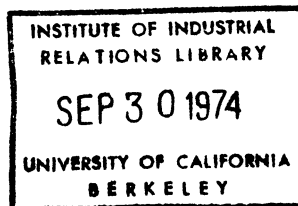


EMPIRICAL FINDINGS AND SUGGESTIONS FOR FUTURE
RESEARCH ON ORGANIZATIONAL COMMUNICATION

Karlene H. Roberts
Charles A. O'Reilly III
University of California, Berkeley



SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM										
1. REPORT NUMBER 6	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER										
4. TITLE (and Subtitle) EMPIRICAL FINDINGS AND SUGGESTIONS FOR FUTURE RESEARCH ON ORGANIZATIONAL COMMUNICATION		5. TYPE OF REPORT & PERIOD COVERED Technical, Interim										
		6. PERFORMING ORG. REPORT NUMBER										
7. AUTHOR(s) Karlene H. Roberts Charles A. O'Reilly III		8. CONTRACT OR GRANT NUMBER(s) N000314-69-A-0200-1054										
9. PERFORMING ORGANIZATION NAME AND ADDRESS Institute of Industrial Relations University of California Berkeley, California 94720		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS										
11. CONTROLLING OFFICE NAME AND ADDRESS Organizational Effectiveness Research Programs, Office of Naval Research Arlington, Virginia 22217		12. REPORT DATE August, 1974										
		13. NUMBER OF PAGES 169										
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified										
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE										
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release, distribution unlimited												
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)												
18. SUPPLEMENTARY NOTES												
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) <table border="0"> <tr> <td>communication</td> <td>information accuracy</td> </tr> <tr> <td>communication failures</td> <td>information blockage</td> </tr> <tr> <td>gatekeeping</td> <td>information distortion</td> </tr> <tr> <td>influence of information recipient</td> <td>information flow</td> </tr> <tr> <td></td> <td>information transmission</td> </tr> </table>			communication	information accuracy	communication failures	information blockage	gatekeeping	information distortion	influence of information recipient	information flow		information transmission
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communication failures	information blockage											
gatekeeping	information distortion											
influence of information recipient	information flow											
	information transmission											
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) <p>This report is a companion piece to Technical Report #7 from this grant. In this report we review the research in organizational communication completed and in progress under the auspices of this grant, suggest some directions future research might take, and mention how the results of the research completed to date might be applied in the Navy. The report reviews the following aspects of the work supported under this grant; two theoretical reviews of the literature in organizational communication, the development of a framework for guiding organizational behavioral research,</p>												

19. KEY WORDS

interpersonal trust
job satisfaction
organizations
pay
performance
research methodology

20. ABSTRACT

the development (and inclusion) of an instrument for assessing individual perceptions about organizational communication, and seventeen investigations based on field data and four laboratory studies of organizational communication.

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CHAPTER ONE

The task of developing ways to describe organizations and to detail simultaneously the nature of attitudes and behaviors of effective participants in different kinds of organizations is anything but complete. In essence, though, identifying human qualities most beneficial given particular kinds of organizations in which people must operate is the superordinate goal of research in organizational behavior.

Many attempts to describe organizations as entities begin by focusing on their structure. One possible problem with this approach is that those dimension of structure most frequently researched in the past are static (Hall, 1970; Parsons, 1960; Perrow, 1970; Thompson, 1967; Pugh, Hickson, Hinings & Turner, 1969), and fail to reflect the fact that organizations change their characteristics in changing environments and with changing constituencies. Generally, these static characteristics have been empirically related to individual attitudes and behaviors (Blood & Hulin, 1967; Porter & Steers, 1973; Gerard, 1957; Porter & Lawler, 1964, etc.), with little attention given the processes intervening between macro organizational and individual variables, and even less attention to the possibility that individuals are changed by organizations and organizations in turn respond to individuals.

