

Information output diversity. Information output diversity is the degree to which an individual makes use of different communication channels in transmitting information to his clients. In the organization under study, specialists have access to a great variety of media and communication channels. The way in which they use the channels can influence their effectiveness as professional educators. Jain (1970) found a positive correlation between the information output diversity of a specialized linker and the linker's peer-evaluated effectiveness.

There are no previous studies on the relationship between liaisonness and information output diversity. However, diffusion research (Rogers 1962; Rogers with Svenning 1969) has shown that clients obtain research results through a variety of communication channels. It is assumed that the specialists in the linking system have served as the sources for much of the information put into the channels. Intuitively, it is expected that the greater the degree of interpersonal contact a specialist has within a social system, the more likely he is to use the available contacts to dispense information. It is therefore hypothesized that:

H_6: Information output diversity is positively related to liaisonness.

CHAPTER III

RESEARCH METHODOLOGY

This chapter provides a general outline of research procedures to be followed. Included are a statement of the approach to the study, a model of a research dissemination organization, and a description of the actual research dissemination organization under study. Sampling procedure, data analysis and data collection are described, along with a discussion of the communimatrix and sociogram as methods of sociometric data display. The chapter defines the liaisonness roles being measured, gives the operationalization of variables, and closes with a discussion of hypothesis testing.

Approach to the Present Study

The research reported here is a field study utilizing an ex post facto, after-only design.* The field study was chosen as a way to explore the nature of existing communication patterns among specialists in an on-going organization. The researcher wanted to first describe the communication structure and the flow of communication along certain dimensions. To accomplish this purpose, it seemed more fruitful to examine a real-life organization through a field study than to artificially structure a simulated organization using an experimental design.

The experimental method of studying communication patterns and networks has been widely utilized in laboratory research (Bavelas and

*For a discussion of types of research and comparison of research designs, see Kerlinger (1966).

Barrett 1951; Cartwright and Zander 1953; Carzo 1963; Glanzer and Glazer 1961; Guetzkow 1965; Shaw 1954). In addition to experimental methods of study, there are at least five ways* to perform field study of communication patterns and networks in organizations (Davis, 1953b). The method proposed for the present research is described by Davis (1953b) as "indirect analysis,"** which is the type of analysis used by Jacobson and Seashore (1951), Schwartz (1968), Mitchell (1970), and MacDonald (1970).

The present field study will focus on one system of a research dissemination organization. A research dissemination organization, and the process of research utilization,*** may be pictured as being circular or cyclical in nature. Research utilization is not simply a one-way flow of research results from researchers to clients, but also entails a flow of client needs to researchers.

In order to examine the dynamic, cyclical process of research dissemination and utilization, it is useful to momentarily "freeze" or stop the dynamic, thus presenting a static picture. In addition, the cyclical nature of the process may momentarily be viewed as a linear or

---

*Davis (1953b) suggested that the experimental method in pure form is probably confined to the laboratory. The five field methods Davis listed are (1) "living in," or observing over time, (2) "indirect analysis," (3) "duty study," (4) "cross-section analysis," and (5) "ecco analysis."

**Davis (1953b:303) gave an example of indirect analysis: "...determine with what other executive each member of the organization spent the most time. The obvious assumption can be made that the member also communicated most with the executive with whom he spent the most time."

***Research utilization was defined by Jain (1970:12) as "the process by which research results are communicated to, and adopted by, clients. Thus, research utilization includes both (1) the communication of research results from researchers to clients, and (2) adoption of these results by clients.

sequential process. By imposing these conditions upon the organization under study, we may better analyze the process. We now turn our attention to the "frozen" process, in order to develop a theoretic model of the dynamic organization under study. Much of the discussion of the research dissemination organization is after Jain and Amend (1968).

The Research Dissemination Organization: A Theoretic Model

In the process of research dissemination and utilization, (as we have temporarily stopped the process), it is possible to conceptually identify three social systems: the research system, the linking system, and the client system. The research systems are composed of research roles which perform the function of producing research knowledge that could be used by the client system. The client system is composed of client roles or potential users of research knowledge in a given field. Interposed between the research and client system is the linking system, composed of linking roles. The linking roles perform the function of information exchange between the research and client systems.

The linking system serves as a communication link between the research system and the client system. It has to communicate with both the research and client systems. From a communication viewpoint, then, the problem is to understand various communication behaviors, communication transactions, and communication processes that are involved in these three interrelated social systems.

In order to understand the nature and interrelationships of communication patterns occurring in the three social systems involved in research utilization, we need to consider two factors with respect to each of the three systems: (1) functions in the research utilization

process, and (2) the nature of information handling processes involved.

Functions in the research utilization process. From the viewpoint of the research utilization process, each of the three previously discussed systems performs different but interrelated functions. The researchers have to produce and develop knowledge that could be utilized by the client system. The individuals within the linking system have to disseminate or diffuse such research knowledge to the clients in a way that it could be effectively utilized. Finally, the members of the client system have to adopt or utilize the research findings in their problem-solving behavior. Thus, there are three major functions or phases* in the overall process of research dissemination and utilization:

(1) Research and development, which includes activities dealing the production of research knowledge that could be utilized for solving practical problems. This function is performed by the research system.

(2) Dissemination, or diffusion, which is performed by the linking system. It includes activities which facilitate the flow of research-based information to and its utilization by the clients.

(3) Utilization, or adoption, which is concerned with the application of research-based information to problem-solving behavior. This function is performed by the client system.

Information handling. The second factor to be considered is the nature of information handling processes involved in performing a given function. Information handling refers to an individual's communication behavior dealing with the acquisition, processing, and transmission of information. Information handling is a way of looking

*For a detailed discussion of the phases in research dissemination and utilization, see Guba (1968).

at the role an individual plays in the communication process. The concept of information handling takes the viewpoint that individuals have considerable initiative in the communication process. Rather than merely responding, they acquire, process, and transmit information in an attempt to satisfy their information needs.

The three main processes involved in information handling are (1) information input, (2) information processing, and (3) information output. Information input deals with the acquisition of information. What kinds of information does the individual acquire? From what sources? More importantly, what are the factors influencing the nature and sources of information?

Our interest in information input is in examining what kinds of information individuals working in three different social systems need to input for performing their roles, and from what sources they obtain such information.

Information processing deals with the evaluation, utilization, storage and transformation of the information. Whether information is input voluntarily or involuntarily, people take the initiative in processing information. In some way they evaluate information they have acquired, decide what information to utilize, what information not to use, what information to store in their memory and what to forget.

Information output deals with the transmission of information. People don't always keep to themselves the information they have input and processed. They often share it with others through various communication channels. Our interest in information output is in examining the nature and audiences of the information transmitted by individuals working in the three social systems.

These three information handling processes provide a useful approach for examining the nature of communication patterns in the three social systems.

All communication behaviors and situations involve one or more of these three processes. They may not be easily discernible in given communication situations, but it should be remembered that they are three conceptually distinct, yet interrelated processes. They constitute useful tools for analyzing communication patterns of individuals working in the three social systems. These three processes are especially applicable to the study of communication behavior at the individual or dyadic level of analysis. The present study is focussed at the individual level of analysis, with particular emphasis on the reciprocated, or dyadic, interaction communication processes.

We have seen that there are three social systems, each performing a distinct function, in the research utilization process. In order to perform his function or a given role in the system, an individual has to input, process, and output various kinds of information.

Individuals in each of the three systems have to handle various kinds of information. The three categories of information handling processes are equally relevant for examining communication patterns of a research role, a linking role, or a client role.

Thus, there are three categories of communication patterns within each social system: (1) communication patterns dealing with information input, (2) communication patterns dealing with information processing, and (3) communication patterns dealing with information output.

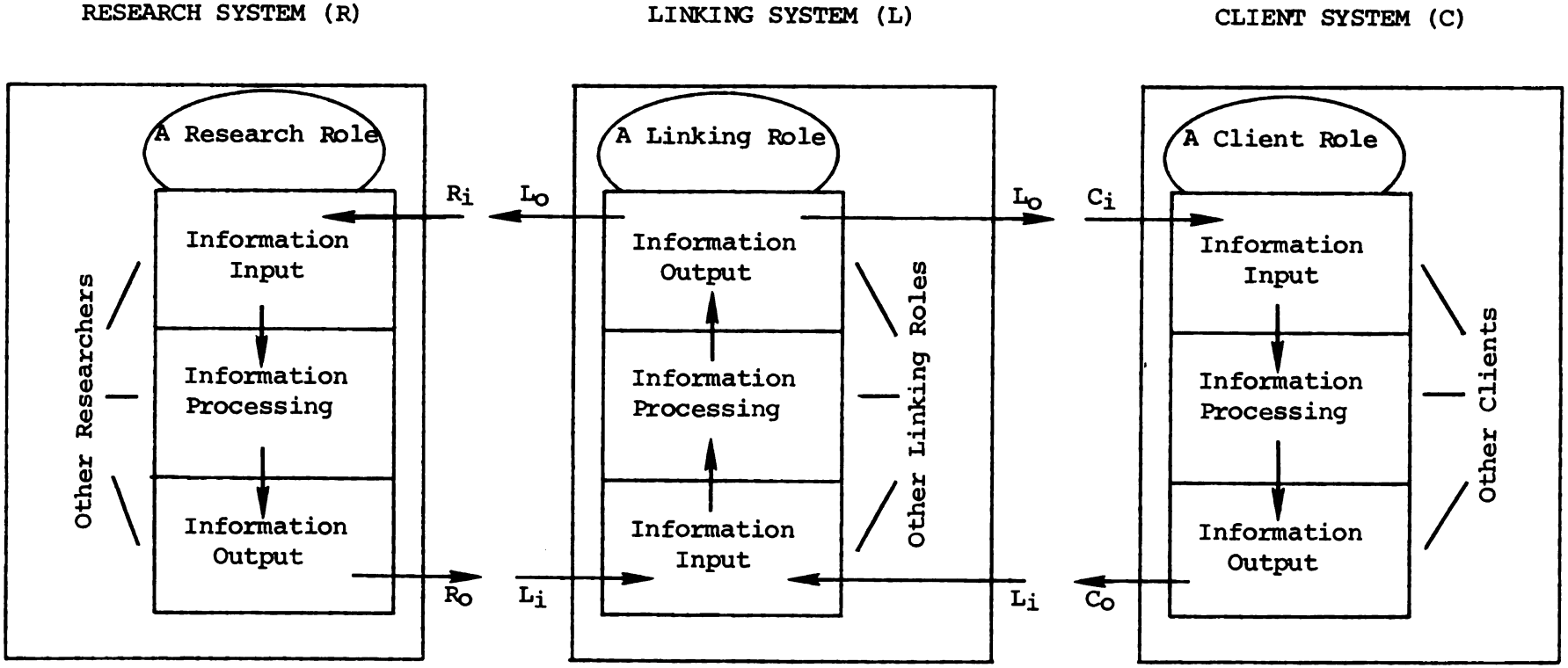
These three categories of communication patterns, parallel across the three social systems, are distinct but interrelated. Figure 3 is a representation of the three systems and the three categories of communication patterns.

Now let us see how these different categories interrelate. As illustrated in Figure 3, a researcher's information output (R_o) about research results may serve as an input (L_i) for the linking role. Looking at a researcher's output (R_o) behavior in conjunction with the linking role's input (L_i) behavior is a case of a communication transaction between a researcher and a linker, involving the flow of information from a researcher to the linker.

The linking role processes research-based information so as to make it relevant, understandable and suited to the needs of the clients. The information output from the linking role (L_o) serves as the information input (C_i) for the client. The client evaluates and (if the information is acceptable) utilizes the information in his problem-solving behavior.

Like any other communication process, research utilization also involves a two-way flow of information. The client may output (C_o) information, e.g. client needs or feedback, which may become input (L_i) to the linking role. The linking role may transmit such information as an output (L_o), which may become an input to the researcher (R_i).

This discussion does not imply that output R_o and input L_i, or output L_o and input C_i, etc., are equivalent. At every transaction point, there may be some distortion or loss of information.



R_i = Research Input

R_o = Research Output

L_i = Linking Role Input

L_o = Linking Role Output

C_i = Client Input

C_o = Client Output

Figure 3. Nature and Interrelationships of Communication Patterns in the Three Social Systems in Research Utilization Process. (From Jain and Amend, 1969:13).

The Linking System of a Research Dissemination Organization

The foregoing discussion of a research dissemination and utilization model included the three major systems of the total conceptual organization. For the purposes of the present study, we are limiting our investigation to the center segment of the model, or the linking system. Figure 4 is a simplified paradigm showing the systems of a research dissemination organization and the major functions of the respective systems.

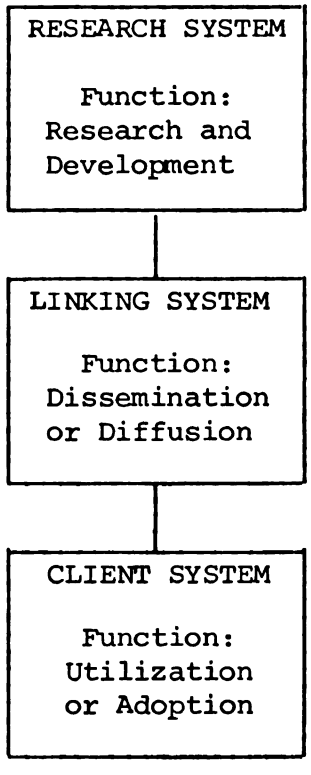


Figure 4. The systems and the functions they perform in a research dissemination organization.

The present study will focus on the linking system portion of the research dissemination organization, shown as the center segment of figure 4. Thus, the communication contacts and flow in the present study may be thought of as occurring horizontally, within and between departments of the linking system.

nents.

linking

The sche

within

a pre-t

/------

/---Pre

in the

It is

"liai

resea

---

index
able
on "c

a dyn
actio
"vert
acros
infor
linki
matio
appre
flow

We now turn our attention to the linking system and its components. It may be schematically represented as shown in Figure 5. The linking system in the present study is described in the next few pages. The schematic representation (Figure 5) shows nine academic departments within a College of a University. Two of the departments were used as a pre-test, and the remaining seven were included in the main study.

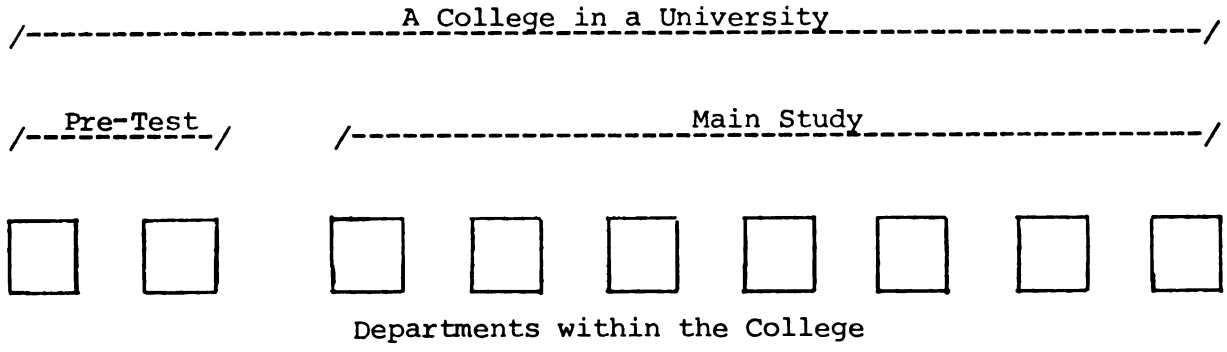


Figure 5. Schematic representation of the linking system under study.

Analysis of the communication patterns among individuals within the linking system is expected to yield a measure of "liaisonness."* It is suggested that there may be different types or patterns of "liaisonness" between the "vertical information flow" in the overall research dissemination organization and the "horizontal flow"** as

*"Liaisonness" will be measured by a numerical index. The index and the operationalization of liaisonness as the dependent variable of the study are explicated later in Chapter III, in the section on "operationalization of variables."

**We must remember that the communication system under study is a dynamic, n-dimensional process. We have temporarily "frozen" the action, and imposed structure on the process for the sake of analysis. "Vertical" information flow is represented as being that which flows across the major systems in the conceptual model, while "horizontal" information flow is that which flows within the center segment, or linking system, of the model. The imposition of "direction" on information flow is an arbitrary operation in two planes, for the purpose of apprehending the complex, dynamic process. "Direction" of information flow could just as well be represented in another way.

represented in one single system of the organization.

The Actual Research Setting

The study reported here was part of a larger research project undertaken by the present author in collaboration with other graduate researchers at Michigan State University. Portions of the larger study have been reported earlier, with other portions yet to follow. In any case, the overall setting for the study is the same. It is discussed here, as previously reported by Jain (1970).

The study was conducted in a large, complex organization, the Michigan Cooperative Extension Service (MCES). The basic function of the Extension Service is to facilitate the dissemination and utilization of useful research results and other innovations to the people of the state of Michigan. The Michigan Cooperative Extension Service is an integral part of Michigan State University. The Extension branch of the University was organized in 1914 with the passage of the Smith-Lever Act, a law which created the foundation for extension services in the State Land Grant Universities of the United States.*

The Michigan Cooperative Extension Service is a statewide organization of over 400 employees, with an annual budget of more than ten million dollars. MCES maintains relationships with the federal, state, and county governments. The service is administered by a Director of Extension, who is responsible to both the United States Secretary of Agriculture and to Michigan State University.**

---

*For a detailed discussion of the Smith-Lever Act and creation of the Cooperative Extension Services, see Kelsey and Hearne (1963) and Sanders (1967).

**An organizational chart of the Michigan Cooperative Extension Service is provided in Appendix A.

From the viewpoint of the present research, the two main roles in the extension service are: (1) specialized linkers, called "subject-matter specialists" or Extension Specialists, and (2) generalized linkers, called County Extension Agents or simply "County Agents". In MCES, the specialists are full-time or part-time faculty members belonging to their respective academic departments in the University. Within each department, one specialist is formally designated as the project leader for coordinating the activities of all the specialists working in that department. The major role of specialists is to serve as liaison and resource persons (within their respective fields of specialty) between researchers and the County Agents. Sometimes specialists also communicate directly with clients on technical matters.

Unlike the specialists, the County Agents belong to specific counties and have their offices there. The agents are not administratively responsible to the specialists, but are responsible to the Director of Extension. Thus, the relationship between a specialist and a County Agent is of a supporting and advisory nature, rather than of an administrative nature. A specialist is directly responsible to his Department Chairman rather than to the Director of Extension.

There are five divisions or program areas within the Michigan Cooperative Extension Service: (1) agriculture, (2) natural resources, (3) marketing, (4) 4-H youth programs, and (5) family living education. Each of these divisions is responsible for research dissemination activities of their own subject matter in the whole state. Agriculture represents the largest division in terms of the number of specialists and agents working in the program area. Each division or area has its own administrative staff, budget, and plan of activities. Also, each

area has its own set of specialists working in the academic departments related to that program area. At the county level, the distinction between these five program areas is not so clear-cut. A county agent might be working in several of these five areas depending on the generalized ability of the agent and needs of the county.

In the present study, the program area of agriculture was selected because it was the biggest single area with a large sample of specialists. The study was thus limited to the communication patterns of extension specialists working in the academic departments dealing with the agriculture program area of the Michigan Cooperative Extension Service.

Sample

The study population from which the sample was drawn consisted of extension specialists working within the Michigan Cooperative Extension Service. The sampling frame was the Administrative and Specialist Staff Directory, MSU Extension Service, (November 1968). The sample unit in the study was the individual specialist.

The sample consisted of 50 specialists assigned to seven different academic departments of Michigan State University. The two criteria used in selecting the sample were: (1) Only those specialists who worked in departments having four or more specialists were selected. This first criterion was the basis for selecting the departments rather than the specialists. The criterion was used because sociometric questions were desired in order to determine communication networks. About four or five individuals are required for meaningful analysis of sociometric network questions. (2) A specialist should have been working for one year or more at the time of data-gathering. It was

felt that the research would be more representative of a complex organization if the respondents had been members of the organization long enough to become active in organizational affairs.

Sampling Procedure

The procedure used in drawing the sample consisted of the following three steps:

1. Of the five main program areas in the Michigan Cooperative Extension Service, the program area of agriculture was selected for study. The reason for selecting only one area was to keep the sample homogeneous with respect to the subject-matter area and to administrative matters, and thus avoid the effect these extraneous factors might have on the hypothesized relationships under study. The agriculture program is the largest area, and had enough specialists to provide a sample of 50 individuals for the present study.

2. Within the program area of agriculture, there are 11 different academic departments in which specialists work. The number of specialists varies from department to department. We wanted to select those departments which had at least four specialists, who have been working for at least one year at the time of sampling. There were nine departments which had four or more specialists. Of these nine departments, two were selected for pretesting the instrument and the remaining seven were used for the main study.

3. From the seven departments included in the study, all the specialists who had been working for at least one year were included in the sample. This procedure provided a sample of 50 specialists.*

*The method of sample selection lends itself well to sociometric analysis or a "case study" approach to research. It does not lend itself to data analysis by inferential statistics.

Data Collection

The data for the present study were gathered through personal interviews with members of the state extension specialist staff of the Michigan State University Cooperative Extension Service. The interviews, requiring an hour to an hour and a half each, were conducted in the respective offices of the respondents, by appointment. A complete interview packet was prepared for each respondent, containing interviewer instructions, questionnaire, and ancillary forms. The questionnaire was pre-tested on a sample of nine specialists selected from two different departments at Michigan State University. The pre-test sample was comparable to the sample of the main study. The pretesting of measuring instruments took place in the first two weeks of May, 1969. The instruments were modified and improved, based on the experiences of the pre-test interviews.

Approximately one month before the data collection for the main study began, a letter from a high prestige source in the university was distributed to the chairmen of all the academic departments included in the study. The letter briefly introduced the study and the investigator, and requested the cooperation of the individual specialists included in the sample. Two weeks after the letter was distributed, personal telephone calls were made to each member of the study sample to enlist their cooperation and make an appointment for conducting a personal interview.

Personal interviews were conducted during the period of May 20, 1969 to July 8, 1969. All interviews were conducted in the offices of the specialists, with no other office personnel present. At the beginning of the interview, each respondent was assured that the data

would be kept strictly confidential to the researcher and would be used only in aggregate form.

The interviews were conducted by four trained graduate students, including the author, who have similar academic interests and experience. All interviews were conducted according to the prepared interview schedule. Following the interviews, the schedules were checked for completeness, and in a few cases, missing information was obtained by telephone. Respondents' cooperation was exceptionally good.

In order to save time during the interview, and avoid recall bias, some data were collected from organizational records. The data collected from records were of two types: (1) biographical information about the specialists, and (2) information output (or extension teaching) activities of the specialists. The biographical information of each faculty member of the university is maintained by the Information Service of the University, with provisions for its updating. Biographical information sheets were obtained from the Information Service, and were updated by the respondents during the personal interview.

The information output data were collected from the administrative records of the extension service. Each specialist keeps a monthly record of his extension activities and periodically reports this information to the extension administrators. Specialists also compile their extension activities report for each academic year and submit the compilation to administration. Information was gathered about extension teaching activities of the specialists for the three calendar years of 1966, 1967 and 1968.

A test-retest reliability check was conducted approximately two months after the main study, to validate the instruments. The reliability coefficients were significantly different from zero, and were high

enough to establish general confidence in the reliability of the measuring instruments.

Data Analysis and Display

Data analysis and display will be accomplished through a communimatrix* and a sociogram.** A communimatrix is a special case of sociomatrix,*** specific to the study of communication contact.

The Communimatrix

In a communimatrix, the persons in the system are listed along the rows and the columns of the matrix in the same order. The rows correspond to the persons making the nominations or communication choices, and the columns correspond to the persons receiving the nominations. The choices made by any of the system members are then entered in the appropriate matrix cells, e.g., 1 equals a positive choice, 0 equals a negative choice or no choice, all from the chooser's point of view.