Purposes of this research

One important task of this research was to find some means of conceptualizing organizations which could reflect their health and stability. It was decided that a useful thermometer of organizational health had to possess at least two major characteristics:

1. It had to be some aspect of organizational life which outcrops at macro and more micro levels. Such a characteristic, then, would be a relevant descriptor regardless of where (at the individual, group, or organizational level) an observer wished to break into an organization.
2. It should be a variable which can be expected to change through

time in response to external organizational factors or to other internal characteristics.

A second research objective was to demonstrate empirically relationships of the outcroppings of the focal variable at each level to other relevant variables at the specific levels. For example, assuming that it is possible to find a characteristic of organizations which is manifest by individuals, groups, and entire organizations, this characteristic might then be found related to (or even found to be caused by) specific properties of individuals such as their personalities, to group characteristics such as climate, or to organizational characteristics such as the structural variables size and hierarchy. To be maximally useful the focal variable should also be shown related to manifestations of organizational effectiveness. Thus, individual performance, group performance, and relative effectiveness of total organizations should be shown dependent on any variable which can be used as a thermometer for organizational health. Two final tasks were to suggest how the variables assessed and relationships uncovered could be used to make organizations better places in which to work, and to discuss the way in which changes in the phenomenon of interest over time will be assessed and analyzed in future work.

Organizational communication as a focal variable

The focal descriptor decided upon was organizational communication. As Barnard (1938) early commented, "In an exhaustive theory of organization, communication would occupy a central place, because the structure, extensiveness, and scope of the organization are almost entirely determined by communication techniques (p. 91)." Communication seemed a reasonable focal variable because

- 1 - It appears no other organizational activities can occur without it,
- 2 - It does outcrop across levels (as will be demonstrated later),
- 3 - If assessed across time it might reflect organizational changes of consequence,

and

- 4 - It appeared possible that it is related to and might predict important organizational outcomes such as performance and well being (Bowers, 1969; Likert, 1967).

"Communication failures" as major problems for organizations

There is considerable discussion in the literature of circumstances of national consequence which are shown attributable to information distortion or blockage. For example, the Bay of Pigs debacle resulted, in part, because estimates of the situation were filtered or distorted, leaving decision makers to operate in a relative vacuum of relevant information (see Janis, 1972, pp. 14-49). A limited recitation of similar fiascos attributable in part to the existence of accurate relevant information in the system and its failure to reach appropriate decision centers because of screening or distortion includes:

- 1 - The lack of preparedness at Pearl Harbor (Janis, 1972; Wilensky, 1967).
- 2 - The failure of strategic bombing during World War II (Wilensky, 1967).
- 3 - The "surprise" intervention of China into the Korean War (Janis, 1972).
- 4 - A number of mistakes encountered in the escalation of the Vietnam conflict (Janis, 1972).
- 5 - The great salad oil swindle perpetrated by Anthony De Angelis on a number of large firms (Miller, 1965; Wilensky, 1967).
- 6 - A similar swindle by Billie Sol Estes (Kaufman, 1973).
- 7 - The deliberate suppression of information about the killing of civilians at My Lai (Kaufman, 1973).
- 8 - Any number of incidents associated with the Watergate Affair and reported in the popular press.
- 9 - Informing Secretary of State Kissinger of the imminent Arab-Israeli war in 1973 (Kalb & Kalb, 1974).

At a somewhat more mudant level Downs (1967) discusses the fact that bureaucratic officials tend to distort information as they pass it along. He mentions several distortion mechanisms, such as condensation, and some antidistortion processes, such as redundancy. Downs does not

examine their specific and simultaneous influences on information change, nor does he provide empirical data on the influence of these communication factors on other aspects of organizational life.

Almost every participant in every organization has occasion to pass information to others and, to some extent, choose which information to send and which to withhold. March and Simon (1958, p. 165) note this process, called uncertainty absorption, occurs every time a sender draws inferences from a body of evidence and transmits the inferences rather than the evidence. Weick (1969) adopts the principles of uncertainty absorption as the very essence of organizing:

Organizing is directed toward removing equivocality from the informational environment. The basic raw materials on which organizations operate are informational inputs that are ambiguous, uncertain, equivocal. Whether the information is embedded in tangible raw materials, recalcitrant customers, assigned tasks, or union demands, there are many possibilities, or sets of outcomes that might occur. Organizing serves to narrow the range of possibilities, to reduce the number of 'might occurs.' The activities of organizing are directed toward the establishment of a workable level of certainty. An organization attempts to transform equivocal information into a degree of unequivocality with which it can work and to which it is accustomed. This means that absolute certainty is seldom required. It also means there can be enormous differences among organizations and industries with respect to the level of clarity that they regard as sufficient for action. (p. 40) [Italics Weick's]

Much of the literature concerned with information flow is also concerned with decision quality and it is obvious that little of this work is of an empirical nature. As Weick notes above there are (probably) enormous differences in the quality of information flow acceptable to different kinds of organizations for decision making or action. Thus, dysfunctional information flow in one organization may be functional in another.

It is important to recognize that other organizational activities may be as important as decision making, and some of these activities might be attributable to "communication failures." In addition, aspects of communication which are not components of the rather broad term, information failure

possibly cause or at least reflect many of the behaviors which occur in organizations. While there exist some studies which observe relationships among various communication and other organizational phenomena, the empirical literature in this area is sparse. It will, however, be discussed in detail later in this report.

Problems in research and theory in organizational communication

Definitional problems. The problem of trying to define communication is well illustrated by Dance (1970). He uncovered 95 definitions of communication which were reduced, through content analyses, to 15 themes. Dance concluded that it is difficult to determine whether communication is over-defined or under-defined but its definitions lead scholars in different and sometimes contradictory directions.

Dubin (1969) would characterize organizational communication as a summary variable including a variety of phenomena involved in information transmission, attribution of meaning, and consequent response. As such, it is probably futile to generate a comprehensive definition of the phrase which is scientifically useful.

Theoretical problems. A number of reviews of research and theory on human communication exist (Barnlund, 1968; McLeod, 1967; Schramm & Roberts, 1971; Thayer, 1967, etc.). Some reviews are even specific to communication in organizations (Guetzkow, 1965; Porter & Roberts, in press; Roberts, O'Reilly, Bretton & Porter, in press; Redding, 1966; Roberts, 1972; Smith, Richetto, & Zima, 1972; Thayer, 1967). The general conclusion is that the area is devoid of theory and that certainly no models exist for integrating communication and other organizational variables.

The early promise of the information theoretic approach (Shannon & Weaver, 1949) seems to have taken hardest blows at the hands of researchers interested in communication in social contexts. As Chapanis notes:

[The literature on communication/information theory] is essentially useless for our purposes. I have yet to find a single instance in which psychological research on communication theory has contributed to the solution of any practical psychological problem. For one thing, the bits, bytes, or chunks of communication theory are

like mouthfulls of sawdust. They are as mindless as they are tasteless. Communication theory is concerned only with the randomness or, conversely, with the statistical organization of messages. It ignores completely their sense or content. (1971, p. 952)

Porter and Roberts (in press) conclude that there exist no adequate theories or conceptual systems for explaining the nature of communication in organizational settings. Theorists writing about communication and those writing about organizations have failed to provide interrelated sets of propositions which can provide coherent direction to researchers. Finally, findings from social psychological research pertaining to communication and attitude change are of limited use to those of us concerned with organizational communication because of the considerable extrapolation required to generalize them to organizations.

Research problems. A major limitation to research in organizational communication is simply that little exists. Porter and Roberts (in press) summarize 22 of the most important field studies in the area and note that these 22 investigations represent the bulk of such research reported prior to 1972. This in contrast to the over 4,000 investigations of job satisfaction in existence (Lawler, 1971) suggests that organizational communication could profit from empirical attention.

At the onset some of the methodological problems inherent in the existing research should be stressed. Specific findings will be discussed later, as they become relevant to various aspects of the research to be reported.