An example of a communimatrix is shown in Figure 6 (after Guimaraes, 1970:35). In its simplest form, the interconnections within

*A communimatrix, as conceived by the present author, is a method of graphically displaying relational data derived from communimetric questions. Schwartz (1968:161) coined the term "communimetric," defining it to mean "that branch of sociometry which utilizes only a criterion of communication contact for operationalizing social system typologies, followed by analysis of structural and/or process characteristics of the system."

**The results of sociometric testing are usually presented by a graph or diagram called a sociogram. Subgroups, leaders, linking persons, cliques, isolates, etc. are symbolically represented, and the contact between the various individuals is shown by lines connecting the symbols. The resulting sociogram is a representation of the structure of the group.

***For a discussion of the sociomatrix, see Forsyth and Katz (1946:340-347); Festinger (1949:153-158); Guimaraes (1970:33).

a network would be represented by a 0-1 matrix, that is, a matrix with a_{ij}=1 or 0 (the subscripts i and j represent the row and column, respectively, of the cell entry). For example, if in a five-member communication network it is found that a, b, and e speak to each other, c speaks to a; and d does not speak to any of the other members, the binary communimatrix for such a network would appear as in Figure 6.

A common use of the sociomatrix has been to show the "connectedness" or "integration" of an individual within the group (Coleman, 1964; Forsyth and Katz, 1946; Guimaraes 1970). Sociometric prestige scores have been used to measure the number and closeness, in terms of communication linkage steps, of sociometric choices.

		Receiver				
		a	b	c	d	e
	a	0	1	0	0	1
	b	1	0	0	0	1
Sender	c	1	0	0	0	0
	d	0	0	0	0	0
	e	1	1	0	0	0

Figure 6. Example of a binary matrix representing a five-member hypothetical communication network.

Weiss and Jacobson (1955) showed that after a sociomatrix has been arranged to show the various cliques or subgroups, it can be seen that the subgroups are linked together by key individuals. When the key individuals (liaisons) are "pulled out" of the matrix, it tends to "fall apart" into its component sub-groups. Thus the sociomatrix (in the present study, the "communimatrix") may be used to determine

"disconnectedness" as well as "groupness" of an organization.

Another example of a reciprocated communimatrix for the analysis of sociometric data is given in Figure 7. In this example,* the respondents are listed according to their assigned respondent numbers down the side and across the top of the matrix. In this example of the communimatrix, we are working with reciprocated choices between respondents, on some dimension of communication behavior. For example, the respondents may be asked a sociometric question such as, "Who do you talk with about technical subject matter?" Mutual, or reciprocated choices are verified by examining the responses to the question on each questionnaire. When such reciprocated choice occurs, a mark is made in the communimatrix on the lines where the two respondents' numbers intersect.

In Figure 7, the communimatrix is subdivided into segments or workgroups, represented by shaded areas. The unshaded area is the region of "outside contacts." The points "a," "b," and "c," have been chosen as placed to segmentalize the larger matrix. To segment the large matrix without having too many outside contacts it is necessary that there be some ordering in the matrix to begin with.** The matrix in Figure 7 already shows clustering of contacts.

The initial clustering of contacts may logically be expected as a result of work proximity. That is to say, those respondents who work in close contact with others will tend to cluster with those others in groups along the diagonal of the matrix, from upper left to lower right.

---

*The example in Figure 7 is after Weiss (1956). For complete directions for the analysis of sociometric information using the matrix technique, see Weiss' (1956) Appendix D.

**In the present study, initial ordering of the workgroups in the matrix was accomplished by use of the personnel roster, which listed respondents in their respective departments of the college.

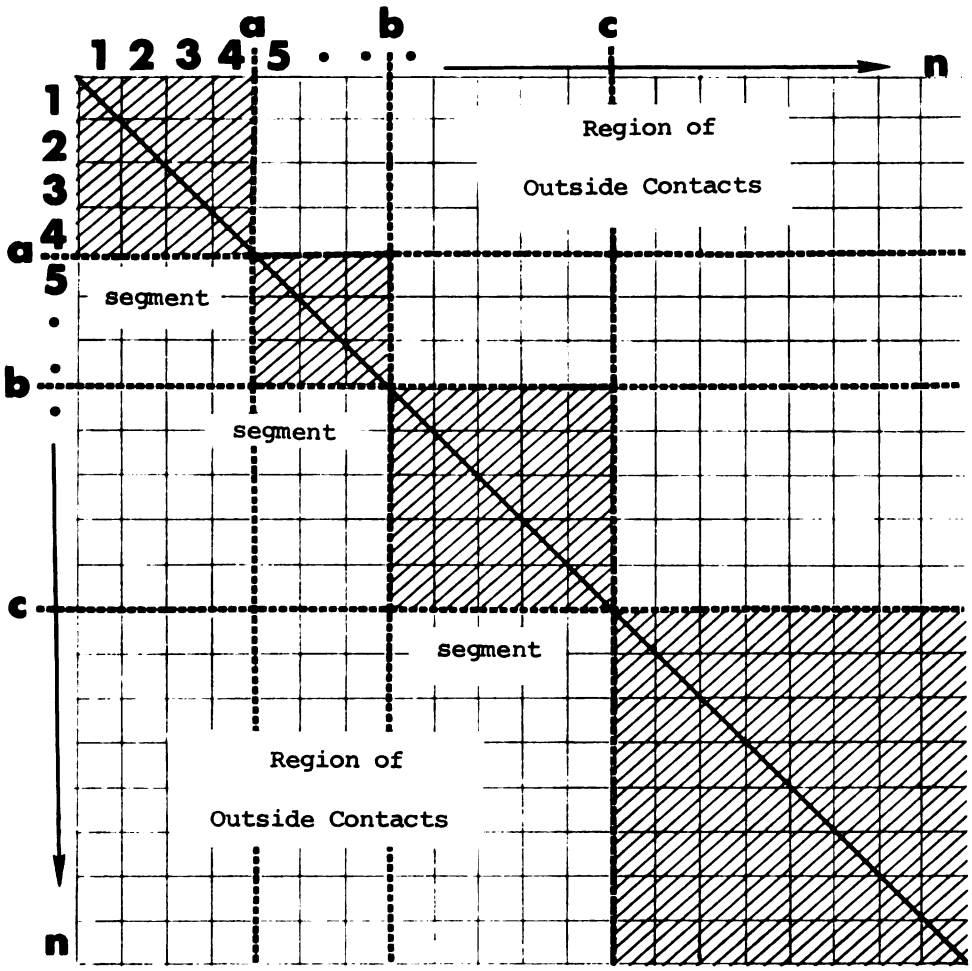


Figure 7. Communimatrix showing segments, e.g. cliques or workgroups, and region of outside contacts.

Those individuals who have frequent reciprocated contacts outside their immediate work groups will first appear in their own work groups. In addition, they will have marks in the matrix in the region of outside contacts. Such individuals are providing the liaison role, or inter-group contact within the total organization under study. Non-liaisons have no reciprocated contacts outside their own segments.

The Sociogram

Following the identification of work groups and their contacts, as analyzed in the communimatrix, the data will be displayed in the form of a sociogram. A sociogram* consists essentially of symbols representing respondents, connected by lines representing communication contact between respondents. The contacts may or may not be reciprocated, depending upon the nature of the study. In the present research, all analyses were made on the basis of reciprocated contacts.

An example of a sociogram is given in Figure 8. In this illustration, all contacts are considered reciprocal. A single line connecting individuals is considered to be going in both directions. It is possible to construct a sociogram and indicate direction of one-way contacts with arrows on the contact lines.

The dotted lines in Figure 8 indicate boundaries of work groups. It may readily be seen that reciprocated contacts may exist both within and between work groups. The work groups represented in the sociogram in Figure 8 would be analogous to the segments previously displayed in Figure 7. The sociometric contacts within work groups would be

*For a discussion of the technique of sociogram construction, see Toeman (1948-9). For comprehensive information about sociometry as a method, see Moreno, J. L. (1934, 2nd edition 1953) and Moreno, J. L. (1960).

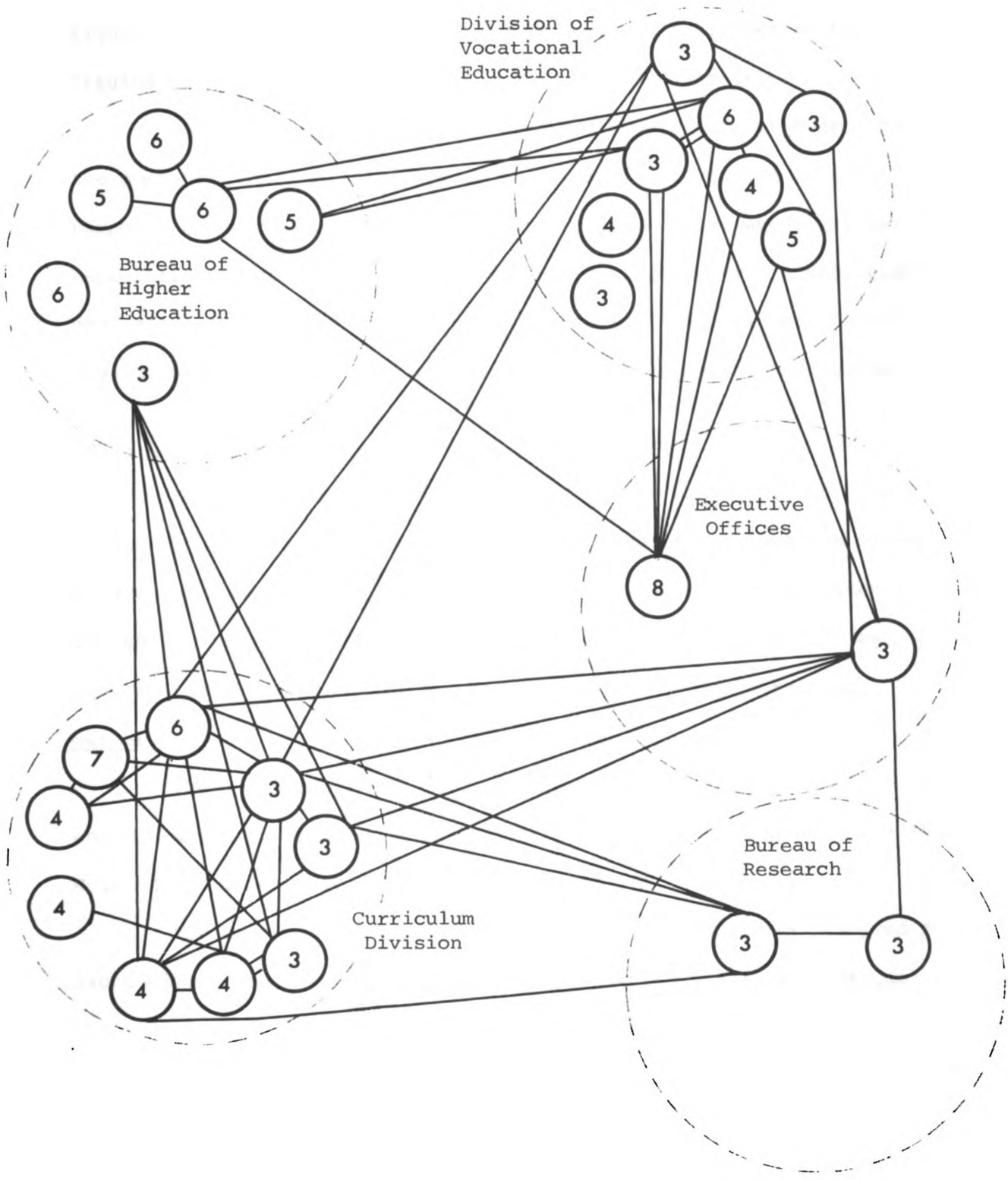


Figure 8. Example of a reciprocated-choice sociogram. (Adapted from Brownlee 1969:80).

analogous to contacts within the shaded areas of the communimatrix in Figure 7. Contacts between work groups would be analogous to the "region of outside contacts" in the Figure 7 communimatrix.

Comparison of Figure 7 and Figure 8 should make it clear that the communimatrix has an advantage in initially displaying data for purposes of contact analysis, while the sociogram is a useful visual representation after initial identification of contacts. A sociogram used alone, especially in analyzing a large body of sociometric data, may become such a maze of lines as to be practically unintelligible.

Types of Liaison Roles

It is anticipated that the communimatrix analysis, when displayed in sociogram form, will aid in the visual identification of types of liaison communication roles in the linking system. These roles include the isolate, the non-liaison group member, the bridge, the liaison individual, the liaison group member, and the liaison set member.

These six roles are similar in concept to the roles identified and discussed by Jacobson and Seashore (1951), Weiss and Jacobson (1955), Weiss (1956), Schwartz (1968) and MacDonald (1970).

The conceptual base for the liaison role concept is provided by Jacobson and Seashore (1951), who noted the existence of work groups which were connected by a few key individuals. Jacobson and Seashore (1951:37) observed that:

> ...some individuals have frequent, reciprocated and important contacts with a limited number of other individuals who in turn are closely interrelated, and have few, non-reciprocated and unimportant contacts outside of this group.

The separation of work groups into independent entities is basically accomplished by removing the liaison persons and contacts between groups from the sociomatrix (Schwartz 1968:23). The liaison person is a communicative link between work groups. Liaisons "characteristically have many, frequent, reciprocated and important contacts which cut across the contact group structure," according to Jacobson and Seashore (1951:37).

Weiss and Jacobson (1955:663) offered formal definitions of work groups, liaison persons and contact between groups:

> (1) Work group was defined as a set of individuals whose relationships were with each other and not with members of other work groups, except for contacts with liaison persons or between groups.
>
> (2) A liaison person was described as an individual who worked with at least two individuals who were members of work groups other than his own.
>
> (3) Contact between groups was defined as a single working relationship between members of sets of individuals who would otherwise be classified as separate work groups.

Schwartz (1968:23) noted that "the special criterion for the liaison person is that he must have contacts with at least two other persons in work groups other than his own." A single contact between two members of two separate work groups is defined simply as a contact between work groups, not as a liaison.

In graph theory, as explicated by Weiss (1956), the liaison person is an analogue to the articulation point and the contact between groups is analogous to the bridge. These analogues are illustrated in Figure 9.

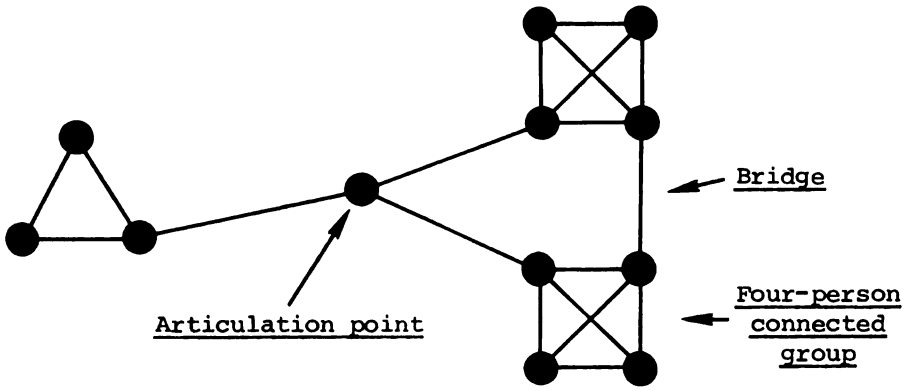


Figure 9. Graph theory representation of articulation point and bridge. (Adapted from Weiss 1956:88).

In their analysis of communication patterns in complex organizations, Schwartz (1968), and MacDonald (1970) applied the procedures devised by Weiss (1956), adopting Weiss' criteria for identification of work groups and types of communication roles.

The present author has adopted the criteria and constitutive definitions insofar as they have been explicated by the previously named researchers. In addition, the present researcher has expanded or clarified the definition of the roles, and has suggested a hierarchical value for the roles in terms of the concept of "liaisonness."

Liaisonness as a Role Concept

It is suggested by the present author that liaisonness is a continuous variable, and that different individuals may possess "more" or "less" of the liaison characteristic. Previous researchers have dichotomized the role, characterizing individuals as being "liaison" or "non-liaison" types. The liaison characteristic has also been trichotomized into "liaison," "bridge," and "non-liaison" types.

The present researcher proposes that the various types of liaison roles which appear in previous research literature are actually roles which lie along a continuum of "liaisonness." The role hierarchy as conceived by the present author is presented in order, from the least to the most "value" or degree of liaisonness.

The six roles embodied in the liaison concept are ideal types, and they apply with respect to any one given topic or stimulus. Any individual probably will display a variety of types of roles as the stimulus topic is changed.

Following are constitutive definitions of the six types of liaison roles as the terms have been used by Jacobson and Seashore (1951), Weiss (1956), Schwartz (1968:99-102), MacDonald (1970:85), and somewhat modified by the present author.

The isolate is the individual who is a member of the organization, but has no communication contact with other members of his work group or organization with respect to a given subject or stimulus topic.

The non-liaison group member (henceforth called simply group member)* has contact with his immediate work group, but may have no more than one contact outside of his own group, except with liaison persons, and must have a majority of his contacts within his own group.

The bridge is a single contact outside the immediate work group, and is a contact with a person other than a liaison person. The bridge person may or may not have other contacts within his own primary work group.

---

*The designation non-liaison group member is a term used by previous researchers. The present author considers the term group member as adequately describing the role type. The criteria for specification of the role are preserved, and are consistent with the criteria used by previous researchers.

The liaison individual does not have a majority of contacts in any one group, but has contacts with members of two or more groups. These contacts may be with other liaison persons only where those persons are themselves members of groups. If there is a liaison set its members qualify as a group for this purpose.

The liaison group member is a member of a communication group with a majority of his contacts, not including contacts with other liaison persons, within the group. The liaison person must have at least two contacts outside his group,not counting other liaison persons. An exception occurs if he has contact with two or more liaison persons outside his group.

The liaison set consists of respondents who have half or more* of their contacts with other liaison persons, at least two of whom must be members of more than one group, i.e., liaison individuals.

If a person is not a liaison individual by these criteria, but also is not a member of any group, and if such a person has half or more of his contacts with the members of a liaison set, he should be classed as a liaison individual.

Operationalization of Variables

In Chapter II, liaisonness was shown as the common dependent variable in the six hypotheses being tested in the present study. Each of the six hypotheses has a different independent variable. Based on the hypotheses listed in the previous chapter, the variables of primary interest are:

*Weiss, Schwartz, and MacDonald define the liaison set criterion as being respondents who have "all or nearly all" of their contacts with other liaison persons. The present author suggests "half or more" of the contacts as being more specific, and a more useful operationalization of the term.

1. Liaisonness
2. Peer-evaluated effectiveness
3. Information input diversity
4. Peer-communication diversity
5. Network centrality
6. Opinion leadership
7. Information output diversity

Following is the operationalization of each of the above listed seven variables. The methods used to operationalize the independent variables are the same as those reported by Jain (1970:63). For each of the seven variables under consideration, an index was constructed.

Liaisonness. The foregoing discussion of the liaison role concept identifies liaisonness as a continuous variable, composed of six main role types. Liaisonness is predicated on the existence of reciprocated contacts between respondents. In order to determine reciprocated contacts, each respondent was asked to name about five individuals in his department with whom he communicated most frequently about technical matters related to Extension work. The respondent was then asked to indicate, for each person named, the frequency of communication contact with that individual. The frequency of communication contact could vary from "about once per term or less often" to "at least once a day." (See questionnaire item no. 17, Appendix C).

Each respondent was then asked to name five to ten people in other departments at MSU with whom he communicated most frequently about technical matters related to extension work. For each individual named by the respondent, the respondent was asked to indicate (a) how frequently the respondent communicated with the individual, and (b) the

amount of time spent communicating with that individual in a month. The frequency of contact could vary from "about once per term or less often" to "at least once a day." The hours of contact per month were to be specified by the respondent. (See questionnaire item no. 18, appendix C).

Based on reciprocated nominations received from fellow specialists in the study, each respondent was assigned contact values according to the six previously identified types of liaison contact role. The six types lie along a continuum of liaisonness, in a hierarchical order. Under these assumptions, numerical values were assigned to each of the types of liaison contact, to produce an index of liaisonness. The unit of analysis is the individual.

Each isolate was assigned a value of "0" since the definition of the type states that no contact is made. In the present study, three individuals were identified as isolates with respect to the topic under consideration.

Each group member was assigned a contact value of "1". Twenty-eight of the respondents were classified as group members.

Each bridge person was assigned a value of "2". Ten of the respondents had single contacts outside their groups, in addition to their group contacts, and thus were classified as bridge persons.

The liaison individual was assigned a contact value of "3". There was only one respondent who emerged as a liaison individual.

The liaison group member was assigned a contact value of "4". There were four respondents who were classified as liaison group members.

The liaison set member was assigned a contact value of "5". There were four respondents whose contacts classified them as liaison set members.

Thus it was possible to classify each of the respondents into one of the six categories, or degrees, of liaisonness. Based on contact frequency within and between work groups, it was possible to assign to each respondent a numerical index value of liaisonness. Using the "contact values" assigned to each of the six role types previously explicated, it is possible to sum the values of contacts so that each respondent earns a cumulative score for his total contacts.

Since N = 50 in the present study, and the index score is based on numbers of reciprocated contacts, it is theoretically possible for the liaisonness index to run from 0 to 49. The actual range of the liaisonness index was from 0 through 22. The liaisonness index -- showing contact values for each of the six role types, the range of index scores and the frequency distribution of respondents across the index -- is shown as Appendix G.

Peer-evaluated effectiveness. Peer-evaluated effectiveness is defined as the performance rating of an individual as judged by his peers in the same organization. In order to measure peer-evaluated effectiveness of specialists in our study, each respondent was given an alphabetically arranged list of all the specialists included in the study, and was asked to check the names of about five individuals whom he considered outstanding specialists.* The actual question was:

> In all groups of people, some gain a reputation for superior performance. Who are some, that in your opinion, most deserve the reputation of an outstanding specialist? I'd appreciate getting approximately five names.

*The present procedure of measuring peer-evaluated effectiveness is adapted from Murray (1965).

Based on the nomination received from fellow specialists included in the present study, scores for peer-evaluated effectiveness were assigned to each respondent. For each individual naming the respondent as an outstanding specialist, a score of "1" was assigned to the respondent. For instance, if a respondent were named by 10 other specialists as being outstanding, a score of 10 was assigned to him. The higher the score, the higher the peer-evaluated effectiveness.

Since N = 50, a respondent could be nominated by as many as 49 other respondents. If a respondent was not nominated by any other respondent, he received a score of "0". Thus, the peer-evaluated effectiveness score could range from "0" to "49".*

Information input diversity. Information input diversity refers to the extent that different information sources and channels are used by an individual in acquiring the information needed for performing his role. The index for information input diversity was constructed from the eight items described in Table 1. The procedure for constructing the information input diversity index consisted of the following two steps:

(1) The numerical scores for each of the eight items listed in Table 1 were arranged in descending order and the median was located in the range of scores on each item. A value of "1" was assigned for an above-median score on each of the eight information input items. For instance, if a specialist read an above-median number of professional journals, he was given a score of 1 for that item. But if he read

*The actual range of scores on peer-evaluated effectiveness in the present study is 0-23. The mean and standard deviation of peer-evaluated effectiveness scores are 4.70 and 5.14, respectively.

Table 1. Items Included in Constructing Information Input Indices

Items	Question or Procedure Used to Obtain Data About the Item
1. No. of professional periodicals read	What professional journals or scientific periodicals do you read or scan regularly? (Periodicals listed were counted).
2. No. of non-professional periodicals read	What non-professional periodicals (such as farm magazines, trade magazines, extension magazines, etc.) do you read or scan regularly? (Periodicals listed were counted).
3. Time spent in reading non-professional journals	On an average, how many hours per week do you spend in reading non-professional periodicals?
4. Time spent in reading professional journals	On an average, how many hours per week do you spend in reading professional journals or periodicals?
5. No. of research publications received	How many research papers (including preprints, reprints, and unpublished papers) have you received from outside your department in the past month?
6. No. of extension publications received	How many extension publications (such as extension bulletins, extension newsletters, etc.) have you received from outside your department in the past month?
7. No. of telephone conversations per month	For this item, the data were collected from organizational records. Each specialist reports the number of telephone conversations he had on a monthly basis. An average was taken from the record of past months.
8. No. of professional meetings attended	On an average, how many professional meetings (such as conventions, conferences, symposia, etc.) do you attend a year?

the median number, or a below-median number, of professional journals, he was given a score of "0" on that item. Scores were assigned on all eight items on a similar basis.

(2) The scores of "0" or "1" assigned in the previous step were summed across all the eight items given in Table 1. This summed score was used as an index of information input diversity.* The index could range from 0 to 8.**

Peer-communication diversity. Peer-communication diversity is defined as the extent to which an individual communicates with different peers within and outside of his organization. The index for peer-communication diversity of a specialist was constructed from the eight items described in Table 2. The procedure for constructing the peer-communication diversity index consisted of the following two steps.

(1) The numerical scores for each of the eight items listed in Table 2 were arranged in descending order and the median score was determined for each item. A value of "1" was assigned to above-median scores and a value of "0" to the median or below-median score on each of the eight items.

(2) The scores of "0" and "1" assigned in the previous step were summed across all the eight items given in Table 2. This summed

*The procedure for constructing an information input diversity index is adapted from Parker and others (1968). The procedure used gives a measure of information input from a wide variety of information sources and channels such as professional versus non-professional journals, research versus extension publication, professional meetings as a source of information, and telephone conversations as an information input channel.

**The correlations between the information input diversity index and the items included in constructing the index are given in Appendix F (Tables 11 and 12).

Table 2. Items Included in Constructing Peer-Communication Indices

Items	Question and or Procedure Used to Obtain Data About the Item
1. No. of intra-dept. contacts	Who are the individuals in your department with whom you communicate most frequently about technical matters related to extension work? Would you name about five people you communicate with most often? The number of individuals listed by the respondent was counted.
2. No. of inter-dept. contacts	The same procedure described in item 1 was used; the question was concerned with individuals in other departments at Michigan State University.
3. Frequency of communication with intra-dept. peers	For each individual named in response to the question in item 1, the respondent was asked to indicate the frequency of communication by checking the most appropriate category out of the following: At least once a day; 2 or 3 times per week; about once per week; 2 or 3 times per month; about once per month; about once per term or less often. These categories were given a score from 6 to 1, respectively. An average frequency was then computed for each respondent.
4. Frequency of communication with inter-department peers	The same procedure described in item 3 was used except the question was concerned with peers in other departments at Michigan State University.
5. Time spent in communicating with intra-dept. peers	For each individual named in response to the question in item 1, the respondent was asked: In a typical month, about how much time do you spend communicating with this person? (Estimate number of hours). A total score was computed by adding the number of hours across all the individuals listed in response to the question used in item 1.
6. Time spent in communicating with inter-dept. peers	A procedure similar to the one described in item 5 was used, except that it was concerned with peers in other departments at Michigan State University.

Table 2 (con'd.)

Items	Question and or Procedure Used to Obtain Data About the Item
7. Number of extra-organizational contacts	With about how many professional people outside of Michigan State University do you have frequent communication about technical matters related to extension work?...that is, people you communicate with at least 2 or 3 times per year.
8. Time spent communicating with extra-organizational peers	In a typical month, about how many hours do you spend communicating with professional people outside of Michigan State University?

score was used as an index of peer-communication diversity.* Like the input diversity index, the peer-communication diversity score could range from 0 to 8.

Constructing a peer-communication diversity index as described yields a measure of an individual's diversity of communication with intra-departmental peers, as well as his communication with peers within and outside of his organization.

Communication network centrality. Communication network centrality is defined as the degree to which an individual specialist occupies the center position in the communication network of specialists working within the organization. Network centrality was measured by a sociometric technique based on the following two questions:

(1) Who are the individuals in your department

*The correlations between the peer-communication diversity index and the items included in constructing the index are given in appendix F (Tables 13 and 14).

> with whom you communicate most frequently about technical matters related to extension work? Would you name about five people you communicate with most often?
>
> (2) Who are the individuals in other departments at Michigan State University with whom you communicate most frequently about technical matters related to extension work? Would you name five to ten people you communicate with most often?

The above two questions were asked of all 50 respondents in the study. The responses to these two questions were examined for the mention of each respondent in our study. Some respondents were mentioned more often than others. We counted the number of individuals who mentioned the name of a respondent in response to the above two questions. The number of nominations received by a specialist from fellow specialists reflects the individual's centrality in the communication network. Based on the nominations received by a respondent from his fellow specialists, we assigned numerical values, giving a score of "1" for each nomination received. For instance, if a person was mentioned by six others in response to the questions mentioned earlier, he was assigned a network centrality score of 6. The network centrality index ranged from 0 to 14.

Opinion leadership. Opinion leadership is defined as the degree to which an individual informally influences others' attitudes or overt behavior in a desired way with relative frequency. Opinion leadership was measured by a sociometric technique based on the following question:

> Whom do you most frequently seek for information and advice on technical matters about extension work? Would you name about three people you seek out most often?

The question was asked of all respondents. The responses to the question were examined for the mention of each respondent in the study.

Some respondents were mentioned more often than others. We counted the number of times each respondent was mentioned by other fellow specialists. Based on the nominations received by a respondent from his fellow specialists, we assigned numerical values, giving a score of "1" for each nomination received. The total number of nominations received by an individual was the opinion leadership score for him. The opinion leadership scores ranged from 0 to 4.

Information output diversity. Information output diversity is defined as the extent to which an individual makes use of different communication channels in transmitting information to his clients. The information output diversity index was constructed from the thirteen items described in Table 3. For each of the thirteen information output items, the median score was located. An above-median score on each item was assigned a value of "1", and a below-median or median score was assigned a value of "0". Then the scores across all 13 items were summed to obtain an index of information output diversity.* The value of the index could range from 0 to 13.**

Hypothesis Testing

The hypotheses were tested by submitting the respective indices for the variables to correlation analysis by computer. The computer

*The procedure used in constructing the information output diversity index is similar to the procedures described earlier for constructing the information input diversity index and the peer-communication diversity index.

**The correlations between the output diversity index and each of the thirteen items included in constructing the index are given in Appendix F (Tables 15 and 16).

Table 3. Items Included in Constructing Information Output Indices

Items	Description of the Item*
1. Farm and home visits	Number of farm, home, and other out-of-office visits per month.
2. Office calls	Number of office calls per month.
3. Telephone calls	Number of telephone calls received or made per month.
4. Consultations	Number of consultations providing information, guidance, and advice on problems of organizations and agencies.
5. Extension committee meetings	Number of meetings of extension committees in which the respondent participated.
6. Leader training meetings	Number of meetings conducted to train leaders.
7. Other extension meetings	Number of other meetings at which the respondent presented information.
8. News stories	Number of news stories released directly to newspapers or magazines.
9. Publications	Number of publications distributed to the public.
10. Direct-mail distributed	Number of direct-mail pieces distributed to the public.
11. Direct-mail prepared	Number of direct-mail pieces prepared.
12. Radio broadcasts	Number of broadcasts in which the respondent participated.
13. Television broadcasts	Number of television broadcasts in which the respondent participated.

*The detailed description of these items is given in Appendix E.

program used was the routine titled "Rank Correlation Coefficients."* This particular program calculates and prints the following measures of correlation:

Kendall Rank Correlation Coefficient (Tau)

Spearman Rank Correlation Coefficient (Rho)

Kendall Partial Coefficient

Kendall Coefficient of Concordance (W)

Pearson Product-Moment Correlation Coefficient (r)

The statistical tests which were most appropriate for the present study are the Spearman Rho and the Pearson r. The Spearman Rho is suited to the analysis of indices which have been prepared through a rank-ordering procedure. It could be argued that the use of Pearson r would be forcing the data, since the Pearson r assumes intervality of data.**

In the present analysis, primary use was made of Spearman Rho to test the hypotheses. At the same time, since the computer program produced both analyses, Pearson r was run on the data for comparative purposes.

It should be observed that both measures are correlative. Correlational analysis does not prove causality (cause and effect), which assumes a time-order relationship. Correlation does provide a measure of association between the variables being considered.

---

*For a discussion of the computer routine and instructions for programming the routine, see Morris, John, Rank Correlation Coefficients, Michigan State University Computer Institute for Social Science Research Technical Report no. 47.

**When r is used to determine relationship between two variables, and not to infer, there is no need to assume normality in the data. See Kerlinger (1966:261); McNemar (1962:136-137).

CHAPTER IV

RESEARCH FINDINGS AND DISCUSSION

The present chapter contains a summary and a discussion of the findings of the study. Included is a discussion of the survey response and the characteristics of the respondents, data collection procedures, data analysis and display using the communimatrix and sociogram, emergence and identification of the liaison role, and hypothesis testing.

Interviewee Response

Response by specialists who were interviewed in the present study was unusually good. The research team experienced no difficulty in scheduling interviews. In only a few cases did a respondent postpone the appointment or allow interruptions to disturb the interview.

As previously mentioned, the research reported here is part of a larger study. On all phases and questions of the present part of the research there was a 100% response from the specialists. In the present study, which is based on reciprocated sociometric choice, completeness of response is especially important so that all possible reciprocations may be measured.

Response rate may be more critical with the sociometric technique than it is with some other data-gathering techniques in which over-sampling or reserve sampling may be included in the research design in case of nonresponses or missing data.

In the present study, there is no problem of missing data or nonresponse. The total sample N was 50, and all analyses reported in the following pages are based on N = 50.

Characteristics of the Respondents

A summary of selected characteristics of the respondents in the study is present in Table 4. This information is based on the data collected from personal interviews with the respondents and from organizational records.

Table 4. Characteristics of the Respondents (N = 50)

Variable	Description of the Variable*	
1. Age (No. of years)	Range	27-65 years
	Mean	45
	Standard Deviation	10
2. Education	No. of individuals holding:	
	a) Master's Degree	12 (or 24%)
	b) Ph. D. Degree	38 (or 76%)
3. Academic Rank	Instructor	2 (or 4%)
	Assistant Professor	9 (or 18%)
	Associate Professor	17 (or 34%)
	Professor	22 (or 44%)
4. Professional experience as an Extension Specialist at Michigan State University (No. of years)	Range	1.5-33 years
	Mean	11
	Standard Deviation	8
5. Role commitment to Extension work (% of time spent in performing linking role)	Range	20-100%
	Mean	65
	Standard Deviation	28

*The values of percentages, means, and standard deviations are rounded to the nearest whole number.

The age of the respondents ranged from 27-65 years with a mean of forty-five years. All fifty respondents in the study had postgraduate education. Seventy-six percent of the sample held Ph. D. degrees. Academic rank of the respondents ranged from instructor to professor. Of the fifty respondents in the study, two were instructors. The remaining forty-eight respondents held various professorial ranks.

The length of respondents' professional experience as extension specialists at Michigan State University ranged from 1.5 to 33 years, with a mean of approximately 11 years.

There were both part-time and full-time specialists in the present study. Respondents were asked to indicate the actual amount of time they spent in doing extension work. Responses which were computed showed that the time spent in extension work ranged from 20 to 100 percent.

Data Collection Using the Sociometric Technique

Data collection in the research reported here presented no unusual problems. The researchers who collected the data, including the present author, were trained in the use of the interview schedule and ancillary forms. In addition, we kept in touch with each other from the inception of the project through the final collection of interview responses.

None of the researchers reported any respondent difficulty in understanding the sociometric questions used. Nor was there any reported hesitation on the part of the respondents in replying to the sociometric questions.

When respondents were asked for information about people with whom they interact frequently, recall was quick and apparently was no

problem. When asked a question which concerned a larger group, the respondents found the staff list, containing the names of all potential nominees, to be useful. (The alphabetical listing of all state staff specialists was provided at the time respondents were asked for nominations of fellow workers as "outstanding specialists." See schedule item no. 29, Appendix C).

Data Analysis and Display

In the sociometric search for the liaison role, data were analyzed along three dimensions of communication contact: (1) technical matters pertaining to extension work; (2) peer-evaluated effectiveness; and (3) opinion leadership.

Data analysis shows a high degree of both intra-group and inter-group communication about technical matters. The very nature of the extension specialists' jobs pertains to the dissemination of technical information. It is not surprising that the specialists would talk about technical matters with their fellow specialists in other departments, as well as with their work peers in immediate proximity.

The second question, on peer-evaluated effectiveness, also served to discriminate well among the respondents. There was much less reciprocated-choice communication on the topic of peer effectiveness than on the topic of technical matters.

The third question, on opinion leadership, discriminated well between the respondents. The total reciprocated-choice within and between work groups was less on opinion leadership than it was on either of the other two topics.

The three sociometric questions were analyzed independently, using the communimatrix as the preliminary method of data display.

The use of the communimatrix as an analysis tool was discussed in Chapter III.

All subsequent analyses, including the development of the Liaisonness Index and hypothesis testing, are based on reciprocated choice on the dimension of technical matters.

Additional data analysis and display on the topics of peer-evaluated effectiveness and opinion leadership are provided in Appendix D. Appendix D includes a discussion and comparison of the communimatrices and sociograms resulting from data analysis on these two dimensions of communication contact.

Communimatrix Analysis: Reciprocation on Technical Matters

A pilot communimatrix was built according to the respondents' replies on the dimension of technical matters. Respondents were asked to name about five people in their department with whom they communicated most frequently about technical matters related to extension work. They were also asked to name five to ten people in other departments with whom they communicated most frequently about technical matters related to extension work.

Following the instructions given by Weiss (1956) which were previously outlined in Chapter III, the author constructed the pilot communimatrix without any reference to organizational charts or departmental listing of personnel. This was done as an informal test of the method, to see how nearly the results would approximate the actual organization of work groups according to departmental affiliation.

The respondents had previously been numbered serially, beginning in one department and continuing to the end of the last department. (They were not randomly assigned numbers.) Thus, the serial

arrangement would provide an initial ordering of respondents, so that they should fall into an approximation of work groups along the diagonal of the matrix. However, this ordering alone was not sufficient to positively identify each respondent with a certain matrix segment or work group.

After initial listing of respondents down the left column of the matrix and across the top of the matrix, reciprocated choices were entered into the appropriate squares within the body of the matrix. Visual inspection was then made, and work groups were identified on the basis of cluster appearance alone. The resulting inspection led the researcher to identify six work groups.

The results of the pilot communimatrix are shown in Figure 10. It may be seen in the pilot communimatrix (Figure 10) that respondents number 15, 27, and 28 are not clearly identified with work groups, and could conceivably be asssigned to one or another work group according to the researcher's interpretation.

After completing the pilot communimatrix without reference to organizational tables or assignments, the researcher prepared the first analytical communimatrix, which is shown as Figure 11. Again, (and in every case of communimatrix construction) instructions provided by Weiss (1956) were followed.

The analytical communimatrix was segmented into primary work groups by reference to the departmental assignments of respondents. Since the respondents were serially numbered, beginning with Department A and continuing through Department G, it was a simple matter to identify expected work groups, or segments, by department. Reference to the sampling frame gave the researcher the respondent numbers for

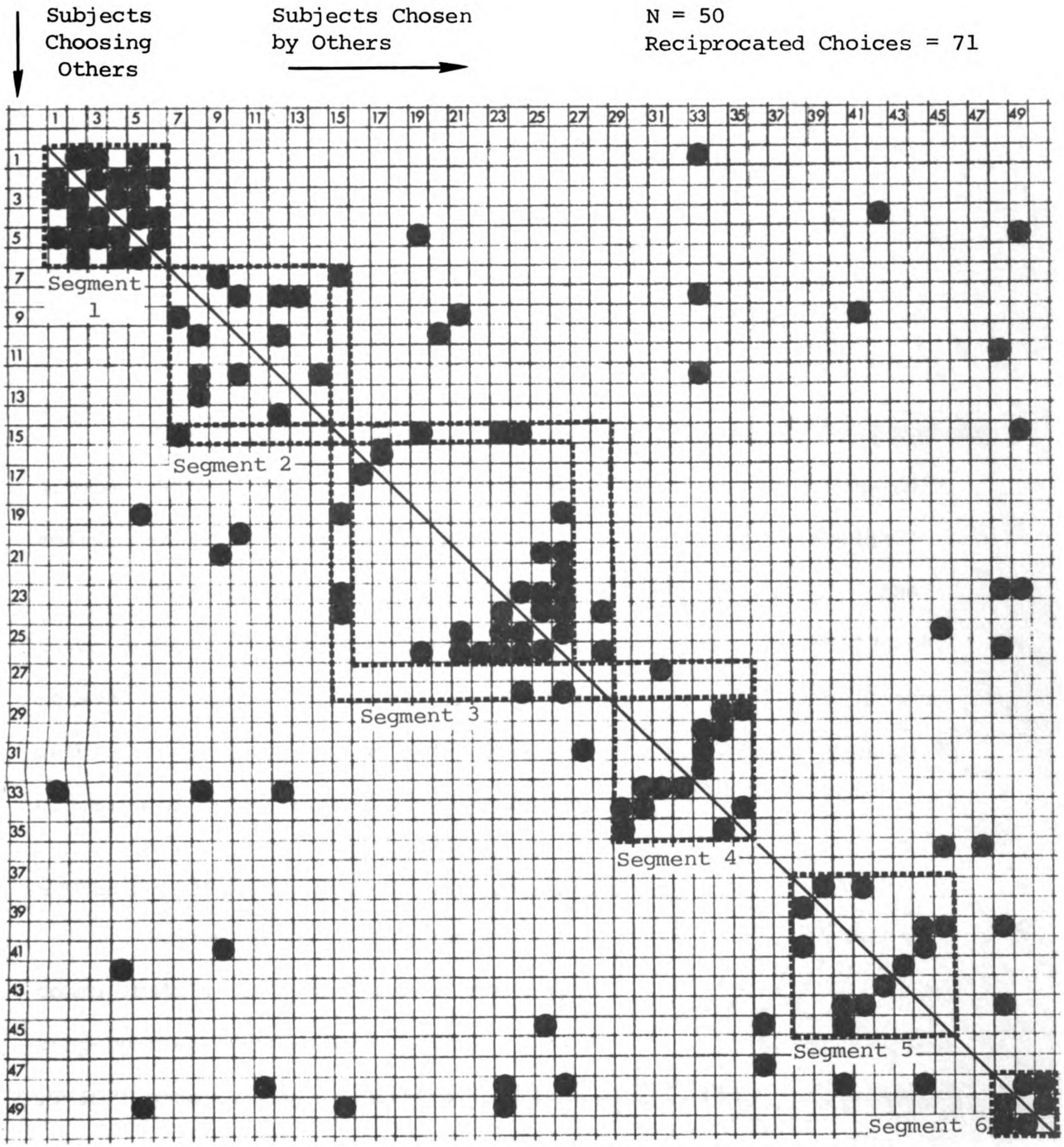


Figure 10. Pilot communimatrix: Reciprocated choices on technical matters without reference to departmental assignment.

each work group as follows:

Department	Segment	Respondent Numbers
A	1	1-6
B	2	7-15
C	3	16-20
D	4	21-26
E	5	27-35
F	6	36-46
G	7	47-50

From Figure 11 it may be seen that there are actually seven work groups (segments) of the overall matrix, rather than the six which emerged strictly by visual inspection in the pilot communimatrix.

Comparison of the pilot communimatrix (Figure 10) with the first analytical communimatrix (Figure 11) shows marked concordance between the two. Thus it may be seen that Weiss' (1956) method of matrix analysis appears to work satisfactorily with only a sequential ordering of respondents initially provided.

Communimatrix Decomposition: Technical Matters

Following the identification of work groups, the analytical communimatrix was decomposed in the search for the liaison role. The step-by-step instructions on matrix analysis provided by Weiss (1956: 99-108) were followed. Original segments were analyzed for communication contact both within and outside of the segment. In this manner, reciprocated contacts outside the segments were identified, thus providing tentative identification of liaison roles. Deletions of the liaison roles. Deletions of the liaisons from the segments resulted in reduced segments, which were re-constructed to show internal

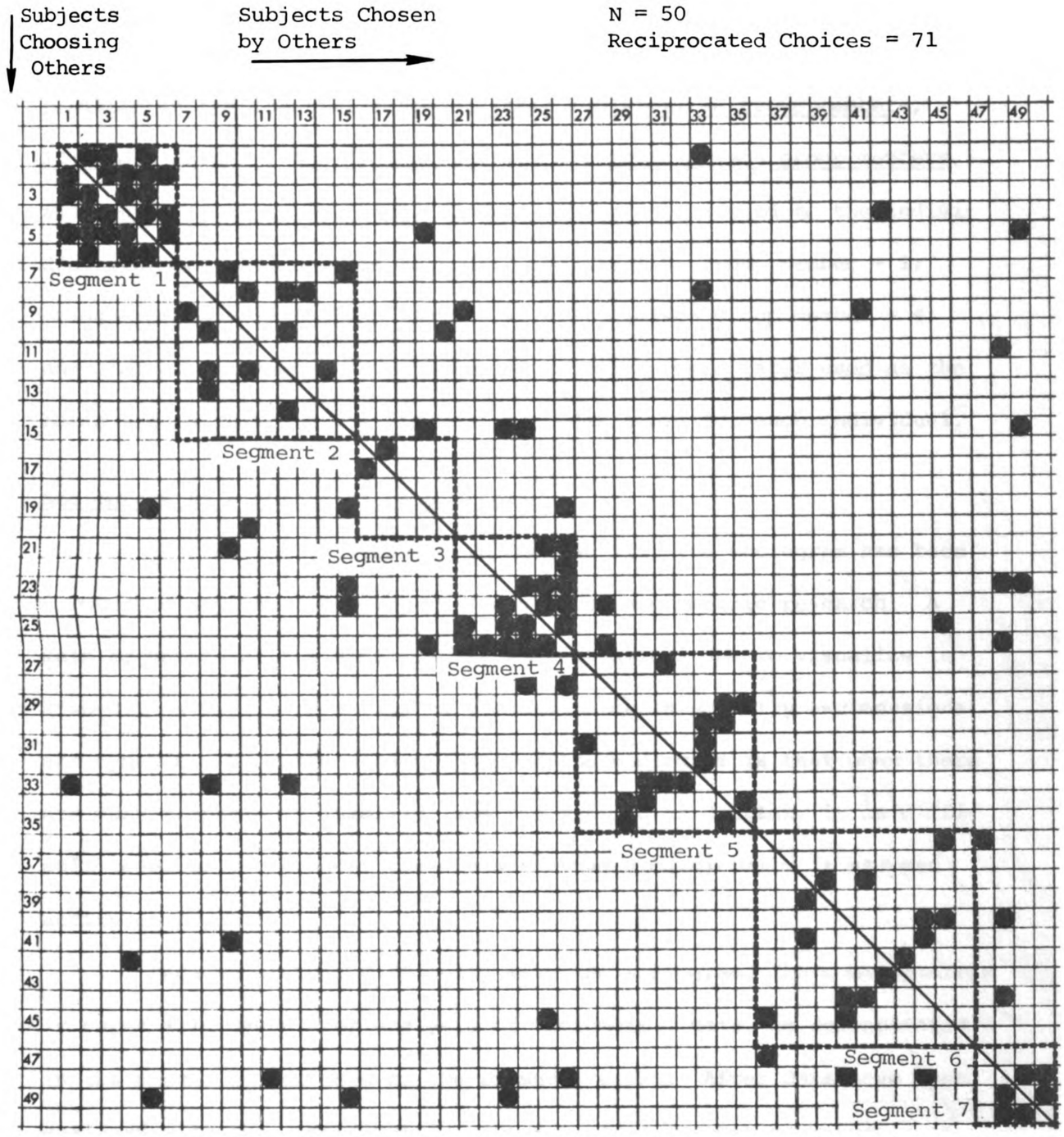


Figure 11. First analytic communimatrix. Reciprocated choices on technical matters with primary work groups (segments) identified by departmental assignment of respondents.

reciprocated contact.