First the definitional problems and lack of theoretically based systematic research suggest the necessity for mapping the organizational communication domain. Only after this task is complete can communication and other organizationally relevant responses be related.

Of the available investigations over half draw subjects from only a single organization and none are truly longitudinal. Where subjects have been drawn from different kinds of organizations there exist no comparisons across organizations. Thus, research to date fails to attempt

to understand how communication functions in specific organizational circumstances. Most of the available studies rely on responses from only one kind of organizational participant, the manager or professional. Generalizing findings from these studies to organizations as entities is an extremely dangerous pastime. Finally, most investigations involve only a few subjects. Porter and Roberts state that with the exception of one study (Smith & Brown, 1964) our entire knowledge about how people communicate in organizations is based on fewer than 1500 individuals.

In terms of data collection devices employed the area is somewhat better off. Typical attitude questionnaires do not predominate; interviews, self recording forms, observations, and sociometric techniques have also been used. However, we know of no investigations which simultaneously used more than one of these methods. And there is little attention to integrating findings from laboratory and field. No research, in fact, seems to have been designed to develop propositions in the field and refine them in the laboratory or vice versa, or to extend findings from one kind of investigation to the other.

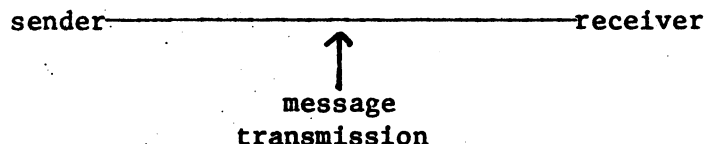
Of major importance, data concerning the relationship of communication and other organizational phenomena are almost entirely missing. The most glaring omission are studies of relationships among communication and performance factors.

In summary, these research problems suggest the following improvements in strategy so that theoretical models can be built based on sound empirical data:

- 1 - Mapping of the organizational communication domain.
- 2 - More inclusive and representative samples from organizations involved.
- 3 - Longitudinal investigations.
- 4 - Comparisons among findings from different kinds of organizations and cross validation among samples within the same organization.
- 5 - Integration within single research programs of laboratory and field investigations.
- 6 - Investigations relating communication and other organizational phenomena.

A clarifying perspective

As indicated previously there is a definitional and theoretical desert in organizational communication, making systematic integration of research extremely difficult to do. The communication process has most frequently been represented as:



This conceptualization is not helpful in defining communication content or process facets or in relating these to other behaviors in organizations. On the basis of the literature reviews mentioned previously it was felt that an umbrella-like framework in which groups are embedded in organizations, and individuals compose groups, would offer a better starting point.

The assumptions and framework relied upon to direct the overall research program reported here are detailed in Roberts and Hulin (1974). A framework for these authors is simply a set of specifications which can guide researchers in looking for variables which account for variance in responses of interest. The framework states:

$$\underset{\sim}{R} = f(\underset{\sim}{U}, \underset{\sim}{E}, \underset{\sim}{U} \times \underset{\sim}{E})$$

R is a vector of any attitudinal, behavioral, or physiological responses at the individual or some aggregate level. U is a vector of descriptors of the responding unit, and E is a vector of the situational or environmental characteristics in which responses are made. The multiplicative term makes explicit the hypothesis that in addition to the main effects of unit and situational characteristics on responses, a significant portion of variance in responses may be related to an interaction between unit and setting characteristics. By definition variables characterizing E must be assessed at a level more general than those characterizing responding units (Us). For example, relevant E variables

for individuals are group characteristics. When groups are assessed as responding units, relevant E variables are departments of entire organizations.

The influence on responses of changes over time are handled by what Roberts and Hulin label as "recategorization of variables." To quote these authors:

Investigators must...explicitly recognize that a set of responses made by a collection of units at time 1 should serve to characterize some part of the environment [or setting] at time 2...the opposite assumption cannot be true. If the responses at one time do not serve to alter and characterize the environment at time 2, then man has no impact on his environment....