To test the tentative identification of liaisons, the criteria for specification of liaison types were then applied. These procedures resulted in the identification of three isolates, 28 group members, 10 bridge persons, one liaison individual, four liaison group members, and four liaison set members. Scores were then assigned to the individuals in each category, as follows: isolate = 0; group member = 1; bridge person = 2; liaison individual = 3; liaison group member = 4; and liaison set member = 5. These score values were later used as the basis for calculating the liaisonness index score for each individual.

Sociograms as a Method of Data Display

As previously discussed in Chapter III, the sociogram has been a standard way of displaying the results of sociometric research. A main advantage of the sociogram is that it allows one to visualize in "two-dimensional stop action" a process which is actually n-dimensional and dynamic. The main disadvantage of the sociogram is that when there are many respondents involved, and the dynamic is complex, it is difficult to clearly represent the situation two-dimensionally in stopped action on paper.

Because of this difficulty with the sociogram, the communimatrix is especially useful for analysis of sociometric data, as demonstrated in the preceding sections of the present report. After data have been analyzed with the communimatrix, the sociogram becomes very useful as a display method.

Sociogram: Liaisons and Technical Matters

The sociogram displayed in Figure 12 is a representation of the intra-organizational communication on the dimension of technical matters. The dotted lines enclose groups of respondents, which are analogous to the work groups or segments previously displayed along the diagonal of the communimatrix. The small numbered circles enclosed within the work groups represent the respondents who belong to that work group. Solid lines connecting respondents indicate two-way communication, or reciprocated choices between the two respondents. Liaison persons are indicated by small squares, while members of the liaison set are indicated by the small triangles.

Inspection of the sociogram in Figure 12 shows that most of the reciprocated communication occurs within the boundaries of the work groups. There is also a great deal of inter-group communication. Some of the inter-group communication occurs between bridge persons, as indicated by lines connecting the small circles.

It is readily apparent, however, that most of the inter-group communication involves members indicated by squares and triangles, i.e., members of the liaison group and liaison set. This sociogrammatic representation of the communication structure visually illustrates the key role held by the liaisons.

The liaisons are graphically seen as individuals who have many reciprocated contacts which cut across the group structure. It may also be seen that the liaisons are not readily identified in any simple way with a single sub-group. They may be members of a work group by departmental affiliation, but the communication contacts exhibited by liaisons in no way limit them to their work groups or segments.

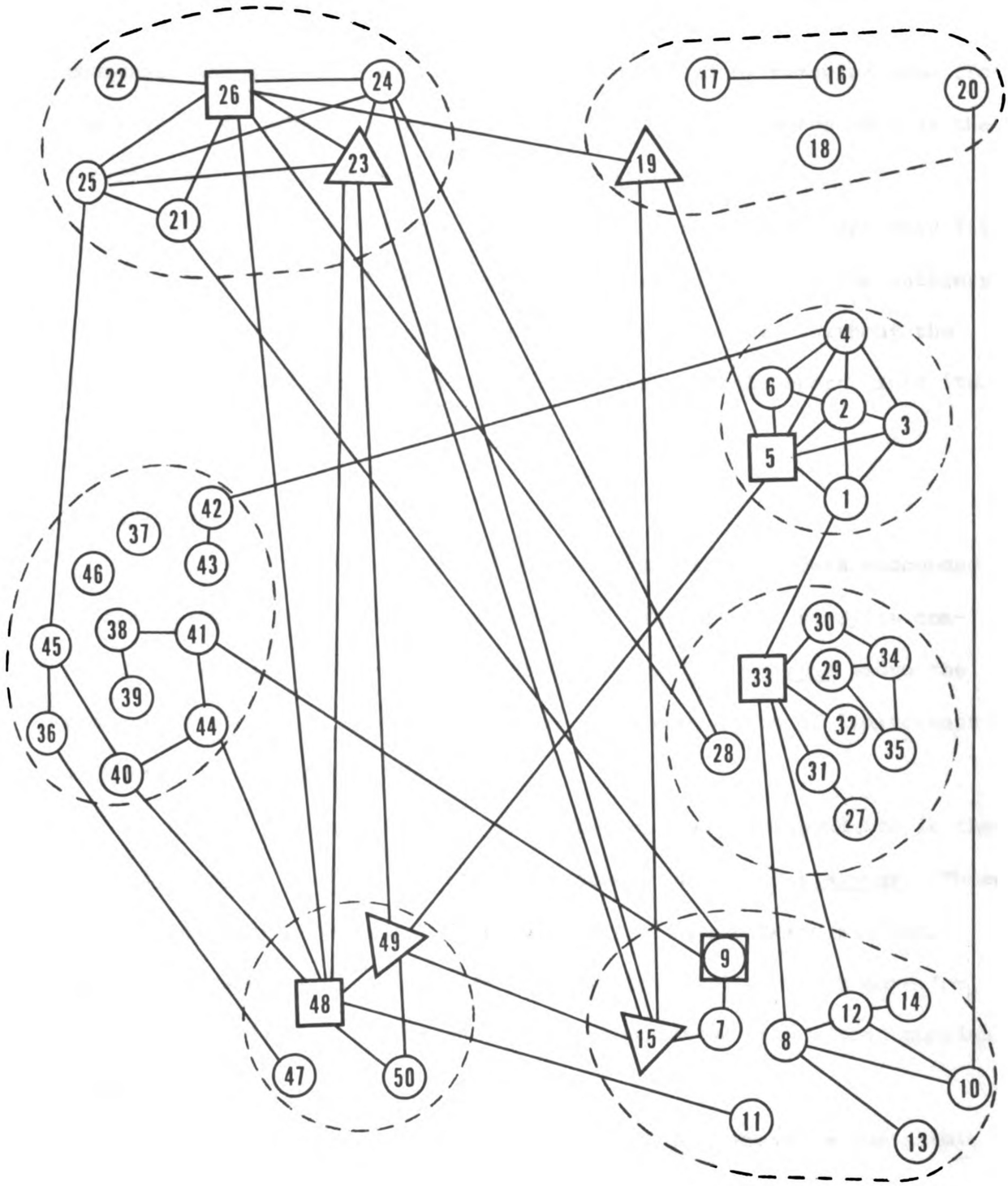


Figure 12. Sociogram representing intra-organizational communication on the topic of technical matters.

Legend: Isolates, Group Members and Bridge Persons = ○
Liaison Individual = ◎
Liaison Group Members = □
Liaison Set Members = △

The key role of the liaisons in providing intra-organizational communication structure may be further illustrated by removing them from the structure. The sociogram presented in Figure 13 is the same as the previous sociogram, but with the liaisons removed.

Now it may be seen that without the liaisons there are only five inter-group contacts. These five contacts are provided by the category of individuals previously described as bridge contacts. Without the presence of the liaisons, the sociogram tends to "fall apart" into its separate sub-groups.

Emergence of the Liaison Role

Analysis of the reciprocated-choice sociometric data succeeded in the identification of the liaison role. The present study is composed of two main parts: (1) a search for the liaison role among the members of a complex organization, and (2) a comparison of liaisonness with other variables.

Results of data analysis show that of the 50 respondents in the present study, 9 meet the criteria for specification as liaisons. These nine respondents constitute 18 percent of the sample being studied. These results are consistent with the previous studies which have focussed on the liaison person as a key communication link within complex organizations.

In the Jacobson and Seashore (1951) study, which is the intellective primogenitor of research on the liaison role, 18 percent of the respondents were found to perform the liaison function. MacDonald (1970) found 14.1 percent of his respondents performing the liaison role, while Schwartz (1968) reported 15.5 percent of his respondents functioning as liaison persons. The least percentage of respondents acting in the

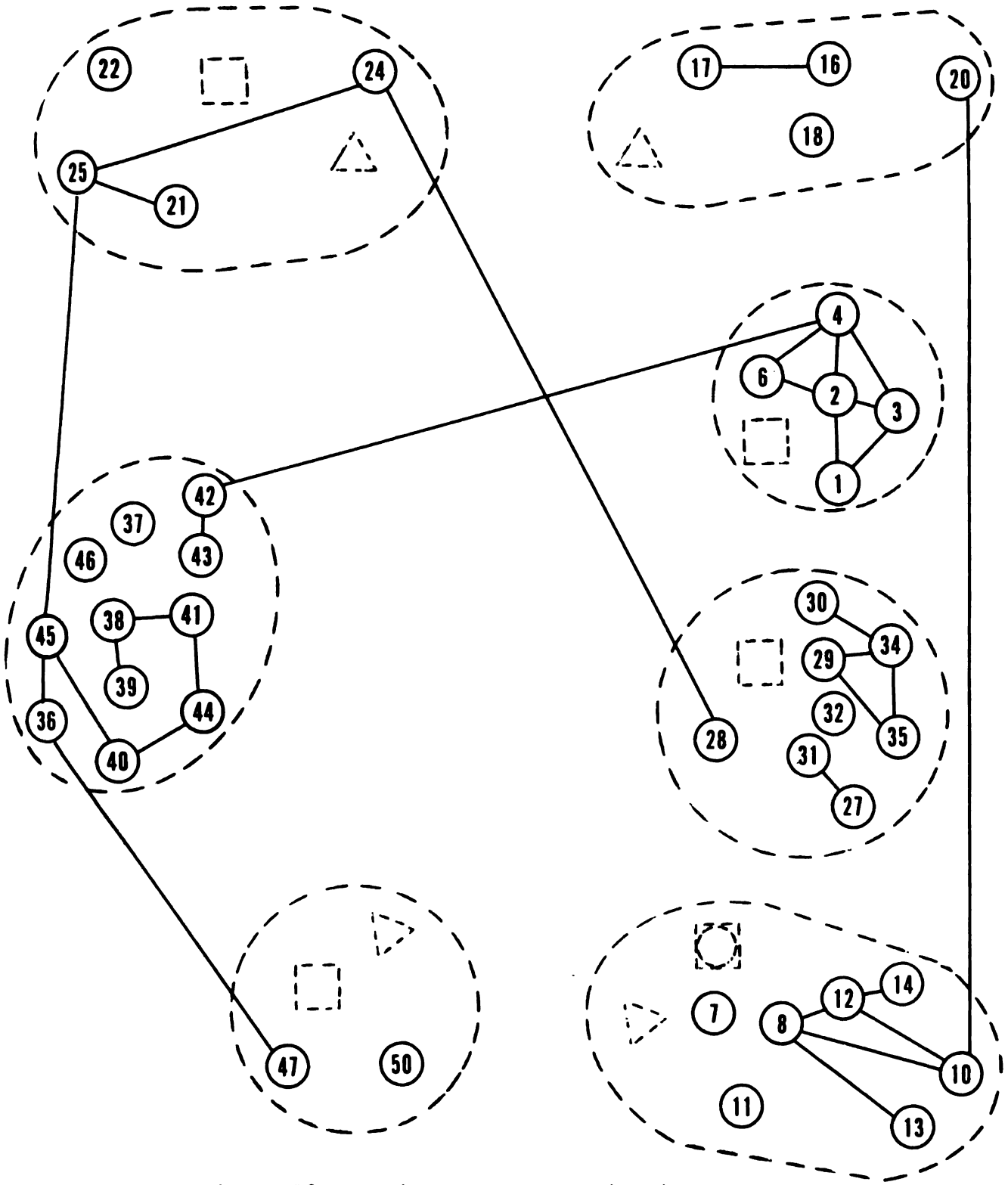


Figure 13. Sociogram representing intra-organizational communication on the topic of technical matters, with liaisons removed.

Legend: Isolates, Group Members and Bridge Persons = ○
Liaison Individual = ◻
Liaison Group Members = □
Liaison Set Members = △

liaison function is reported by Davis (1953a:45), who found that less than 10 percent of his respondents performed as liaisons.*

The Liaison Set

In addition to identifying the liaison role, the present study disclosed that a portion of the liaisons also interacted to a high degree with other liaisons. Such persons are described as members of the liaison set. Jacobson and Weiss (1955) report that one-third of their liaisons were also members of the liaison set. In the present study, four of the nine liaisons interact with other liaisons sufficiently to meet the criteria for liaison set members. Schwartz (1968) reported that five of his 22 liaisons also functioned as members of the liaison set.

Based on the present study and previous research it appears therefore that about one-fourth to one-half of the respondents who are liaisons are also members of the liaison set.

Communication Isolates

In addition to identifying individuals who have a large number of intra-organizational contacts, the present study identified a few individuals who have no intra-organizational communication contact on certain dimensions. These individuals are called communication isolates. Typically, they are relatively few in number.

---

*The Davis study is one of the early reports to use the term "liaison" to describe the key communication linking role in complex organizations. Davis, however, does not further explicate the term nor use the criteria set forth by Jacobson, Seashore, Weiss, Schwartz, MacDonald and the present author. It is a moot point, therefore, whether or not Davis' 10 percent constitute the lower end of the percentage range of persons serving as liaisons in complex organizations.

In the present study, three respondents were classified as Isolates. These three constituted 6 percent of the total sample of 50 respondents. The percentage of isolates in the present study was considerably smaller than the 12.68 percent identified by Schwartz (1968). Jacobson and Weiss (1955) identified only one isolate, and MacDonald (1970) found no isolates at all.*

Liaisonness as a Continuous Variable

The identification of liaisons and liaison set members who display a large number of communication contacts, along with the identification of isolates who have no contacts, suggests the existence of a continuum.

The data show that liaisonness may be treated as a continuum of communication contact with the liaison set member and the isolate at opposite ends of the continuum. Instead of treating the liaison role as a dichotomy, and classifying persons as "liaison" or "non-liaison" types, the researcher classified respondents into six types according to both the number and location of intra-and inter-group contacts.

---

*It must be remembered that designation as an "isolate," or "liaison," or any other type as discussed in the present study, is contingent upon the respondent's interaction with other respondents along one given dimension of communication contact. The communication types as previously explicated are role designations, not descriptions of individual persons. Individual persons probably perform different types of roles with respect to different dimensions of communication contact. Thus, in the MacDonald (1970) study, where respondents were measured across a variety of communication dimensions, it is likely that every respondent will interact with at least one other respondent, on at least one given dimension. It should be reiterated that in the present study, the classification and discussion of role types is based on the dimension of communication on technical matters.

Different values were assigned to contacts with the various types of liaisonness roles, ranging from zero for the isolate with no contact, to five for the liaison set member.

The assignment of numerical values to the six types resulted in a system whereby respondents could be given scores according to their diversity of organizational contact. The scores, when totalled for each individual, resulted in the creation of a liaisonness index ranging in value from zero to 22.

The Liaisonness Index

As previously discussed in this chapter, the decomposition of the communimatrix on technical matters resulted in the positive identification of six types of communication roles. The identification of the individual roles was made by inspection of the communimatrix. The criteria for specification of types were based on both the number and location of interpersonal contacts in the work groups. Scores were then assigned to the individuals in each category.

Contact scores for each respondent were then determined. For example, if a respondent chose to speak with a "bridge," a "liaison group member," and a "liaison set member," that respondent would earn a total liaisonness index score of 11. If a respondent chose to speak to four "group members" and two "bridge persons," his total liaisonness index score would be 8. Using this method of scoring, all from the chooser's point of view, each respondent was assigned a numerical value representing his total score on the liaisonness index.

Table 5 gives a listing of respondents by code number, each respondent's classification into one of the six categories, and the index value he has earned by his communication activity on technical matters.

Table 5. Respondent Categories and Liaisonness Index Scores

Respondent Number	Category	Liaisonness Index Score
1	Group Member	10
2	Group Member	9
3	Group Member	8
4	Bridge Person	9
5	Liaison Group Member	16
6	Group Member	7
7	Group Member	8
8	Group Member	8
9	Liaison Individual	3
10	Bridge Person	4
11	Group Member	4
12	Group Member	8
13	Group Member	1
14	Group Member	1
15	Liaison Set Member	18
16	Group Member	1
17	Group Member	1
18	Isolate	0
19	Liaison Set Member	13
20	Bridge Person	2
21	Group Member	9
22	Group Member	4
23	Liaison Set Member	22
24	Bridge Person	18

Table 5 (cont'd.)

Respondent Number	Category	Liaisonness Index Score
25	Bridge Person	14
26	Liaison Group Member	22
27	Group Member	1
28	Bridge Person	6
29	Group Member	2
30	Group Member	5
31	Group Member	5
32	Group Member	4
33	Liaison Group Member	6
34	Group Member	3
35	Group Member	2
36	Bridge Person	4
37	Isolate	0
38	Group Member	2
39	Group Member	1
40	Group Member	7
41	Group Member	5
42	Bridge Person	3
43	Group Member	2
44	Group Member	6
45	Bridge Person	5
46	Isolate	0
47	Bridge Person	2
48	Liaison Group Member	18
49	Liaison Set Member	19
50	Group Member	9

The liaisonness index as applied was successful in discriminating among the various types of respondents according to their communication contact. It was found that individuals could readily be assigned to categories, or role types.

The results of the application of the liaisonness index as it was developed in the present study appear to lend support to the notion that liaisonness is a continuous variable. The liaisonness index appears to function as a useful tool in describing the communication activities of respondents within and between organizational departments.

It was also found that the liaisonness index lent itself to mathematical comparison with other indices. It was thus possible to test the hypotheses in the study.

Hypothesis Testing

In each of the six hypotheses posited in the study, liaisonness appears as the dependent variable. The six independent variables are: peer-evaluated effectiveness, information input diversity, peer-communication diversity, network centrality, opinion leadership, and information output diversity.

The author hypothesized a positive relationship between each independent variable and the dependent variable.* The hypotheses were tested by submitting the respective index for each independent variable to computerized correlational analysis with the index of the dependent variable. The test statistic used was Spearman rho. The

*The research reported here explores relationships between communication pattern variables and a communication role. The design and data-analysis methods employed in the study will not establish a time-order, or causal relationship between variables.

pre-determined alpha level for statistical significance was .05.

The results of analysis showed all six relationships to be positive in direction, as hypothesized. Five of the six relationships were statistically significant at less than the .05 level. The findings for each hypothesis are discussed individually.

H_1: Peer-Evaluated Effectiveness is positively related to Liaisonness.

The independent variable was measured by the number of nominations an individual received from his fellow specialists included in the study. The range of scores was from 0 - 23. The dependent variable was measured by both the number and location of communication contacts the individual made within and between work groups in the organization. Contact scores were cumulative, yielding a total score for each individual. Scores earned by respondents formed the liaisonness index, which ranged from 0 - 22.

Spearman rho correlation between the two variables equals .49, which is statistically significant at less than the .01 level. Thus, the hypothesis is supported.

H_2: Information Input Diversity is positively related to Liaisonness.

The independent variable was measured by an eight-item scale, summed to yield an index with a potential range from 0 - 8. The dependent variable was measured by use of the liaisonness index (described in H_1 above) with a potential range from 0 - 22.

Spearman rho correlation between the two variables equals .02, which is statistically significant at the .36 level. Thus, the hypothesis is not supported.

H_3: Peer-Communication Diversity is positively related to Liaisonness.

The independent variable was measured by an eight-item scale, summed across the eight items to yield an index with a potential range from 0 - 8. The dependent variable was measured by use of the liaisonness index (described in H_1 above) with a potential range from 0 - 22.

Spearman rho correlation between the two variables equals .37, which is statistically significant at less than the .01 level. Thus, the hypothesis is supported.

H_4: Network Centrality is positively related to Liaisonness.

The independent variable was measured by the number of nominations an individual received from his fellow specialists as being one to whom the nominator talked. The range of nomination scores was from 0 - 14. The dependent variable was measured by use of the liaisonness index (described in H_1 above) with a potential range of 0 - 22.

Spearman rho correlation between the two variables equals .75, which is statistically significant at less than the .01 level. Thus, the hypothesis is supported.

The very high correlation, coupled with the extremely high level of statistical significance, identifies such a strong association between the variables as to suggest a tautology. A re-examination of the methods of measuring the variables shows two major differences between the two methods: (1) the independent variable is measured by the <u>one-way</u> nominations received by an individual from fellow specialists, while the measurement of the dependent variable is based on reciprocated choice, or <u>two-way</u> nominations; (2) interpersonal contact in the dependent variable is weighted, so that reciprocated contact with

different types of individuals has differing values in terms of the liaisonness scale.

The methods appear to be different enough that the high correlation is not an artifact of measurement. The possibility remains that where an individual's total contacts may be few, the weight of the contacts he does make compensates for the fewer number, and vice versa.

H_5: Opinion Leadership is positively related to Liaisonness.

The independent variable was measured by the total number of nominations an individual received from his fellow specialists as being one to whom the nominator came for information and advice. The range of scores was from 0 - 4. The dependent variable was measured by use of the liaisonness index (described in H_1 above) with a potential range of 0 - 22.

Spearman rho correlation between the two variables equals .36, which is statistically significant at less than the .01 level. Thus, the hypothesis is supported.

H_6: Information Output Diversity is positively related to Liaisonness.

The independent variable was measured by a 13-item scale, which was summed across the 13 items to produce an index with a potential range of 0 - 13. The dependent variable was measured by use of the liaisonness index (described in H_1 above) with a potential range of 0 - 22.

Spearman rho correlation between the two variables equals .30, which is statistically significant at less than the .02 level. Thus, the hypothesis is supported.

Hypothesis Testing: Summary

In summary, the testing of the six hypotheses in the present study shows a high degree of positive correlation between liaisonness and five communication pattern variables. The five variables which significantly correlate with liaisonness, listed in a rank-order from highest correlation to lowest correlation, are: (1) network centrality; (2) peer-evaluated effectiveness; (3) peer-communication diversity; (4) opinion leadership; and (5) information output diversity.

Of the six independent variables tested, information input diversity also correlated positively with liaisonness, but not sufficiently high to reach the statistically significant level of .05.

The mathematical results of correlational analyses are summarized in Table 6. As mentioned in the discussion of hypothesis testing methodology in Chapter III, the computer program performed several analyses as a matter of routine. A computer printout of analysis was provided for each of the tests. Table 6 lists the independent variables in order of their proposal and testing against the dependent variable, the mathematical correlation for each pair of variables using the Pearson r formula, and the mathematical correlation for each pair of variables using the Spearman rho formula.

In determining the degree of correlation and the statistical level, the author used the Spearman rho value in each case. It was assumed in the research design that the Spearman rho test was the appropriate statistic to use in analysis. The Pearson r values are provided for comparative purposes. It may be seen in Table 6 that in four of the six cases, the Spearman rho value is lower than the Pearson r value, and thus is the more conservative estimate.

Table 6. Results of Statistical Tests of Hypotheses*

Hypothesis Number	Liaisonness vs. Independent Variable	Pearson r Value	α	Spearman rho Value	α	Significance Level (p)
1	Peer-Evaluated Effectiveness	.58	.00	.49	.00	$p<.001$
2	Information Input Diversity	.02	.46	.02	.36	N.S.
3	Peer-Communication Diversity	.40	.00	.37	.00	$p<.01$
4	Network Centrality	.75	.00	.75	.00	$p<.001$
5	Opinion Leadership	.31	.01	.36	.00	$p<.01$
6	Information Output Diversity	.28	.02	.30	.02	$p<.05$

*Table values rounded to two places.

Other Findings

Additional data analyses were undertaken in a search for relationships other than those formally hypothesized and tested in the present study. The purpose of the additional analyses was to seek relationships between liaisonness and other characteristics of the respondents.

The rationale behind the additional analyses was that if further positive relationships appeared between liaisonness and variables not

already formally tested, such information would help in the comprehension of the liaison characteristic.

Correlational analyses were performed between the liaisonness index developed in the present study and six other variables for which data were available. The six additional variables included age, education, professional experience, role commitment, contact frequency, and organizational status.

The correlations* between liaisonness and each of the six named variables, along with the level of statistical significance for each correlation, are summarized in Table 7. In each case, the significance probabilities are based on F values for simple correlations.

Liaisonness and age. Age was operationalized as the actual years of age of the respondent. Liaisonness and age are positively correlated at .2397, at a statistical significance level of .094. This small correlation gives some indication that the older specialists are somewhat more likely to be liaison persons than are younger specialists.

While the relationship is not statistically significant at the .05 level, the finding is congruent with the finding of Schwartz (1968). Schwartz' liaisons were slightly older on the average than were his non-liaisons.

It appears that age may be an important factor in the liaison roles which provide organizational communication linkage. While age

*As with the formal tests of hypotheses, correlational analysis does not establish cause and effect. Therefore, the findings reported in this section should be interpreted with caution. Relatively low correlations, coupled with relatively low statistical significance probability, should be regarded as tenuous findings.

Table 7. Results of Other Variables not Formally Tested in Hypotheses.*

Liaisonness vs. Other Variables	Correlation Value	Statistical Significance
1. Age	.24	.09
2. Education	-.13	.35
3. Professional Experience	.29	.04
4. Role Commitment	.29	.05
5. Contact Frequency	.44	.01
6. Organizational Status	.26	.07

*Table values rounded to two places.

is not highly correlated with liaisonness, age does correlate highly with professional experience and with organizational status,* both of which are positively correlated with liaisonness. These relationships will be discussed shortly.

Liaisonness and education. Education was operationalized in terms of the highest academic degree earned by the respondent. Liaisonness and education are negatively correlated at -.13, at a statistical significance level of .35. The very low significance level indicates that very little if any confidence should be placed in this result. The relationship, however, causes one to speculate. It may be in the present case that the older specialists, with more professional experience and organizational status, who have been in the organization for

*Data analysis also shows a very high positive correlation between age and professional experience (.73; $p<.01$) and between age and organizational status (.78; $p<.01$).

some time without having earned higher degrees, are in a better position to fill the liaison role. This could be one interpretation of the negative correlation between education and liaisonness.*

Liaisonness and professional experience. Professional experience was operationalized as the actual years of employment as an extension specialist at Michigan State University. Liaisonness and professional experience are positively correlated at .29, at a statistical significance level of .04. This correlation was the second highest obtained in comparing liaisonness with the six previously named variables. In addition, the correlation is significant at less than the .05 level. The indication, therefore, is that the specialist who has been on the job for some time is also more likely to be a person who fills a liaison role. This finding is congruent with Schwartz' (1968) finding that liaisons held slightly longer tenure at the university than did non-liaisons.

Liaisonness and role commitment. Role commitment was operationalized as the percentage of time the respondent actually spent on extension work. Liaisonness and role commitment are positively correlated at .29, at a statistical significance level of .05. This finding is not unexpected. The sociometric choice question used in determining liaisonness deals with the exchange of technical information regarding extension work. It is logical to assume that the specialists who spend a greater percentage of their time on extension work would also be the specialists who are more likely to talk with other specialists about technical extension matters.

---

*Data analysis also shows a negative correlation (-.22) between education and age.

Liaisonness and contact frequency. Contact frequency was operationalized as the summed frequency score of communicatees both within and outside of the respondent's department. Liaisonness and contact frequency are positively correlated at .44, at a statistical significance level of less than .01. This is the highest correlation obtained between liaisonness and the six additional variables compared in this section of the research. The relatively high correlation, coupled with the significance level of .01, lends strong support to the Jacobson and Seashore (1951) observation that liaisons have frequent contacts.

Liaisonness and organizational status. Organizational status is the relative position of an individual in the hierarchical structure of an organization. The variable was measured in terms of both the academic rank held by a specialist and the number of years a specialist had been in his present academic rank.

Values were assigned to the academic ranks as follows: Instructor = 10: Assistant Professor = 20; Associate Professor = 30; Professor = 40. In addition, for each year of service in the present academic rank, a score of "1" was added to the score previously assigned to each respondent according to rank. The result provided a numerical index of organizational status.

Liaisonness and organizational status are positively correlated at .26, at a statistical significance level of .07. This correlation is weak, and does not reach the statistical significance level of .05. It does suggest that the higher ranking specialist who is a long-time staff member is also more likely to be a liaison person.

MacDonald (1970) found that the average civil service grade of liaison persons was almost one full grade-level higher than that for

non-liaisons. Mitchell (1970) found that administrators and coordinators had more communication contacts than did faculty. Mitchell (1970) also noted, however, that the most important liaison roles in his study were played by persons holding positions in the structure of the program which invited volumes of communication.

Jacobson and Seashore (1951) first considered the possibility that their liaisons were all persons of executive status, having formal liaison functions with many groups. They later found, however, that such was not the case. The liaisons were found by Jacobson and Seashore (1951) at all status levels in the structure.

Thus it would appear that organizational rank is associated with liaisonness, but probably is not a reliable predictor of liaisonness. The correlation raises the speculation that perhaps rank is a necessary but not a sufficient condition for liaisonness.

CHAPTER V

SUMMARY AND CONCLUSIONS

The basic objectives of the present research were: (1) to conduct a search for the liaison role, which is a communication structural concept, among the specialist staff members of a complex organization; (2) to empirically compare the communication structure concept (the liaison role) with communication pattern variables, treating the liaison role as a continuous variable.

The first part of the study was conceptual in nature, using empirical data to further explicate the liaison role as a key linking position in a complex organization. Previous studies have demonstrated the existence of the liaison role in a variety of complex organizations.

Organizations previously studied include a federal agency with responsibility for funding research projects, a college of education in a large university, and a very large federal civil service agency charged with planning and conducting measures in case of national emergency. The present study was designed to seek the liaison role among the specialist staff of a research dissemination organization which is an integral educational unit of a large university.

The second part of the study was predicated upon the existence and successful identification of the liaison role. Assuming the liaison role would exist in the complex organization under study, the research was designed to compare liaisonness with communication patterns

of respondents. The aim was to better understand the communication behaviors of the specialist staff members of the research dissemination organization.

The present chapter contains a summary of the conceptual and empirical findings, contributions and limitations of the study, practical implications, and suggestions for future research.

Summary

Much of the literature on communication research in organizations concentrates on aspects of the formal structure. Communication between superior/subordinate and among peer members of primary work groups has been extensively researched. Laboratory, or experimental, research on small group communication has concentrated on the social dynamics of small groups, correlating physical positions and communication behaviors with other aspects of group functioning.

The intent of the present study was to "map" the extant communication structure of a complex organization along dimensions of communication contact. The "map," in the form of a sociogram, was derived from reciprocated sociometric choice data, analyzed by the use of a communimatrix.

The theoretical assumption undergirding the first portion of the study is that understanding of organizational communication processes may best be gained by examining the actual communication patterns and events in the organization rather than simply analyzing portions of the formalized structure.

The primary structural type sought and identified was the liaison communication role. Individuals who function in liaison roles have inter-linking communication contacts with two or more separate

sociometric work groups within the organization. The liaison individuals are key members of the communication system, providing intra-organizational linkage from both the static and dynamic points of view. Essentially, when liaison roles are removed from the sociogram of communication contacts, the work groups to which they are connected tend to "fall out" of the sociogram and become separate entities.

A theoretical model explicating the concept of organization for the purpose of disseminating research results was presented. The research design used in the present study was a field survey, conducted in an organizational setting.

The organization studied was a branch of a university. The population consisted of technical subject matter specialists working as state staff members of a research dissemination organization. The sample consisted of 50 Extension specialists selected from the specialist staff working in seven different academic departments of Michigan State University. The study reported here was part of a larger research project conducted in the same organizational setting.

Data for the study were gathered by interviews with the specialists and from organizational reports. The personal interviews utilized a pre-tested, structured interview schedule, supplemented by self-administered instruments. The data collected from organizational records included biographical information about the respondents and data about their information output activities.

A test-retest reliability check was conducted approximately two months after the main study, to validate the instruments. The reliability coefficients were significantly different from zero, and were high enough to establish general confidence in the reliability of the measuring instruments.

Main Conceptual Findings

In preparing for the analysis of the organization's communication structure, responses to four sociometric questions from the interview schedule were used to determine reciprocated contacts. All data analyses aimed at specifying the extant communication structure were based upon reciprocated contacts only.

The 50 respondents had sociometric membership in seven work groups of varying size. Within the sample of 50 respondents, 71 reciprocated communication contacts were reported on technical matters pertaining to Extension work.

The 71 reciprocated contacts were cast into a communimatrix, and following procedures described by Weiss (1956:88-108), analyzed to yield identification of four Liaison Set Members, four Liaison Group Members, one Liaison Individual, ten Bridge Persons, 28 Group Members, and three Isolates.

The concept of the liaison role emerged from the analysis of the data. The analysis showed that there are a few members of the organization who perform the linking role among the subsystems of the organization.

Operationalization of the liaison role as a continuous variable was accomplished through the use of a numerical index. The index was based on the number and location of contacts between members of the work groups. This method of quantification made it possible to break down the liaison role function into six typologies of individuals within the organization.

Liaisonness, or the quality of being a liaison person, was then utilized in the balance of the study, to provide empirical comparison with other attributes possessed by the respondents.

Main Empirical Findings

In the testing of hypotheses, a positive relationship was found between liaisonness and each of the six attributes formally tested. The hypotheses had predicted a positive relationship in each case. In five of the six hypotheses tested, the relationship was sufficiently strong to be statistically significant at less than the .05 level.

Each hypothesis is presented below, along with the numerical value of Spearman rho correlation between the variables, and the level of statistical significance. Values are rounded to two places.

H_1: Peer-evaluated effectiveness is positively related to liaisonness.

Rho value = .49; alpha level = .01. The hypothesis is supported by the data.

H_2: Information input diversity is positively related to liaisonness.

Rho value = .02; alpha level = .36. The hypothesis is not supported by the data.

H_3: Peer-communication diversity is positively related to liaisonness.

Rho value = .37; alpha level = .01. The hypothesis is supported by the data.

H_4: Network centrality is positively related to liaisonness.

Rho value = .75; alpha level = .01. The hypothesis is supported by the data.

H_5: Opinion leadership is positively related to liaisonness.

Rho value = .36; alpha level = .01. The hypothesis is supported by the data.

H_6: Information output diversity is positively related to liaisonness.

Rho value = .30; alpha level = .02. The hypothesis is supported by the data.

Thus it is shown that of the six hypotheses tested in the study, five were supported at a statistically significant level. The remaining hypothesis showed a relationship in the direction predicted, but not at a statistically significant level.

Other Findings

In addition to the formal hypotheses tested, data analysis showed further relationships between liaisonness and six other variables. Positive correlations were found between liaisonness and: age, professional experience, role commitment, contact frequency, and organizational status. A negative correlation was found between liaisonness and education.

Of these six variables, three correlated with liaisonness at a statistical significance level of less than .05. They were: contact frequency (.001), professional experience (.043), and role commitment (.045).

Contributions of the Present Study.

The findings of the present study support findings of previous research, which suggest that a small percentage of the members of an organization serve as key linking individuals between subsystems of the organization.

In addition, the present study illustrated that the liaison characteristic was present among the staff members of a complex organization which was different in organizational pattern and function than previous complex organizations studied with the same technique. The findings lend support to the notion that within the universe of complex organizations, there may exist some traceable consistencies in the communication behaviors of organization staff members.

The present study differs from previous research, however, in that it treats the liaison role as a continuous variable. Previous studies have dichotomized or trichotomized the liaison role for purposes of comparing "liaison" with "non-liaison" persons. The present author considers liaisonness to be an attribute of individuals within organizations. Some individuals may have a great deal of the attribute, others less, some very little, while others have none at all.

With this view of liaisonness, the present researcher operationalized the attribute in the form of a numerical index. The index is constructed on the basis of interpersonal contact, taking into consideration both the number and the location of the contacts. Interpersonal contacts both within and between subsystems (work groups) were weighted, to yield different values for different location as well as number of contacts. The liaisonness index was then used as the measuring tool in testing the variables set forth in the hypotheses.

The method employed produced results congruent with previous studies. The results reinforce the notion that the technique offers promise as a way to bridge the research gap between studies on small, closed communication networks and the real-life, complex organizations encountered in the everyday world.

Limitations of the Present Study

While the present study was successful in supporting five of the six hypotheses postulated, inherent in the study are some limitations which should be pointed out.

In the first place, the sample studied was not randomly drawn. It was a purposive sample, selected according to pre-set criteria, which would allow the sort of data-gathering and analysis desired.

The field research was essentially a case study, analyzing and describing the respondents within their "real world" organizational setting. It is not statistically possible, therefore, to generalize beyond the sample to a larger population.

It should be noted, however, that the organization studied was a branch of a state land-grant university. Each state in the United States has such a land-grant university. The extension services of these universities are essentially similar in organizational pattern and function to the one studied here. The research dissemination organization described and analyzed in the present study is typical of what might be expected within each land-grant university extension service in the nation.

It is entirely within reason to expect that the liaison characteristic described in the present study is not greatly different from what one might expect to find in a similar study of any other land-grant university extension service. Therefore, while it is not possible to generalize on a sound statistical base from the present study to a larger population, it certainly is not unreasonable to suggest that similar findings might be expected, were similar studies done within the same university setting in other locations.

A second limitation to the present study is the nature of the test procedure applied to the hypotheses. The hypotheses were tested by correlational analyses, which do not establish time order. Therefore, while a strong relation may be shown between variables, it is impossible with the present technique to determine cause and effect. Caution should be used, therefore, in the interpretation of test results.

The liaisonness index used in measurement of the variables takes into consideration the number and location of interpersonal contacts within the organization. It does not, however, consider either the frequency or the perceived importance of the contacts. The original liaison concept, as stated by Jacobson and Seashore (1951) included the notion that liaisons had "many, frequent, reciprocated, important contacts" (emphasis by present author). The personal contact checklists used by Jacobson and Seashore (1951), Schwartz (1968) and MacDonald (1970) included these dimensions in the questions asked of the respondents. The present study did not use the same checklist form for data-gathering and did not ask respondents for their perception of the importance of contacts.

It is possible, therefore, that the liaisonness index could be strengthened if the dimensions of frequency and importance of contact could be included in the index.

To further test the liaisonness index, correlations were run between:

(a) the index vs. frequency of reciprocated contact external to work groups;

(b) the index vs. frequency of reciprocated contact internal to work groups;

(c) frequency of external reciprocated contact vs. each of the six hypothesized independent variables, and

(d) frequency of internal reciprocated contact vs. each of the hypothesized independent variables.

The independent variables are those which appear in the statements of hypotheses and in summary form in Table 6. Results of the test of the index are presented below.

In every case, external contact was found to correlate at a higher level than internal contact. A re-check of the raw data shows almost exactly twice as many total internal contacts as external contacts. Therefore, the consistently higher correlations for external contacts indicate that the liaisonness scores do indeed reflect the index weighting procedure. Liaisonness index values appear to be a function of the liaison characteristic, rather than simply a function of total contact. The test appears to further validate the measurement capability of the index.

Correlations of both internal and external contact frequency with the hypothesized independent variables yielded results approximating the correlations between liaisonness and the same variables. Again, in every case the correlation for external contact frequency was greater than the correlation for internal contact frequency.

In three of the six correlations, the values for both internal and external contact were lower than the values previously obtained between liaisonness and the independent variables. Two of these three correlations are significant at the .01 level, thus offering further support for the liaisonness index.

In three cases, the correlation values exceeded the values previously obtained between liaisonness and the independent variables. In these three cases, therefore, there would appear to be less support for the validity of the liaisonness index.

Practical Implications

Research on the liaison role has consistently found that a small number of people in organizations function as liaisons within and among subsystems of the organization. The number of people functioning in the

liaison role is variously reported from 10 percent to 18 percent of the organization.

Persons concerned with getting information diffused throughout an organization could deliberately use the liaisons as information channels. Such use, of course, presumes some knowledge of who the liaisons are. It also presumes the existence of some mechanism for insuring that the liaisons are properly and accurately informed. A note of caution is in order; it must be remembered that liaisonness is measured on a given dimension of communication contact. If a person is planning to use liaisons as information channels, he must be sure to select the proper liaisons for the particular topic.

Liaisons, by definition and by research verification, occupy strategic positions within the organization. Liaisons possess a potential as expediters of information or as bottlenecks.

From the management point of view, if internal communication appears to be satisfactory, it might behoove management to insure that the liaisons are regularly and accurately informed on matters pertaining to the organization. Timely sharing of appropriate information might help insure the continuity of good organizational communication.

Conversely, if organizational communication appears to be less than what is desired by management, the liaisons would be a logical group to check with in seeking a solution. Are some of the liaisons absent (away on business, on leave, or sick)? If so, are arrangements made for substitute communication links while they are away?

If the communication situation is less than desired but the liaison network appears to be intact, what is causing the communication problem? Are some of the key individuals holding up information? Are there some liaisons who are deliberately withholding or distorting

information for some reason?

Management persons concerned with internal organizational communication might also look for constraints peculiar to that organization which could predict who the liaisons might be. For example, are there positions which might be changed in a deliberate attempt to influence the communication structure? Is it possible to re-arrange facilities to enable greater physical access of workers, one to another? (Or conversely, to curtail physical access and reduce message flow).

From the individual's point of view, the findings of the present study offer some implications for personal behavior within the organizational context. The present research showed relatively high positive correlations between liaisonness and peer-evaluated effectiveness, peer-communication diversity, opinion leadership and information output diversity.

The findings suggest that if an individual aspires to opinion leadership or higher evaluation by his peers, he could work toward them by increasing his liaisonness. Two approaches would be to (1) diversify his peer-communication contacts in order to acquire a broader base of peer acquaintance, and (2) to diversify his information output.

The high correlation between liaisonness and peer-evaluated effectiveness suggests that peers associate personal contact with effectiveness, at least on the dimension of technical subject matter. The person who makes contact within and between departments is more likely to receive a high peer rating. Thus, the individual who aspires to high peer evaluation might make a deliberate effort to contact fellow workers outside his own department. (High peer communication diversity might also have a beneficial effect on coordination between departments).

Similarly, the individual who wishes to increase his liaisonness could turn to more communication channels. Communication output diversity includes the use of several media. The specialist who has been limiting his information output to one form, or to very few communication channels, may be unnecessarily restricting his own effectiveness in the eyes of his peers.

Implicit in the characteristic of liaisonness is the notion of individual initiative. Reciprocated choice, which is the basis of measurement of liaisonness, depends upon individuals actively choosing others. It would appear, then, that an individual would have a certain amount of discretionary power, and that actively taking the initiative in technical communication might enhance his liaisonness.

Of course, since individual initiative is involved, the person who chooses not to initiate contacts is free to do so, and will be found at the lower end of the liaisonness index.

Suggestions for Future Research

The notion of the liaison role first emerged in the study of a complex organization. Subsequent research on the liaison concept has been undertaken within the setting of complex organizations which differ in organizational patterns, functions and size. The fact that studies within these varying settings have consistently found the liaison role suggests that liaisonness may be a concept which is generalizable to the population of complex organizations.

For example, Jacobson and Seashore (1951) studied an organization consisting of 196 respondents. They found 18 percent of the respondents to be performing the liaison role. Schwartz (1968) obtained data from 142 respondents, and found that 15.1 percent of his respondents were

liaisons. MacDonald (1970) tested a complex organization consisting of 185 respondents, and found 14.1 percent of the sample to be performing in the liaison role. In the present study, with 50 respondents, 18 percent of the sample were identified as liaison types.

These findings raise several researchable questions. Does the pattern of communication liaison contact hold across all complex organizations of varying size? Is there a minimum size of organization required before liaison types may be identified? Is there a maximum size? What is the optimum organization size in terms of communication contact within and between subsystems?

With respect to the liaison role itself, what percentage of a complex organization may be expected to emerge as liaisons? What are the minimum, maximum, and optimum percentages of staff members who should be performing the liaison function?

If the liaison function is found to exist across different sizes of organization, does it also exist universally across different types of complex organizations? For example, Jacobson and Seashore (1951) studied a Government research funding agency; Schwartz (1968) studied a college within a large university; Mitchell (1970) studied the adoption of a curriculum within a university; MacDonald (1970) studied a very large Federal bureaucracy staffed with Civil Service employees; the present study analyzed a research dissemination organization which is an integral educational unit of a university.

A logical next step for research using the concept of liaisonness is to study other complex organizations, to validate previous studies. It is questionable that there exist many complex organizations similar in function and organizational pattern to those studied by

Jacobson and Seashore (1951), Schwartz (1968), or MacDonald (1970).

However, given the nature of the research dissemination organization described in the present study, and given the fact that the present organization is only one of about 50 very similar university organizations throughout the United States, it would appear that there exist plenty of similar organizations for replication of the present study. It is suggested, then, that a fruitful area of research would be a study of liaisonness within the extension specialist organizations of other universities.

The present study set forth a theoretical model of the research dissemination and utilization process. As conceptualized, the model consists essentially of four levels of organization, according to functions at the various levels.

The actual organization studied in the present research closely parallels the theoretic model. The research reported here was confined to an internal analysis of communication patterns within only one level of the organization. A needed area of research is the communication linking pattern between levels of the research dissemination organization. That is, what communication roles exist linking the state specialist staff members of the organization and the county agents, or county level staff members?

Are there liaisons between the two levels of organization? How do the county level staff members see the state specialist staff members, and vice versa, in terms of communication contact? If the liaison role emerges between organizational levels, are those liaisons the same individuals who were liaisons in the present study?

The linking notion could be carried to the next logical step, i.e., the link between county staff and clientele. In theory, and by legislative edict, the extension organization exists to disseminate information to the people of the state served by the state university. As a research dissemination organization, it could be examined for linking or liaison roles both within and between all organizational levels discussed in Chapter II.

Nor should research be limited to complex organizations such as those which have already been studied. Weiss and Jacobson (1955) suggest that "complex organizations" include such units as government agencies, labor unions, churches, military units, schools and industrial plants. It would seem that such organizations would lend themselves to analysis of the nature reported here. Study of such organizations would provide more information as to the generalizability of the liaison role concept.

Extant research on the liaison role in complex organizations has been primarily based on reciprocated interpersonal contact on different dimensions of communication. Such studies have assumed that reciprocation occurs in organizational communication.

Further research is needed on other dimensions of the liaison notion. For example, is reciprocation necessary for "good" organizational communication? Might there be types of organizations, or occasions within organizations, when other types of roles would provide "better" communication? Is the liaison role pervasive regardless of the formal intent of organizational pattern or assignment? Is the liaison role necessary?

What explanatory role is played by physical distance or nearness? What about time within the system; is there a "minimum time"

that one must be in the organization in order to become a liaison? What relationship is there between frequency of contact and the status of the liaison person? Berkowitz and Bennis (1961) found an inverse relationship between status and frequency of contact in their study of a hospital unit. Could such findings be expected with high-status liaisons and others in a variety of complex organizations?

Another type of organization which might be studied would be a group of social science-oriented people. In the present study, the sample consisted of highly trained individuals in a variety of technical subject matter disciplines. If a similar study were conducted in an organization of people oriented to other kinds of subject matter, would they respond similarly to questions on the three dimensions contained in the present study (viz., technical matters, peer-evaluated effectiveness and opinion leadership)?

Additional research needs to be done in order to further validate the liaisonness index used in the present study.

Testing of the index showed that it does function as a measurement tool, but that it is not perfect. Further development and mathematical testing would improve the validity of the index. It should also be applied in other studies. Will the index hold up in subsequent analyses? What are the components of liaisonness? Is it possible to identify the components, and then to modify them in order to influence liaisonness?

What further defining characteristics would help us understand the different typologies of individuals distributed by the liaisonness index? Previous studies, as well as the present research, have concentrated on the liaison role. But since organizations consist of a

variety of individual typologies, a study of the "isolate" may be as fruitful in comprehending the function of the organization as would be the study of the "liaison." What is "different" about the isolate may be as important as what is "different" about the liaison.