There may also be situations in which a response or a set of responses by U at time 1 is used to characterize the E for a second U at time 2. The time delay is arbitrary and depends on the questions being studied....

Interdependencies among parts (individuals, groups, etc.) of the organization can be handled by specifying that for the Nth unit at time 1, the responses of the other N-1 units serve as partial characteristics of the setting at time 2....For example, N-1 members of a work group provide a consistent set of responses characterizing a cohesive, high morale group. These responses provide the environment for the remaining group member's responses. (p. 13)

Recapitulating, note that the primary purposes of this research are to identify an organizational concept which outcrops at the individual, group, and organizational levels of analyses and to relate this concept to other important aspects of organizational life. A second purpose is to provide practical suggestions about changes which can be made in the interest of improving organizational health and/or efficiency.

Organizational communication appeared to be a reasonable focal concept for reasons stated. However, the general research area is fraught with a number of definitional, theoretical, and research methodological problems. Some suggestions are offered for improvement over the scant past research which does exist, and the skeleton of the research framework which guided our activities was provided. In the next chapter we detail the general methodologies employed in the various studies which are a part of our research program.

CHAPTER TWO

A variety of research approaches, measurement devices, and samples have been employed to date in this research program. The reader will recall that a necessary task of the research was to identify communication outcroppings at individual, group, and organization levels and to relate these outcroppings to appropriate variables at the same level. Thus, a variety of approaches used simultaneously are called for.

Since at this writing the entire research program is not complete the various research strategies will be summarized in this chapter for all of the studies to be discussed. Thus, the reader can at later points in this report return to this chapter for clarification about samples, methods, and instruments.

The next chapter will present the results for those investigations of individual communication and its correlates which are complete and will describe complementary work still in progress. Chapter four will describe the complete and in progress work concerned with group communication and related phenomena, and chapter five will move to the organizational level. Chapter 6 will attempt to summarize some obvious gaps in our knowledge when all the described work is complete, mention our future efforts, and suggest applications of the current findings in real organizations.

Designs and samples

Most of the studies discussed here are field surveys in which attitude questionnaires serve as the data base. In addition, where possible archival performance data were obtained. Two of the reported investigations are laboratory studies. All of the samples will be briefly described.

The major and most comprehensive of the field studies involved large scale data collections, the nature of which will be described later, in the first training and first two operational F-14 squadrons (VF124, VF1, and VF2). The attitude data in these investigations were collected in January, 1973, and again in January, 1974. The 1973 data collection was

followed by a collection of enlisted personnel performance data relevant to the January, 1973, period. The 1973 attitude data collections involved 579 officers and enlisted men, or about 82% of the available sample. The 1974 attitude data collection included 813 officers and enlisted men, or about 81% of the available sample. These data collections were preceded by a pre-testing of instruments in a similar Navy fighter squadron in July, 1972. For convenience these data sets are labelled ONR#1 (pre-test), ONR#2 (F-14 squadron, January, 1973) and ONR#3 (F-14 squadrons, January, 1974). It is important that the focal organization in which we begin to explore organizational communication is a high technology organization. This is because such organizations can be considered as prototypes for most future organizations. It is not as useful to investigate types of organizations which may not be as predominant in the future.

Many of the propositions under scrutiny in these field studies were and are in need of extension and cross-validation. Thus, data using some of the instrumentation developed in ONR#s 1, 2, and 3 and employing some refinements of concepts unexplored in the Navy were obtained from the following samples:

- 1 - A Mental Health Center. Data were collected over three years (with intervals of 7 months and 1 year). The sample included professional and non-professional respondents in four mental health care delivery teams. For convenience these data are labelled MHC, and are subdivided into MHC #1, MHC #2, and MHC #3, indicating the time of the data collection.
- 2 - Hospital Emergency Room Personnel. A controlled field experiment (referred to later) was completed. This field experiment is labelled "ER field experiment."
- 3 - Professional and non-professional respondents from 16 medical practices. These data are labelled "PA data."
- 4 - Five US and five overseas financial institutions. These data are labelled "bank data" and are subdivided into a US and a foreign subsample.