BIBLIOGRAPHY

BIBLIOGRAPHY

Alexander, C. Norman, Jr. A method for processing sociometric data. Sociometry, June 1963, 26 (2) 268-269.

Amend, Edwin H. The cooperative extension service and continuing adult education. Fort Collins, Colorado State University, unpublished mimeograph, 1968.

Amend, Edwin H. Small group communication structure and participant behavior: An annotated bibliography on communication networks. East Lansing, Department of Communication, Michigan State University, unpublished mimeograph, 1970.

Anderson, Robert C. A Sociometric Approach to the Analysis of Inter-Organizational Relationships. East Lansing, Institute for Community Development and Services, Michigan State University, Technical Bulletin B-60, October 1969.

Barnard, C. I. The Functions of the Executive. Cambridge: Harvard University Press, 1938.

Barnlund, D. C. & Harland, C. Propinquity and prestige as determinants of communication networks. Sociometry, 1963, 26, 467-479.

Bavelas, Alex & Barrett, D. An experimental approach to organizational communication. Personnel, 1951, 27, 366-371.

Beal, George M.; Klonglan, G. E.; Yarbrough, P.; Bohlen, J. M. & Dillman, D. A. System Linkages Among Women's Organizations. Ames, Department of Sociology and Anthropology, Iowa State University, Rural Sociology Department Report No. 42, 1967.

Berkowitz, N. H. & Bennis, W. G. Interaction patterns in formal service-oriented organizations. Administrative Science Quarterly, 1961, 6, 25-50.

Bertalanffy, L. von. General System Theory. New York: George Braziller, 1968.

Blake, Robert R. & Mouton, Jane S. The reliability and validity of sociometric measures. In Moreno, J. L. (ed). The Sociometry Reader. Glencoe: The Free Press, 1960.

Boyd, Bradford B. An analysis of communication between departments: Roadblock and bypasses. Personnel Administration, 1965, 28 (6) 33-38.

Brownlee, R. Wiley. Communication Networks Among the Professional Staff of Michigan's State Department of Education. East Lansing, Department of Education, Michigan State University, Ph. D. Thesis, 1969.

Burns, Tom. The directions of activity and communication in a departmental executive group: A quantitative study of a British engineering factory with a self-recording technique. Human Relations, 1954, 7, 73-97.

Campbell, Donald T. A rationale for weighting first, second, and third sociometric choices. In Moreno, J. L. (ed). The Sociometry Reader. Glencoe: The Free Press, 1960.

Cartwright, Dorwin and Zander, Alvin (eds). Group Dynamics Research and Theory. New York: Harper and Row, 2nd ed., 1953.

Carzo, R., Jr. Some effects of organization structure on group effectiveness. Administrative Science Quarterly, 1963, 7, 393-424.

Chesler, Mark & Flanders, Mary. Resistance to research and research utilization: The death and life of a feedback attempt. Journal of Applied Behavioral Science, 1967, 3 (4) 469-487.

Coleman, J. Introduction to Mathematical Sociology. Glencoe: Free Press, 1964.

Compton, Bertita E. & Garvey, William D. Information functions of an international meeting. Science, 1967, 155 (3770) 1648-1650.

Couch, Carl J. & Bebermeyer, James P. Some Research Possibilities on Communication and Change Within Extension. East Lansing, Michigan State University, IEPD Publication No. 15, July 1964.

Criswell, Joan H. Sociometric concepts in personnel administration. In Moreno, J. L. (ed). The Sociometry Reader. Glencoe: Free Press, 1960.

Davis, Keith. Management communication and the grapevine. Harvard Business Review, 1953a, 31 (5) 43-49.

Davis, Keith. A method of studying communication patterns in organizations. Journal of Personnel Psychology, Fall, 1953b, 301ff.

Deutsch, Karl W. On communication models in the social sciences. The Public Opinion Quarterly, 1952, 16, 367.

Etzioni, Amitai. Toward a theory of societal guidance. The American Journal of Sociology, September, 1967, 73 (2) 173-187.

Festinger, Leon. The analysis of sociograms using matrix algebra. Human Relations, 1949, 2, 153-158.

Festinger, Leon; Schacter, Stanley & Back, Kurt. Social Pressures in Informal Groups: A Study of Human Factors in Housing. Stanford: Stanford University Press, 1950.

Forsyth, Elaine & Katz, Leo. A matrix approach to the analysis of sociometric data: Preliminary report. Sociometry, November, 1946, 9, 340-347.

Garvey, William D. & Compton, Bertita E. A program of research in scientific information exchange: Orientation, objectives, and results. Information sur les Sciences Sociales, 1967, 6 (2-3) 213-237.

Garvey, William D. & Griffith, Belver C. Scientific communication: The dissemination system in psychology and a theoretical framework for planning innovations. American Psychologist, 1965, 20 (2) 157-164.

Glanzer, M. & Glaser, R. Techniques for the study of small group structure and behavior: II. Empirical studies of the effects of structure in small groups. Psychological Bulletin, 1961, 58, 1-27.

Golembiewski, Robert T. The Small Group. Chicago: University of Chicago Press, 1962.

Guba, Egon G. Development, diffusion and evaluation. In Eidell, Terry & Kitchel, Joanne M. (eds). Knowledge Production and Utilization in Educational Administration. Eugene, University Council for Educational Administration and Center for the Advanced Study of Educational Administration, University of Oregon, 1968.

Guetzkow, Harold. Communications in organizations. In March, J. G. (ed). Handbook of Organizations. Chicago: Rand McNally, 1965.

Guimaraes, Lytton. Network Analysis: An Approach to the Study of Communication Systems. East Lansing, Michigan State University, Technical Report 12, 1970.

Hage, Jerald & Marwell, Gerald. Toward the development of an empirically based theory of role relationships. Sociometry, 1968, 31 (2) 200-212.

Hare, A. Paul. Handbook of Small Groups Research. New York: Free Press, 1962.

Havelock, Ronald G. Planning for Innovation. Ann Arbor, ISR, University of Michigan, 1969.

Hunter, Floyd. Community Power Structure. Chapel Hill, University of North Carolina Press, 1953.

Jacobson, Eugene. Personal conversation with the author, May, 1970.

Jacobson, Eugene, Charters, W. W., Jr. & Lieberman, S. The use of the role concept in the study of complex organizations. Journal of Social Issues, 1951, 7 (3) 18-27.

Jacobson, Eugene & Seashore, S. E. Communication practices in complex organizations. Journal of Social Issues, 1951, 7 (3) 28-40.

Jain, Nemi C. Communication Patterns and Effectiveness of Professionals Performing Linking Roles in a Research Dissemination Organization. East Lansing, Michigan State University, unpublished Ph. D. dissertation, 1970.

Jain, Nemi C. & Amend, Edwin H. A conceptual framework for studying communication patterns in research dissemination and utilization, paper contributed for the 17th Annual Meeting of the National Society for the Study of Communication, Cleveland, Ohio, April 24-26, 1969.

Jennings, Helen H. Sociometric choice process in personality and group formation. In Moreno, J. L. (ed). The Sociometry Reader. Glencoe: Free Press, 1960.

Katz, D. & Kahn, R. L. The Social Psychology of Organizations. New York: John Wiley & Sons, 1966.

Katz, E. The two-step flow of communication: An up-to-date report of an hypothesis. Public Opinion Quarterly, Spring, 1957, 21, 62-78.

Katz, E. & Lazarsfeld, P. F. Personal Influence. New York: Free Press of Glencoe, 1955.

Katz, Leo. The distribution of the number of isolates in a social group. In Moreno, J. L. (ed). The Sociometry Reader. Glencoe: The Free Press, 1960.

Keith, Robert F. Information and Modernization: A Study of Eastern Nigerian Farmers. East Lansing, Michigan State University, unpublished Ph. D. dissertation, 1968.

Kerlinger, Fred N. Foundations of Behavioral Research. New York: Holt, Rinehart & Winston, 1966.

MacDonald, Donald. Communication Roles and Communication Content in a Bureaucratic Setting. East Lansing, Michigan State University, unpublished Ph. D. dissertation, 1970.

Mackenzie, Kenneth D. Decomposition of communication networks. Journal of Mathematical Psychology, 1967, 4 (1) 162-173.

Massarik, Fred; Tannenbaum, Robert; Kahane, Murray & Weschler, Irving. Sociometric choice and organizational effectiveness: A multirelational approach. In Moreno, J. L. (ed). The Sociometry Reader. Glencoe: Free Press, 1960.

McNemar, Quinn. Psychological Statistics. New York: John Wiley & Sons, 1962.

Merton, Robert K. Social Theory and Social Structure. Glencoe: Free Press, 1949.

Mitchell, William G. Communication of an Educational Innovation in an Institution of Higher Learning. East Lansing, Michigan State University, unpublished dissertation, 1970.

Moreno, J. L. Who Shall Survive? (2nd ed). Beacon: Beacon House, 1953.

Moreno, J. L. (ed). The Sociometry Reader. Glencoe: Free Press, 1960.

Morris, John. Rank Correlation Coefficients: Technical Report 47. East Lansing, Computer Institute for Social Science Research, Michigan State University, January 5, 1967.

Morris, William. The Information Influential Physician: The Knowledge Flow Process Among Medical Practitioners. Ann Arbor, University of Michigan, unpublished Ph. D. dissertation, 1970.

Murray, John S. Influence of Self Concepts, Significant Others and Interaction Patterns on the Publication Activity of Agricultural Scientists. East Lansing, Michigan State University, unpublished Ph. D. dissertation, 1965.

Nehnevajsa, Jiri. Graphic presentation. In Moreno, J. L. (ed). The Sociometry Reader. Glencoe: Free Press, 1960.

Oppenheim, A. N. Questionnaire Design and Attitude Measurement. New York: Basic Books, 1966.

Parker, E. B. & Others. Communication and Research Productivity in an Interdisciplinary Behavioral Science Research Area. Stanford: Institute for Communication Research, Stanford University, 1968.

Pelz, Donald C. Some social factors related to performance in a research organization. Administrative Science Quarterly, 1956, 1, 310-325.

Ratchford, C. Brice. Significant trends affecting your audiences, paper presented at the annual meeting of the American Association of Agricultural College Editors, Columbia, University of Missouri, July 13-16, 1969.

Rogers, Everett M. Diffusion of Innovations. New York: Free Press, 1962.

Rogers, Everett M. & Jain, Nemi C. Needed research on diffusion within educational organizations, paper presented at the National Conference on the Diffusion of Educational Ideas, East Lansing, Michigan, March 26-28, 1968.

Rogers, Everett M. & Jain, Nemi C. Research utilization: Bridging the communication gap between science and practice, paper presented at the Joint Session of the Information Systems Division of the International Communication Association and the Behavioral Sciences Interest Group, Speech Association of America, New York, December 27-30, 1969.

Rogers, Everett M. with Svenning, Lynne. Modernization Among Peasants: The Impact of Communication. New York: Holt Rinehart and Winston, 1969.

Ross, Ian C. & Harary, Frank. Identification of the liaison persons of an organization using the structure matrix. Management Science, 1955, 1-2, 251ff.

Schwartz, Donald F. Liaison Communication Roles in a Formal Organization, East Lansing, Michigan State University, unpublished Ph. D. dissertation, 1968.

Schwartz, Donald F. Liaison roles in the communication structure of a formal organization: A pilot study, paper presented to the National Society for the Study of Communication, Cleveland, Ohio, April 24, 1969.

Selye, Hans. What makes basic research basic? In Thruelsen, Richard & Kobler, John (eds). Adventures of the Mind. New York: Vintage Books, 1958.

Shaw, M. E. Some effects of unequal distribution of information upon group performance in various communication nets. Journal of Abnormal and Social Psychology, 1954, 49, 547-553.

Sussman, Marvin B. Cross-national research studies on the family: Theoretical problems and approaches, document prepared for a meeting of the Core Research Team and Consultants in San Juan, Puerto Rico, March 1-7, 1969. Mimeograph, Cleveland, Case Western Reserve University, January 1969.

Sussman, Marvin B. Some conceptual issues in family-organizational linkages, paper given at the session of Family Bureaucracy, 64th meeting of American Sociological Association, September 1, 1969b. Mimeograph, San Francisco, 1969.

Thomas, Edwin J. Effects of facilitative role inter-dependence on group functioning. Human Relations, 1957, 10, 347-366.

Toeman, Zerka. How to construct a sociogram. Sociatry, 1948-9, 2 (3&4) 407ff.

Tully, Joan. Towards a sociological theory for extension. Human Relations, 1966, 19 (4) 391-403.

Walter, Benjamin. Bureaucratic Communications: A Statistical Analysis of Influence. Chapel Hill, Institute for Research in Social Science, University of North Carolina, September, 1963.

Walton, Eugene. A study of organizational communication systems. Personnel Administration, 1963, 26 (3) 46-49.

Weiss, Robert S. Processes of Organization. Ann Arbor, Survey Research Center, Institute for Social Research, University of Michigan, 1956.

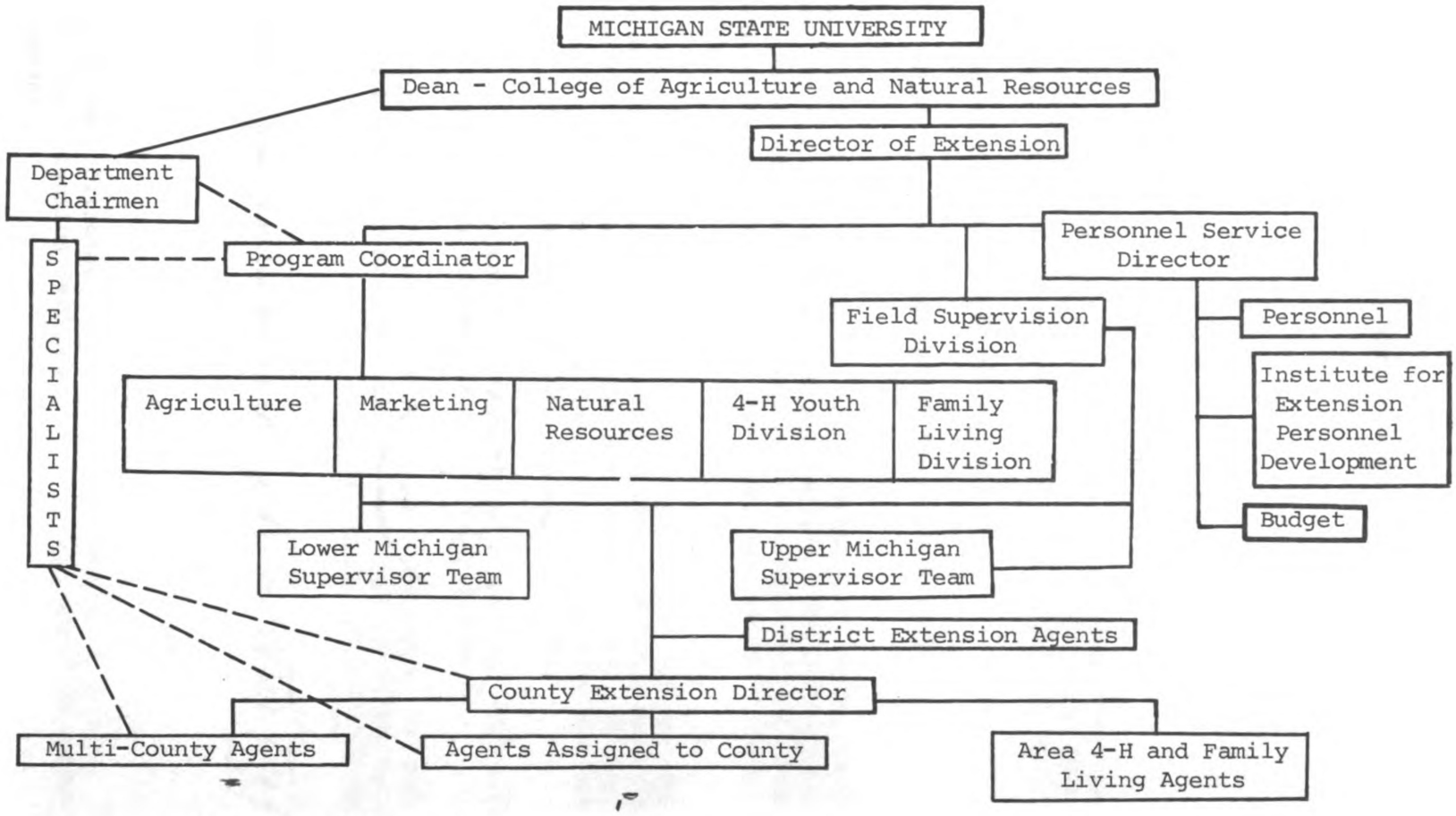
Weiss, Robert & Jacobson, Eugene. Method for the analysis of the structure of complex organizations. American Sociological Review, 1955, 20, 661ff.

Wilkening, Eugene A. Roles of communicating agents in technological change in agriculture. Social Forces, 1956, 34 361-367.

APPENDICES

APPENDIX A

ORGANIZATIONAL CHART OF MICHIGAN COOPERATIVE EXTENSION SERVICE (April 1971)



APPENDIX B

ENTRY LETTER

April 8, 1969

MEMORANDUM

To: Chairmen, Departments of Agricultural Economics, Agricultural Engineering, Animal Husbandry, Botany and Plant Pathology, Crop Science, Dairy, Entomology, Horticulture, Soil Science

From: Mason E. Miller and Everett M. Rogers

Subject: Study of Communication of Research Findings

Nemi Jain, a Graduate Student in the Department of Communication, is carrying out a study of Extension specialists under our guidance. The study is concerned mainly with specialists' communication behavior as they deal with research findings and other new ideas in their field of specialty.

Mr. Jain will be contacting specialists working in the agricultural program area of Extension in your department. He will make appointments with them for interviews during the next month or so. He will be interviewing both part- and full-time Extension specialists who have been working on Extension ag programs for at least a year.

All data will be confidential. Reports will not deal with individual cases, but rather with grouped data and characteristics.

We think this will be a valuable study for Extension. We have cleared the idea with Director McIntyre and Richard Bell of Extension administration. We wanted you to know about the study in case any questions came up.

If you should have questions, please contact one of us. Thank you for your help.

Mason E. Miller, Director
Institute for Extension Personnel Development

Everett M. Rogers, Professor
Department of Communication

APPENDIX C

INTERVIEW SCHEDULE INCLUDING SELF-ADMINISTERED INSTRUMENTS

Interview Schedule
Specialist Communication Study
Department of Communication

Name and Number of the Department_____

Name and Number of Respondent_____

Location_____

Date of Interview_____

Time: From_____to_____

* * * * * *

Q 1. What is your subject matter specialty?

Q 2. How many years have you worked as an Extension Specialist here at MSU? _____years.

Q 3. Of the following four activities, approximately what percentage of your time do you actually spend on each:

1. Extension work _____%
2. Classroom teaching _____%
3. Research _____%
4. Administration _____%

Now we would like to know about your membership and participation in professional associations or societies. Here are the questions I would like you to answer . . .

HAND QUESTIONS FOUR TO SIX TO THE RESPONDENT. ASK HIM TO SUPPLY ANSWERS IN THE SPACES PROVIDED.

Appendix C (cont'd.)

Q 4. What professional associations or societies do you belong to?

_____

_____

Q 5. On an average, how many professional meetings (such as conventions, conferences, symposia, etc.) do you attend in a year?

_____

Q 6. What professional meetings did you attend in 1968? (Please list.)

_____

_____

Now we would like to know about reading preferences for professional and non-professional periodicals. Here are the questions I would like you to answer . . .

HAND QUESTIONS 7 TO 12 TO THE RESPONDENT. ASK HIM TO SUPPLY ANSWERS IN THE SPACES PROVIDED.

Q 7. What professional journals or periodicals do you read or scan regularly (that is, read almost every issue)?

_____

Q 8. What non-professional periodicals (such as farm magazines, trade magazines, extension magazines, etc.) do you read or scan regularly (that is, almost every issue)?

_____

Q 9. On an average, how many hours per week do you spend in reading non-professional periodicals? _____Hours per week.

Q 10. On an average, how many hours per week do you spend in reading professional journals or periodicals? (Estimate if necessary)

_____Hours per week.

Q 11. How many research papers (including preprints, reprints, and unpublished papers) have you received from outside your department in the past month? (Estimate if necessary) _____.

Appendix C (cont'd.)

Q 12. How many extension publications (such as extension bulletins, extension newsletters, etc.) have you received from outside your department in the past month? _____.

The next few questions are concerned with the sources that are important to you for becoming aware of new ideas and providing information necessary for evaluating the new ideas in your field of specialty. . .

Q 13. Where or from whom do you usually first hear about new ideas in in your field?

_____

_____

Q 13a. Which one of these sources would you say is the most important?

_____

Q 13b. Which one is the next most important?

_____

Q 14. After you have first heard about an idea, what sources do you generally seek for further information about it?

_____

_____

Q 15. Whom do you most frequently seek for information and advice on technical matters about extension work? Would you name about three people you seek out most often.

_____

_____

_____

Q 16. Generally, where or from whom do you get information that helps you make up your mind about the usefulness of a new idea? In other words, who tells you about, or where do you go to get information that helps you decide on the usefulness of a new idea?

_____

_____

Now let's discuss the people that you usually talk with about research findings, new ideas, and other technical matters related to extension work. Over the past three or four months, think of the faculty people at MSU that you have communicated with most frequently about technical matters related to extension work. (By "faculty people" we mean individuals with academic rank of instructor or higher and/or administrator).

First, let's consider your communication with persons in your department...

HAND QUESTION SEVENTEEN AND ACCOMPANYING "INTRA-DEPT. CONTACT FORM" (BLUE SHEET) TO RESPONDENT. ASK HIM TO LIST THE NAMES OF INDIVIDUALS AND CHECK THE FREQUENCY OF COMMUNICATION.

TAKE THE FORM WHEN COMPLETED

* * * * *

Now let's consider your communication with people in other departments at MSU...

HAND QUESTION EIGHTEEN AND ACCOMPANYING "INTER-DEPT. CONTACT FORM" TO RESPONDENT. ASK HIM TO SUPPLY ANSWERS IN THE SPACES PROVIDED.

* * * * *

WHILE THE RESPONDENT IS ANSWERING QUESTION EIGHTEEN, DO THE FOLLOWING:

(1) INSPECT BLUE SHEET OR INTRA-DEPT. CONTACT FORM THAT HAS BEEN JUST COMPLETED BY RESPONDENT.

(2) WRITE THE NAME OF EACH INDIVIDUAL LISTED ON THE BLUE SHEET ON SEPARATE "IMMEDIATE OTHER SHEETS".

* * * * *

TAKE THE INTER-DEPT. CONTACT FORM WHEN COMPLETED

* * * * *

Now I would like you to answer the following questions concerning those individuals with whom you communicate frequently. Here are the questions:

> FIRST, HAND "IMMEDIATE OTHER SHEET" TO RESPONDENT. TAKE IT BACK WHEN COMPLETED AND HAND SECOND SHEET TO HIM, AND SO ON UNTIL ALL IMMEDIATE OTHER SHEETS HAVE BEEN COMPLETED.

Q 17. Who are the individuals <u>in your department</u> with whom you communicate most frequently about technical matters related to extension work? Would you name <u>about five</u> people you communicate with most often. For each individual named, please indicate the <u>frequency of communication</u> by checking the most appropriate column in the following table:

NAME OF INDIVIDUAL	FREQUENCY OF COMMUNICATION					
	At least once a day	2 or 3 times per week	About once per week	2 or 3 times per month	About once per month	About once per term or less often

Q 18. Who are the individuals <u>in other departments</u> at MSU with whom you communicate most frequently about technical matters related to extension work? Would you name <u>five to ten</u> people you communicate with most often. For each individual named, please indicate: (a) how frequently do you communicate with him, and (b) the amount of time you spend communicating with him in a month (estimate number of hours).

Name of Individual	Department	Frequency of Communication (Same six categories as in the table accompanying Question 14)	Number of hours you spend communicating with him in a month

Please complete the following items in terms of your communication with

_____
(Name)

a. In a typical month, about how much time do you spend communicating with this person? (Estimate number of hours) _____

b. How does the communication with this person usually originate? Estimate the percent occuring in the following ways, to the nearest ten percent.

1. I visit or contact him_____%.
2. He visits or contacts me_____%.
3. We both attend a meeting or seminar_____%.
4. Conversation arises spontaneously when we see each other_____%.
5. Other ways_____%.

c. Please evaluate this person as a source of information in terms of the adjective pairs listed in the following table. Check one and only one of the seven points in each item. FOR EXAMPLE:

Happy ___ ___ X ___ ___ ___ ___ Unhappy

extremely happy | quite happy | somewhat happy | not sure | somewhat unhappy | quite unhappy | extremely unhappy

	Extremely	Quite	Somewhat	Not sure	Somewhat	Quite	Extremely	
Informed								Uninformed
Close-minded								Open-minded
Reliable								Unreliable
Friendly								Unfriendly
Out-of-date								Up-to-date
Frank								Reserved
Untrustworthy								Trustworthy
Unsociable								Sociable
Aggressive								Meek
Incompetent								Competent
Safe								Dangerous

Now let's consider for a moment your communication with field extension agents working in our extension service.

Q 19. With how many county agents (including multi-county agents) did you have frequent communication during the past eight or nine months? That is, county agents that you communicated with at least once a month. _____Number of agents

HAND QUESTION TWENTY TO RESPONDENT ALONG WITH THE LIST OF COUNTY AGENTS. ASK HIM TO CHECK THE NAMES OF AGENTS.

Q 20. With which county agents did you have the most frequent communication during the past eight or nine months? I'd appreciate your going through the list given below and checking the names of five to ten agents with whom you had most frequent communication during the past eight or nine months.

Now let's consider your social contacts with people here at MSU...

HAND QUESTION TWENTY-ONE TO RESPONDENT. ASK HIM TO SUPPLY ANSWERS IN THE SPACES PROVIDED.

Now let's consider your communication with professional people outside MSU. I'd like you to answer the following questions concerning your communication with people outside MSU. Here are the questions...

HAND QUESTION TWENTY-TWO TO THE RESPONDENT. ASK HIM TO SUPPLY ANSWERS IN THE SPACES PROVIDED.

* * * * * *

Q 20a. If you have contacts with district extension agents, please indicate the names of those agents with whom you communicate at least once a month about technical matters.

_____

_____

Q 21. Who are the individuals in your department and/or in other departments with whom you or your family meet socially? I'd appreciate getting five to ten names of those who you meet most often.

Name_____ _____ Department

Q 21a. Which one of these people is your closest friend?

Q 21b. What are some of your common interests with this person in extra-academic areas?

_____

_____

Q 22. With about how many professional people outside MSU do you have frequent communication about technical matters related to extension work? That is, people you communicate with at least two or three times in a year. _____number of people

Q 23. Who are the individuals outside MSU with whom you have had your most frequent communication about technical matters related to extension work during the past five or six months? Would you name approximately five people outside MSU you communicated with most often during the past five or six months. For each individual named, please indicate his title and the organization he works for.

Name of Individual	His Title	Name of Organization he Works For

Q 24. In a typical month, about how many hours do you spend communicating with professional people outside MSU? _____Hours

Now let's talk about some specific research findings and new ideas within your field of specialization. We would like to know the main technical ideas or practices that you have been disseminating to the field extension agents during the past eight or nine months....and a little bit about those ideas....

Q 25. What are the main technical ideas or practices (within your field of specialization) that you have been disseminating to the agents during the past eight or nine months?

_____

_____

Q 25a. Which two of these, would you say, have you started disseminating most recently? (INTERVIEWER: WRITE DOWN THE NAMES OF THESE TWO INNOVATIONS IN THE SPACES PROVIDED BELOW)

1. _____
(NAME OF INNOVATION #1)

2. _____
(NAME OF INNOVATION #2)

WRITE THE NAME OF EACH OF THESE TWO INNOVATIONS ON SEPARATE "SPECIFIC INNOVATION SHEETS".

Now we would like you to tell us more about each of these two ideas... We would like to know certain aspects such as how you became aware of it, how did you go about evaluating it, and how are you disseminating it, etc...

First, let's talk about _____
(READ THE NAME OF INNOVATION #1LISTED ABOVE)

TAKE THE FIRST SPECIFIC INNOVATION SHEET AND ASK ALL PARTS OF QUESTION TWENTY-SIX.

* * * * * *

Now let's talk about _____
(READ THE NAME OF INNOVATION #2 LISTED ABOVE)

TAKE THE SECOND SPECIFIC INNOVATION SHEET AND ASK ALL PARTS OF QUESTION TWENTY-SIX AGAIN.

SPECIFIC INNOVATION SHEET (Two provided in questionnaire)

_____

(NAME OF THE INNOVATION)

Q 26a. Where or from whom did you first hear about it?

_____

_____

Q 26b. When was this? In other words, when did you first hear about this idea? _____

Q 26c. After you first heard about it, what sources did you seek for further information about it?

_____

_____

Q 26d. Whom did you seek most for information and advice about this idea? In other words, whom did you consult most in evaluating this idea?

_____

_____

Q 26e. Where or from whom did you get information that convinced you that this idea should be disseminated to the agents?

_____

_____

Q 26f. When did you start disseminating this idea to the agents?

_____

Q 26g. How are you disseminating this idea to the agents? In other words, what methods or techniques are you using to disseminate this idea to the agents?

_____

_____

Q 26h. Which one of these methods you just named, would you say, has been most effective in disseminating this idea to the agents?

_____

_____

The next questions concern your participation in faculty and administrative committees here at MSU....Here are the questions I would like you to answer...

HAND QUESTION TWENTY-SEVEN TO THE RESPONDENT. ASK HIM TO ANSWER ALL THREE PARTS OF THE QUESTION. TAKE THE SHEET WHEN COMPLETED.

* * * * * *

Some people's opinions of "us" are important while the opinions of other people are not. In other words, we care what some people think of "us", while the opinions of some others don't matter much. I'd like to know the kinds of people whose opinions of you as an extension specialist are important to you. Here is the question I would like you to answer...

HAND QUESTION TWENTY-EIGHT TO THE RESPONDENT. ASK HIM TO ANSWER BOTH PARTS OF THE QUESTION. TAKE THE SHEET WHEN COMPLETED.

* * * * * *

Q 29. In all groups of people, some gain a reputation for superior performance. Who are some, that in your opinion, most deserve the reputation of an outstanding specialist? I'd appreciate getting approximately five names...

Here is an alphabetically arranged list of some extension specialists working with the agricultural programs of our extension service...

HAND LIST OF EXTENSION SPECIALISTS TO THE RESPONDENT

Please go through the list and circle the names of about five individuals, who in your opinion, most deserve the reputation of an outstanding specialist...

Q 27. What faculty and administrative committees (including both standing and ad hoc committees) do you belong to? Please indicate the names of extension committees, department-wide committees, college-wide committees, university-wide committees and other committees, of which you are now a member.

a. Extension committees:

b. Department-wide committees:

c. College-wide committees:

d. University-wide committees:

e. Other committees:

Q 27a. Generally, about how many committee meetings all together do you attend in a month? _____

Q 27b. On an average, in a month about how many hours all together do you spend in committee meetings? _____ Hours

Q 28. Some people's opinions of "us" are important while the opinions of other people are not. Whose opinions of you as an extension specialist are important to you?

_____

_____

Q 28a. Now consider that the amount of importance of the opinions of these people toward you as a specialist is equivalent to 100 points. Please distribute the 100 points among these people according to the relative importance of their opinions.

Q 30. In your opinion, what are the main communication problems faced by extension specialists?

_____

_____

Finally, we are interested in obtaining some biographical information about you. We have obtained some biographical data about you from the MSU Department of Information Services. Will you please look through this biographical information sheet and make appropriate corrections or additions where necessary...

HAND BIOGRAPHICAL INFORMATION SHEET TO THE RESPONDENT. ASK HIM TO UP-DATE THE CORRECTNESS OF HIS PERSONAL DATA.

* * * * * *

Is there anything else you would like to add to our discussion?

Many thanks for your time and cooperation.

APPENDIX D

ADDITIONAL DATA ANALYSIS AND DISPLAY

The present study is based on reciprocated sociometric choice on the topic of technical matters pertaining to Extension work. The discussion of main findings, illustrated with communimatrices and sociograms, is contained in Chapter IV.

Appendix D consists of additional data analysis. It includes a discussion and comparison of the communimatrices and sociograms on the topics of peer-evaluated effectiveness and opinion leadership.

Communimatrix Analysis: Peer-Evaluated Effectiveness

The second dimension of communication contact measured was that of peer-evaluated effectiveness. Following the same procedure which was given in detail (see Chapter IV) for the analysis of communication on technical matters, the researcher prepared the second communimatrix. The second communimatrix, displaying the reciprocated choices on peer-evaluated effectiveness, is shown in Figure 14. The segments remain the same as those previously identified, i.e., work groups identified by departments.

Inspection of the second communimatrix (Figure 14) shows less interpersonal contact on the dimension of peer-evaluated effectiveness than existed on the dimension of technical matters.

Communimatrix Analysis: Opinion Leadership

Following the same procedures previously outlined, the researcher prepared the third communimatrix to show interpersonal communication on the dimension of opinion leadership. As in the preceding matrices, the

N = 50 Reciprocated Choices = 21

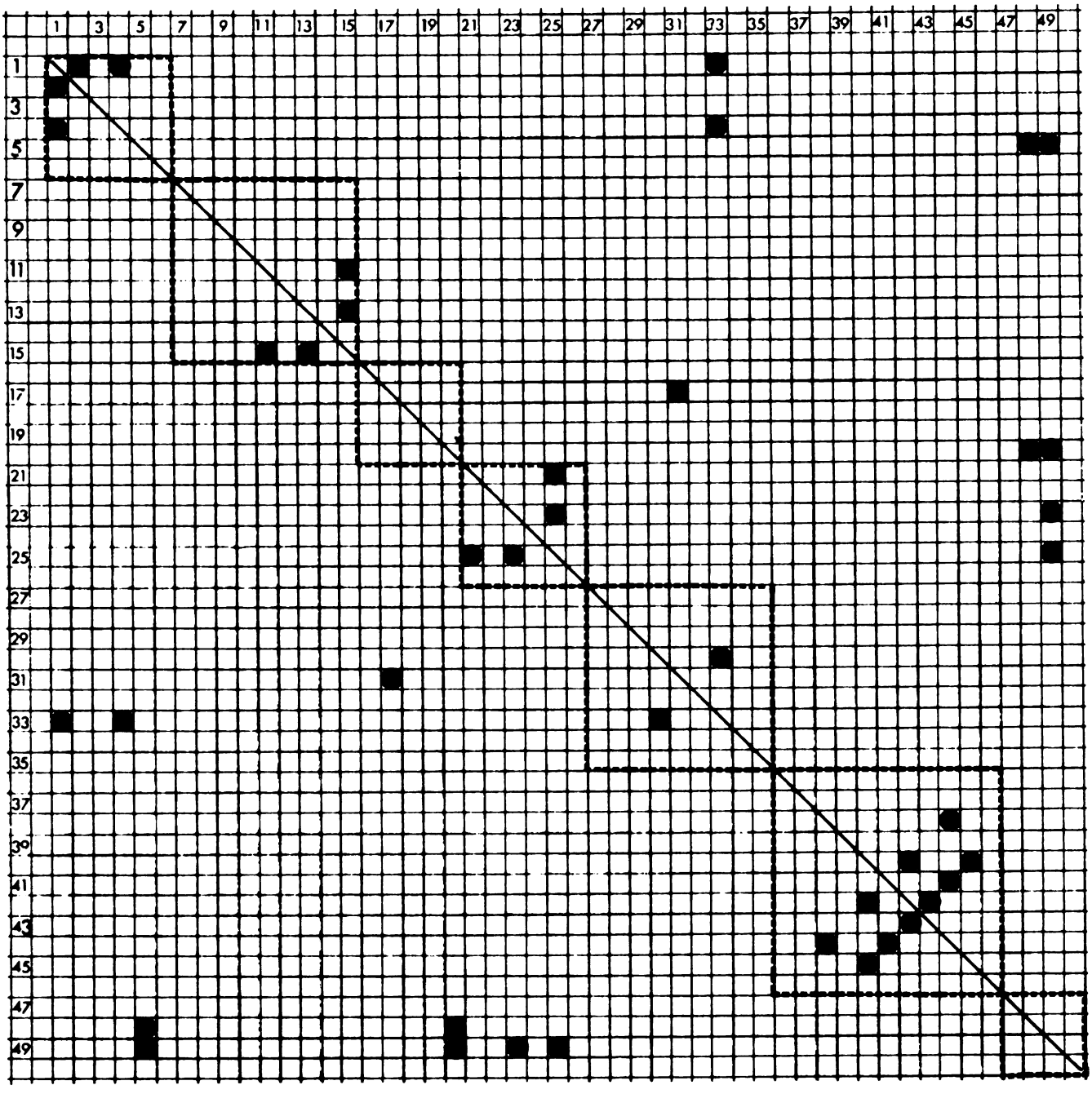


Figure 14. Second communimatrix: Reciprocated choices on peer-evaluated effectiveness.

segments are primary work groups according to departmental affiliation of the respondents.

The third communimatrix is shown in Figure 15. It is obvious even from a cursory inspection of Figure 15 that there was much less interaction on the topic of opinion leadership than there was on the preceding two topics.

Comparison of the communimatrices in Figure 11, Figure 14, and Figure 15 graphically illustrates the different degrees of intra-organizational reciprocated choice across the three dimensions of communication contact measured in the present study.

The analysis of the matrices on peer-evaluated effectiveness and opinion leadership did not identify any liaison roles not previously identified in the analysis of the communimatrix on technical matters. Therefore, in the assignment of liaisonness index values in order to test hypotheses, the researcher used the liaison types identified and categorized in the communimatrix on technical matters (Figure 11).

After the communimatrices were utilized for the analysis of data, the data were displayed in the form of sociograms.

Sociogram: Liaisons and Peer-Evaluated Effectiveness

The sociogram presented in Figure 16 is constructed from the communimatrix on peer-evaluated effectiveness (Figure 14). The topic of peer-evaluated effectiveness produced fewer reciprocated choices among our respondents. Comparison of the sociogram on technical matters with the sociogram on peer-evaluated effectiveness makes the difference in responses apparent.

Nevertheless, in spite of the lower level of reciprocated choice on the dimension of peer-evaluated effectiveness, the key role of the

N = 50 Reciprocated Choices = 8

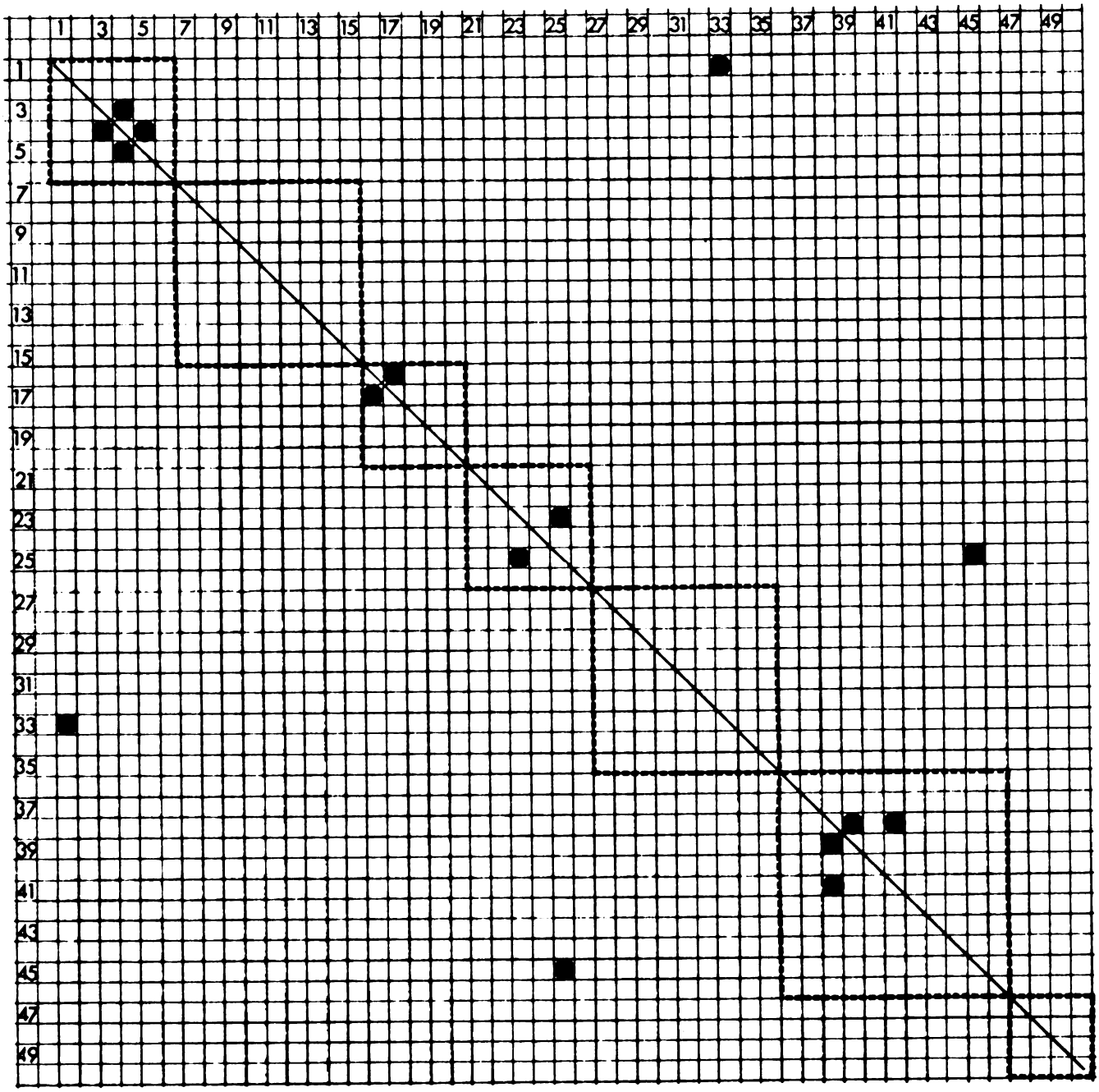


Figure 15. Third communimatrix: Reciprocated choices on opinion leadership.

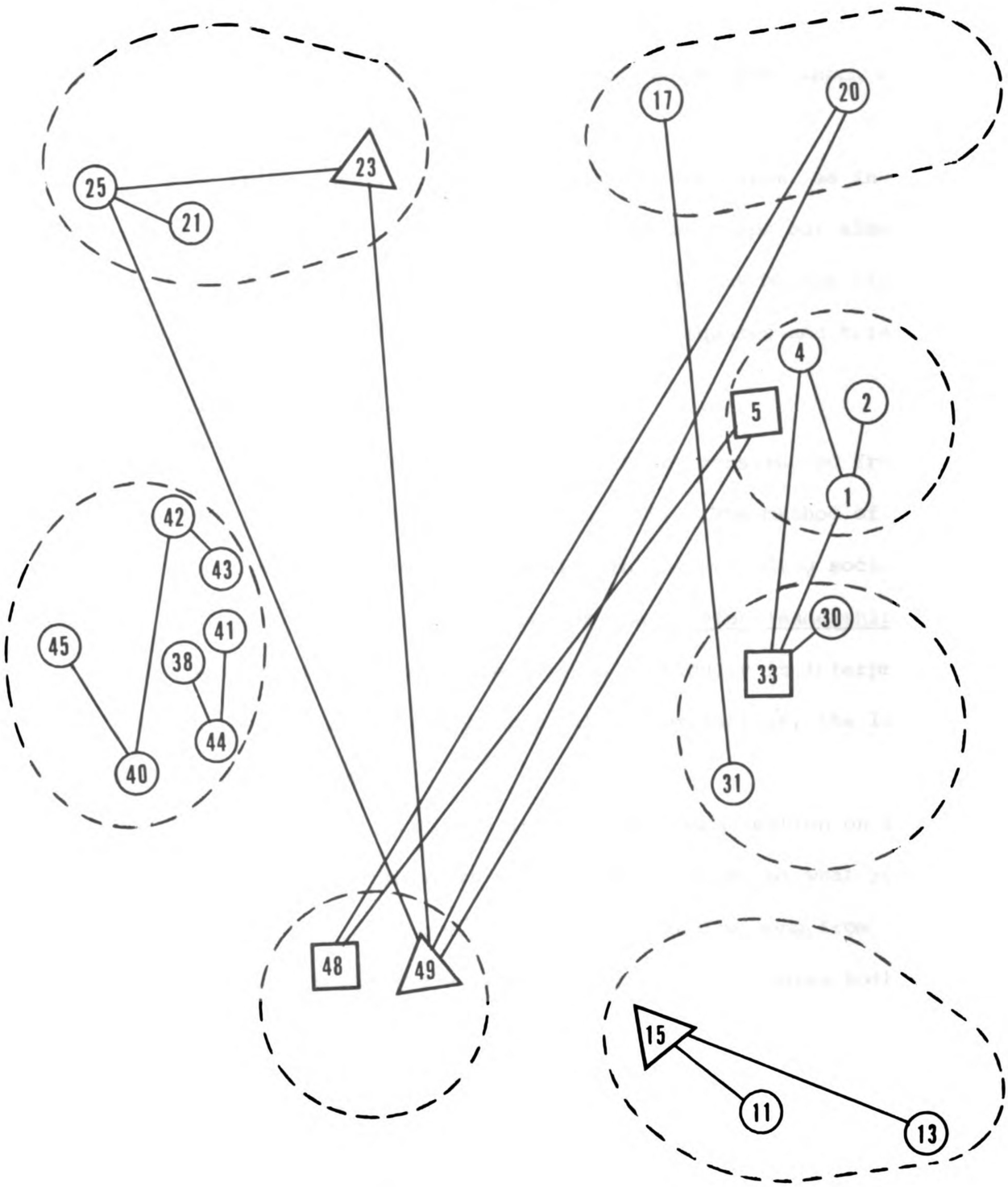


Figure 16. Sociogram representing intra-organizational communication on the topic of peer-evaluated effectiveness.

Legend: Isolates, Group Members and Bridge Persons = ○
Liaison Individual = ◎
Liaison Group Members = □
Liaison Set Members = △

liaison may still be seen in the sociogram. As before, the liaisons are shown as the individuals who have communication contacts which cut across the organizational structure.

When the liaisons are removed from the sociogram, as in Figure 17, the already-limited inter-group communication drops out almost completely. As previously illustrated, the positions of the liaisons before their removal is indicated by the dotted squares and triangles.

Sociogram: Liaisons and Opinion Leadership

The sociogram presented in Figure 18 was constructed from the communimatrix on opinion leadership (Figure 15). The method of construction and the symbols used are identical with the preceding sociograms.

So little interaction occurred on the opinion leadership dimension of communication contact, there is no difficulty in interpreting the sociogram. Still, even with very little interaction, the liaisons are seen to be involved.

Since there was so little inter-group communication on the opinion leadership dimension, it is not readily apparent what role the liaisons play in this instance. Deletion of the liaisons from the opinion leadership sociogram as shown in Figure 19, reduces both the intra-group and inter-group contact on that dimension. Deleted liaisons are indicated in Figure 19 with dotted squares and triangles.