Obviously, in not every case did samples include all organizational members. For example, an emergency room is not the sum total of a hospital.

However, in every case the samples include job respondents from all levels of the organizational hierarchy. Generally, the response rate ran around 80% of the total available personnel.

The two laboratory investigations which will be discussed used college subjects, over 90% of whom had considerable working experience. These investigations were conducted in the Management Science Laboratories at the University of California, Berkeley. Attitudinal data were collected and behavioral observations made.¹

In addition to the general survey and laboratory experimental approaches which will be discussed here, several design strategies were attempted for the primary purpose of assessing distortion of specific communication messages as they flow through organizations. One of these, the snowball sampling technique combined with focused interviews proved particularly disastrous. The approach is discussed in Roberts (1974), and it is recommended that researchers either use the approach quite differently than we did or avoid it completely.

General instrumentation

During the Navy pre-test (ONR #1) a number of ways to assess organizational communication and other variables were attempted. Additionally, interviews were conducted with squadron personnel at all levels in an attempt to obtain their reactions to the questionnaire. Pre-test data also included questions of specific interest to the squadron commanding officer. While the pre-test observations yielded some scientifically interesting data which will be reported within the context of various studies, its primary purpose was to develop an instrument which could reasonably be completed by personnel at all levels of the squadron and which might have theoretical and applied value.

The ONR #2 attitude instrument is described in detail in Blood

¹The bulk of the work was supported by ONR contract N000314-69-A-0200. Additional funds were provided by Public Health Service Research Grant #MH22051-01, Bureau of Health Manpower subcontract from Stanford University Medical School training grant, and a small Ford Foundation Institutional Award. These awards have now expired.

(1973a) and comprises the major part of the data base for this research. Some of the additional studies added or deleted instruments and this will be mentioned as we go along. Briefly the ONR #2 package consisted of the following:

- 1 - Assessment of a number of demographic variables including military occupational specialty, rank, years in Navy, months on squadron, age, education, state of residence, type of population of community in which the respondent was raised.
- 2 - The Job Orientation Inventory (Blood, 1973b) which orders respondent's preferences among ten job rewards.²
- 3 - The Self Description Inventory (Ghiselli, 1954) assessing thirteen personality dimensions which can be grouped as abilities, personality, and motivational traits.
- 4 - A nine-item assessment of occupational venturesomeness which is subdivided into ego strength, tolerance for ambiguity, and risk preference. The development of this instrument is to be reported in Bretton (1974).
- 5 - The Job Descriptive Index (Smith, Kendall & Hulin, 1969) which assesses satisfaction with five aspects of work; work itself, pay, promotion, supervision, and co-workers. An overall measure of job satisfaction is also included (Kunin, 1955).
- 6 - An instrument assessing respondent mobility aspirations, his/her trust in superior, and the degree to which that superior is seen as having influence over him/her. The questionnaire also asks respondents to report their perceptions of communication directionality, information accuracy, gatekeeping, blockages, change, expansion, repetition, desire for interaction, overload, and modality use. An overall estimate of satisfaction with communication is also obtained.
- 7 - A description of leadership behavior based on the work of Stogdill and Coons (1957). This particular version of the questionnaire was developed by Nealey and Blood (1968).
- 8 - Assessment of commitment to the squadron and to the Navy in general (Porter and Smith, 1970).

²Much of the work relevant to ONR Contract N000314-A-69-0200 concerns work values. That work is described in Blood (1974) and will not be described in this report. However, included in the Blood report are a few contributions from our analyses (Bretton, 1974; O'Reilly, Bretton & Roberts, in press; and O'Reilly & Roberts, submitted for publication [a]).