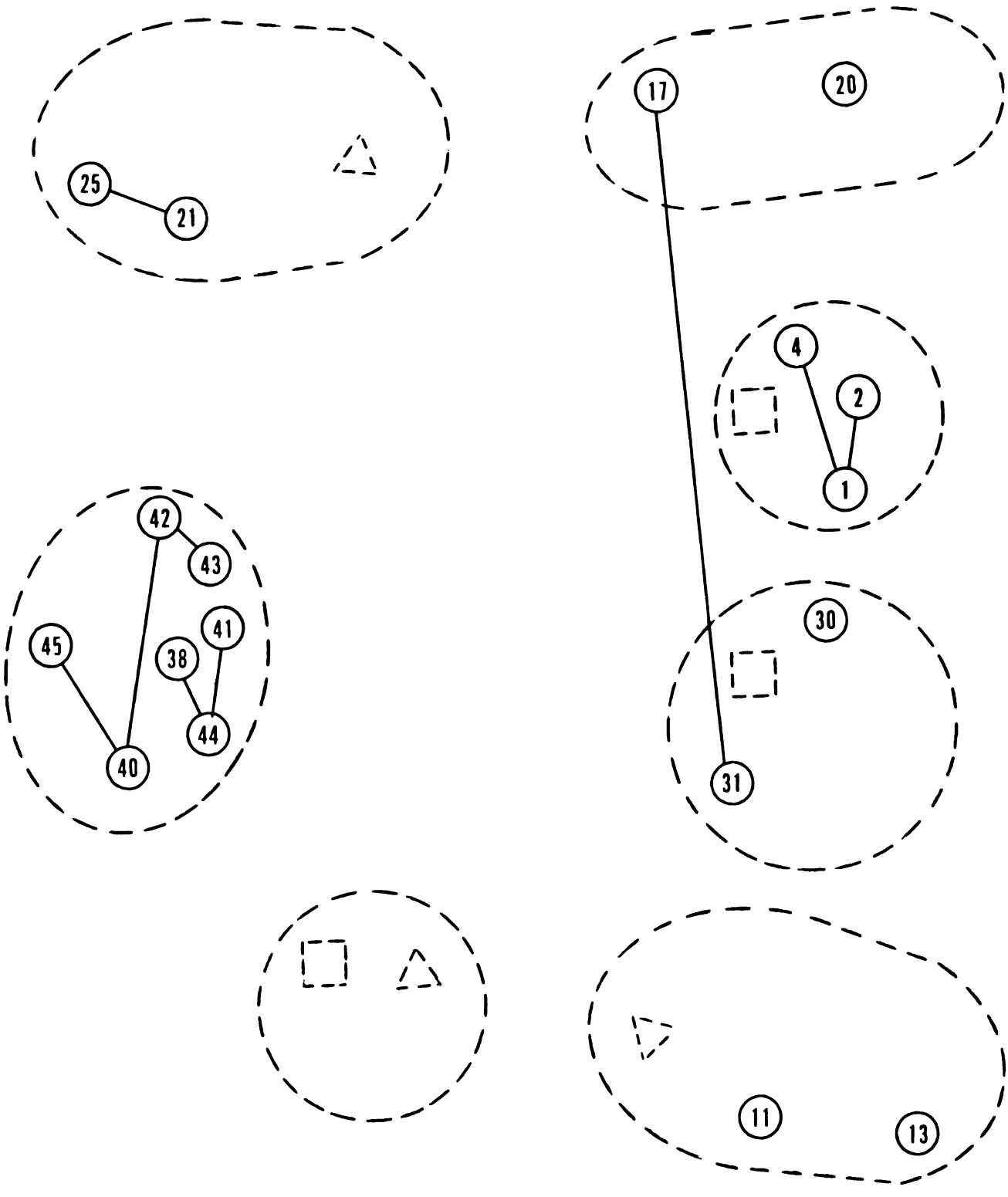


Figure 17. Sociogram representing intra-organizational communication on the topic of peer-evaluated effectiveness, with liaisons removed.

Legend: Isolates, Group Members, and Bridge Persons = ○
Liaison Individual = ◎
Liaison Group Members = □
Liaison Set Members = △

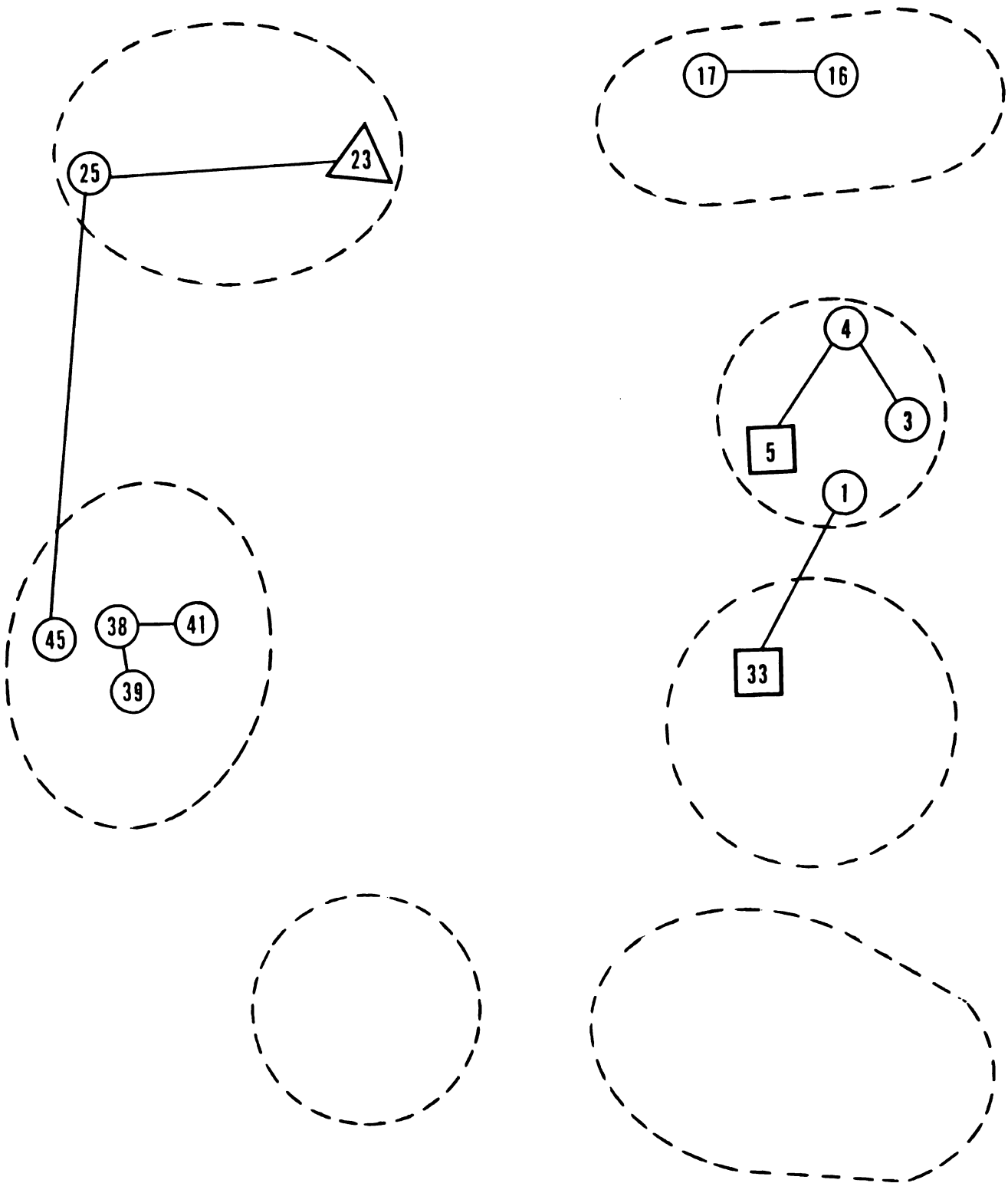


Figure 18. Sociogram representing intra-organizational communication on the topic of opinion leadership.

Legend: Isolates, Group Members and Bridge Persons = ○
Liaison Individual = ◘
Liaison Group Members = □
Liaison Set Members = △

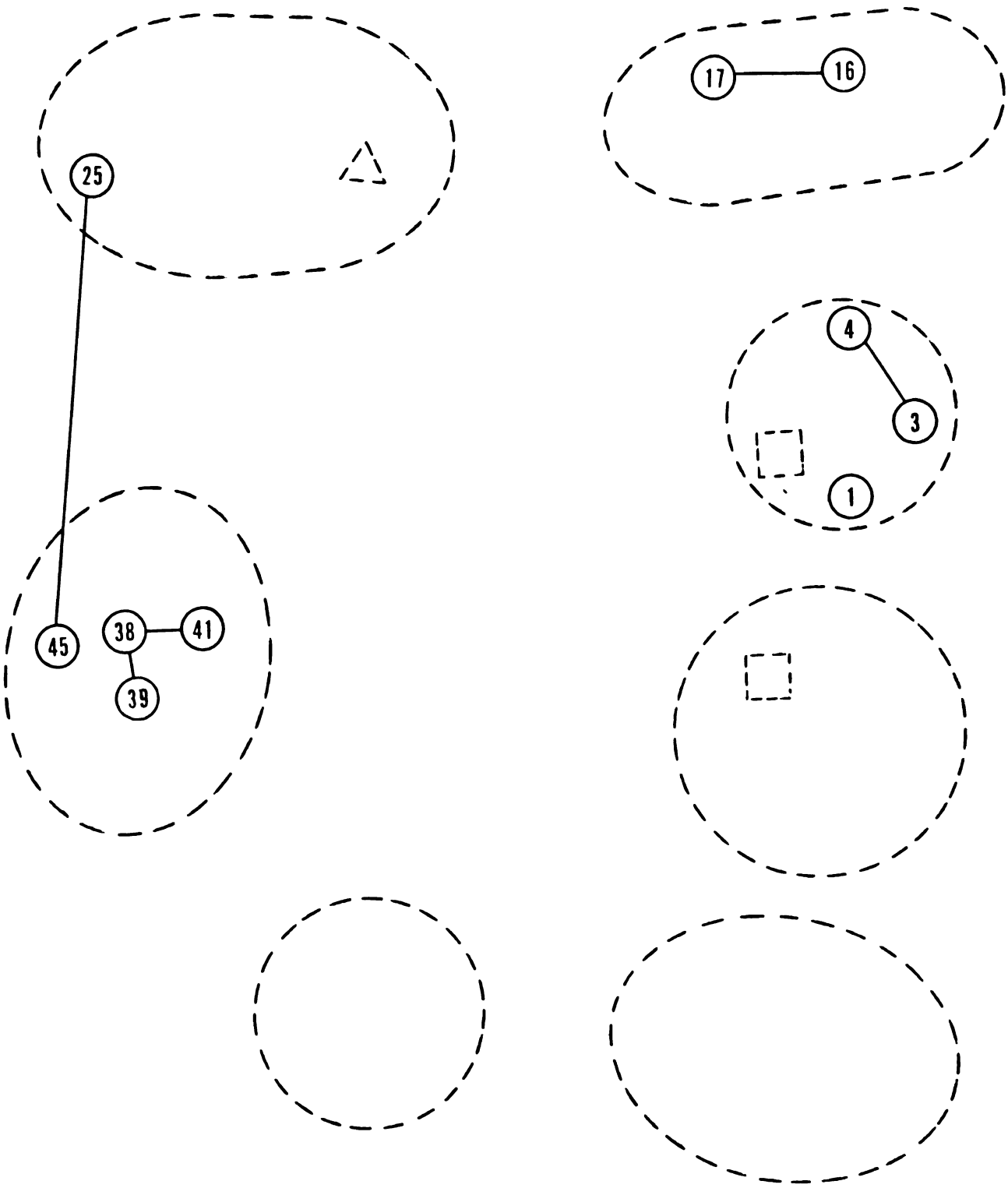


Figure 19. Sociogram representing intra-organizational communication on the topic of opinion leadership, with liaisons removed.

Legend: Isolates, Group Members and Bridge Persons = ○
Liaison Individual = ◎
Liaison Group Members = □
Liaison Set Members = △

APPENDIX E

PRESCRIBED FORMS FOR REPORTING EXTENSION TEACHING ACTIVITIES AND INSTRUCTIONS

(a) Form for individual monthly statistical report including summary of extension teaching activities.

(b) Instructions for completing the individual monthly statistical report including summary of extension teaching activities.

Appendix E (a)

PRESCRIBED FORM FOR INDIVIDUAL MONTHLY STATISTICAL REPORT INCLUDING SUMMARY OF EXTENSION TEACHING ACTIVITIES

INDIVIDUAL MONTHLY STATISTICAL REPORT
State, District, Area, and County Extension Workers

NAME_____

TITLE_____

DEPARTMENT, COUNTY,
DISTRICT AND AREA_____

REPORT MONTH_____

ADMINISTRATIVE PROGRAM AREA_____

SUMMARY OF EXTENSION TEACHING ACTIVITIES

ACTIVITIES	Number, by Project Areas					
	Agri-culture III	Market-ing IV	Family-Living V	Youth VI	Natural Re-sources	Total No.
58. Studies of problems and opportunities						
59. Field trials, tests, and demonstrations						
60. Consultations providing information and guidance on problems of individuals, families, and operators. A. Farm, home, other out-of-office visits						
61. B. Office calls						
62. C. Telephone calls - received or made						
63. Consultations providing information, guidance, advice on problems of organizations and agencies						

Appendix E (a) (Cont'd.)

ACTIVITIES	Number, by Project Areas					
	Agri-culture III	Market-ing IV	Family-Living V	Youth VI	Natural Re-sources	Total No.
64. Meetings of Extension Planning, Development & other committees						
65. Leader Training: A. Meetings to train local leaders						
66. B. Number of different leaders trained						
67. Other meetings at which Extension workers presented information						
68. News stories released directly to newspapers or magazines						
69. Publications distributed to public						
70. Direct Mail: A. Number of different pieces prepared						
71. B. Number of pieces distributed						
72. Radio broadcasts participated in						
73. Television broadcasts participated in						

Appendix E (b)

INSTRUCTIONS FOR COMPLETING THE INDIVIDUAL MONTHLY STATISTICAL REPORT INCLUDING SUMMARY OF EXTENSION TEACHING ACTIVITIES

Instructions and Interpretations for Completing The Monthly Statistical Report.

A. This report is to determine quantitatively some of the more important teaching techniques used to reach Extension's clientele. No attempt is made in this report to get a total picture of how a staff member does his extension work or to measure the efficiency of individual workers.

B. When two or more state, district, area, or county staff members participate in the same activity, the person having major responsibility for planning the activity should report it. When equal responsibility is shared, the persons involved should mutually decide which one will report it.

C. Extension employees with less than 100% Extension appointment should report only total days devoted to Extension work.

D. Organization of Report:

Page 1 - Identification

Page 2 & 3 - Total days worked are to be accounted for in the five program areas.

The three sections on page 4 are for additional information. They do not cross check with any previous figures except Total Days Worked, (51-A) Days in Office, and (52-B) Days in Field which should correspond with the grand total at bottom of page 3 (50).

E. At the end of each month each Staff member completes a monthly Statistical Report and sends the original to his Program Director. The Report must reach the Program Director no later than the 15th of the following month. A six month summary of the monthly statistical Reports will be required at the end of June. Area Extension Agents will provide their County Extension Agriculture or Natural Resource Agent with a copy of the monthly Statistical Report for each county they serve.

Instructions for Summary of Extension Teaching Activities.

58. Include the number of special studies or surveys made in each project area to aid in identifying and solving problems of people or present new opportunities for Extension work. Place the number of special studies or surveys in the appropriate project area column.

59. Report the number of field trials, tests, and demonstrations in the appropriate project area column.

60. Include all individual staff efforts to provide individuals, families, and farm operators with guidance, advice, and information. Report the number in the appropriate project area column.

63. Include all individual staff efforts that provide advice, guidance, and information to organizations and agencies, both public and private. Report the number in the appropriate project area column.

64. Report the number of all Extension planning, development and other committee meetings, including sub-committee meetings, in the appropriate project area columns, i.e., Agricultural Production Committee meetings in Column III, Marketing Committees in Column IV, Family Living Education in Column V, 4-H Youth Development in Column VI, and Natural Resource Committees in Column VII.

65. Include all meetings to train local leaders, and the number of different leaders trained. Use appropriate project area columns.

67. Report all other meetings at which you participated as a professional Extension worker.

68. Report each news story, feature article, and personal column released by you directly to a newspaper or magazine as one item. This includes suggested stories prepared by the state office and released by agents to news media if adapted to the local situation. The same story sent to several outlets should be reported only once. Information given to reporters or writers as the basis for a story should also be reported. News stories prepared by local leaders should not be reported. The State Office of Information should report stories released directly to news outlets from that office. County or area offices also count them only if they were adapted to local situations and released from the county or area office.

69. Report the number of copies of bulletins, circulars, leaflets, and other materials related to subject-matter and organization aspects of Extension work. Include such materials prepared in the county or area office, as well as those of state and federal origin. Commercial publications are not to be counted unless they are recommended by the state office. (see Item #70)

70. Include commodity letters, newsletters, postcards, self-mailers, envelope stuffers and all messages sent by mail to specific audiences for a specific purpose. Do not include letters to individuals.

71. Report total number of pieces mailed.

72. A broadcast is a single presentation on the air. It may be given in person or by transcription. An Extension worker does not have to appear on the program so long as he is responsible for its preparation. Information given to station announcers or writers and used as the basis for a broadcast is also to be reported. Broadcasts, including tapes, prepared with the Office of Information should be counted only by that office.

73. Same as above.

APPENDIX F

INTER-ITEM CORRELATION MATRICES

(a) Correlation between the items included in constructing information input indices (Table 11)

(b) Correlation between information input indices and the items included in constructing the indices (Table 12)

(c) Correlations between the items included in constructing peer-communication indices (Table 13)

(d) Correlations between peer-communication indices and the items included in constructing the indices (Table 14)

(e) Correlations between the items included in constructing information output indices (Table 15)

(f) Correlations between information output indices and the items included in constructing the indices (Table 16)

Table 11. Correlations Between the Items Included in Constructing Information Input Indices

Items Included in Constructing Indices	2	3	4	5	6	7	8
1. No. of professional periodicals read	-.22	.13	.52	.33	.08	-.16	.09
2. No. of non-professional periodicals read	X	.06	-.21	-.18	.12	.32	.20
3. Time spent in reading non-professional journals	X	X	.37	.07	.40	.12	-.11
4. Time spent in reading professional journals	X	X	X	.44	.22	.07	-.06
5. No. of research publications received	X	X	X	X	.37	.03	.05
6. No. of extension publications received	X	X	X	X	X	.10	.16
7. No. of telephone conversations	X	X	X	X	X	X	-.03
8. No. of professional meetings attended	X	X	X	X	X	X	X

Table 12. Correlations Between Information Input Indices and the Items Included in Constructing the Indices

Items Included in Constructing the Indices	Correlation Between Input Amount Index and the Item	Correlation Between Input Diversity Index and the Item
1	2	3
1. No. of professional periodicals read	.46	.43
2. No. of non-professional periodicals read	.28	.24
3. Time spent in reading non-professional journals	.54	.44
4. Time spent in reading professional journals	.61	.55
5. No. of research publications received	.55	.42
6. No. of extension publications received	.64	.56
7. No. of telephone conversations	.38	.17
8. No. of professional meetings attended	.34	.32

Table 13. Correlations Between the Items Included in Constructing Peer-Communication Indices.

Items Included in Constructing Indices	2	3	4	5	6	7	8
1. No. of intra-dept. contacts	.21	.85	.17	.51	.18	.15	.15
2. No. of inter-dept. contacts	X	.21	.88	-.04	.54	.22	.30
3. Frequency of communication with intra-dept. peers	X	X	.31	.53	.30	.26	.15
4. Frequency of communication with inter-dept. peers	X	X	X	-.02	.61	.22	.23
5. Time spent in communicating with intra-dept. peers	X	X	X	X	.30	.17	.13
6. Time spent in communicating with inter-dept. peers	X	X	X	X	X	.12	.15
7. Number of extra-organizational contacts	X	X	X	X	X	X	.58
8. Time spent in communicating with extra-organizational peers	X	X	X	X	X	X	X

Table 14. Correlations Between Peer-Communication Indices and the Items Included in Constructing the Indices

Items Included in Constructing the Indices	Correlation Between Peer-Communication Amount Index and the Item	Correlation Between Peer-Communication Diversity Index and the Item
1	2	3
1. No. of intra-dept. contacts	.37	.39
2. No. of inter-dept. contacts	.42	.70
3. Frequency of communication with intra-dept. peers	.48	.54
4. Frequency of communication with inter-dept. peers	.43	.74
5. Time spent in communicating with intra-dept. peers	.33	.31
6. Time spent in communicating with inter-dept. peers	.34	.59
7. Number of extra-organizational contacts	.94	.49
8. Time spent in communicating with extra-organizational peers	.64	.51

Table 15. Correlations Between the Items Included in Constructing Information Output Indices

Items Included in Constructing Indices	2	3	4	5	6	7	8	9	10	11	12	13
1. Farm and home visits	.41	.25	.07	.41	.25	.60	.49	.39	.00	.22	.11	.19
2. Office calls	X	.72	.26	.16	.13	.36	.32	.42	.02	.15	-.08	.16
3. Telephone calls	X	X	.33	.15	.11	.36	.32	.42	.16	.10	-.09	.14
4. Consultations	X	X	X	.09	.12	.19	.15	.06	.18	.20	-.11	.17
5. Extension committee meetings	X	X	X	X	.27	.56	.42	.22	.28	.15	.14	.03
6. Leader training meetings	X	X	X	X	X	.32	.55	.52	.01	.52	.09	.55
7. Other extension meetings	X	X	X	X	X	X	.57	.49	.12	.28	.17	.22
8. News stories	X	X	X	X	X	X	X	.41	.49	.54	.05	.53
9. Publications	X	X	X	X	X	X	X	X	-.11	.29	.16	.39
10. Direct-mail distributed	X	X	X	X	X	X	X	X	X	.02	.07	-.09
11. Mail prepared	X	X	X	X	X	X	X	X	X	X	.04	.85
12. Radio broadcasts	X	X	X	X	X	X	X	X	X	X	X	.00
13. Television broadcasts	X	X	X	X	X	X	X	X	X	X	X	X

Table 16. Correlations Between Information Output Indices and the Items Included in Constructing the Indices

	Items Included in Constructing the Indices	Correlation Between Output Amount Index and the Item	Correlation Between Output Diversity Index and the Item
	1	2	3
1.	Farm and home visits	.61	.64
2.	Office calls	.58	.55
3.	Telephone calls	.56	.61
4.	Consultations	.38	.33
5.	Extension committee meetings	.54	.51
6.	Leader training meetings	.62	.49
7.	Other extension meetings	.75	.71
8.	News stories	.81	.67
9.	Publications	.65	.61
10.	Direct-mail distributed	.28	.21
11.	Direct-mail prepared	.61	.38
12.	Radio broadcasts	.20	.09
13.	Television broadcasts	.58	.39

APPENDIX G

LIAISONNESS INDEX

Respondent Number	Index Value	Respondent Number	Index Value
23	22	41	5
26	22	45	5
49	19	10	4
48	18	11	4
24	18	22	4
15	18	32	4
5	16	36	4
25	14	9	3
19	13	34	3
1	10	42	3
2	9	20	2
4	9	29	2
21	9	35	2
50	9	38	2
3	8	43	2
7	8	47	2
8	8	13	1
12	8	14	1
6	7	16	1
40	7	17	1
28	6	27	1
33	6	39	1
44	6	18	0
30	5	37	0
31	5	46	0

Unit of Analysis is the Individual N = 50

Liaisonness Range = 0 through 22

Contact values for typologies of individuals:

Each Isolate	0
Each Group Member Contact	1
Each Bridge Person Contact	2
Each Liaison Individual Contact	3
Each Liaison Group Member Contact	4
Each Liaison Set Member Contact	5