- 9 - An index of organizational climate (Campbell & Beaty, 1971) including perceptions about work group centralization, achievement orientation, task structure, supportiveness, security versus risk, training and development orientation, problem solving, ability, concern for excellence, and satisfaction and morale. Similar scales are concerned with perceptions about the total organization.
- 10 - A sociometric questionnaire which identified the communication roles (isolate, participant, etc.) people occupy in their organizations and the groups to which they belong in expertise, formal, authority, etc., networks.
- 11 - A set of questions which attempted to assess the quality of interaction in expertise and social groups considered most important by the respondent.
- 12 - A set of questions concerned with issues specific to the squadrons involved.³

Since the developmental work for most of the instruments is referenced no further comment will be made about it here. However, instruments 6, 10, and 11, because they assess communication in various organizations, and are focal to this research will be discussed further. In addition to the attitudinal data NAMTRA grades and job performance ratings were obtained where possible for enlisted personnel. The job performance ratings are of two types: for grades E1-E6 the rating forms included four separate categories. A factor analysis of the data showed 93% of the variance to be accounted for by a summed score. Thus, a summed score is used in this research for grades E1-E6. For grades E7-E9 the job performance form was slightly different. It included an overall rating which was used here. A perceptual measure of group performance was obtained for ONR #3.

Note that the bulk of the instruments used for ONR #2 attempted to assess attitudinal and performance data at the individual level of analysis, to obtain perceptions of group variables and to arrive at descriptions of organizations as entities. This point will be returned to at the end of the chapter, after discussion of the development of the communication instruments and mention of some of the instrumentation used in other samples.

³The analyses of these questions and morale data were reported back to the squadrons.

Assessing communication phenomena at the individual level (instrument #6)

The primary goals inherent in the development of this instrument included:

- 1 - The need to develop a short, easily scorable instrument which could assess a variety of communication facets in real organizations.
- 2 - The necessity for developing an instrument useful at various hierarchical levels within different kinds of organizations.
- 3 - The necessity to develop an instrument relatively free of bias, reliable in terms of internal consistency and stability over time, and valid.

The project began by reviewing all methodology previously used in communication research. The communication dimensions discussed in the literature were categorized. Not surprisingly, it was found that most previous research had given primary attention to network aspects of communication; and that more emphasis had been given hierarchy than any other aspect of directionality. Purposes for communication, its content and modalities used are also popular in the literature. Some attention has been devoted to information accuracy and distortion, importance of information transmitted, and transmission volume and speed. Finally, gatekeeping is often discussed, but its components little analyzed, and general level of interaction is often alluded to.

With these phenomena in mind a set of 189 items was drawn up, were worded to recognize the fact that communication is a time dependent process. Administration of the original item pool indicated that respondents could not make some differentiations which might be useful. For example, they could not differentiate the amount of communication engaged in at work which was social as opposed to task related.

Three non-communication variables are included in the instrument. These three, trust in superior, degree to which one's superior is perceived as having influence over his/her future, and mobility aspirations of the respondent, were variables shown in past research to have a significant impact on communication (Cohen, 1958; Friedlander, 1970; Hurwitz, Zander, & Hymovitch, 1960; Jones, Gergen & Jones, 1963; Loomis, 1959;

Mellinger, 1956; Read, 1962; Rosen & Adams, in press; Zand, 1972).

Ultimately, seven data sets with a total N of over 1200 respondents were used to develop a 35-item questionnaire measuring 13 communication and 3 non-communication facets. These facets are summarized above. The developmental efforts are reported in Roberts and O'Reilly (1974b). Since its initial development this instrument has been modified some by adding additional scales.⁴

Assessing communication at the group and organizational levels.

For a number of years a group of researchers at Michigan State University have been working on the development of a sociometric analysis useful in large organizations (Berlo, Farace, Monge, Betty & Danowsky, 1972; Monge & Lindsey, 1974; Richards, 1971; 1974a; 1974b; 1974c). This is instrument #10 above. Richards reviews past efforts in this area and details their limitations. The Michigan State method is based on ordering and re-ordering matrices, and is concerned with the following set of elements:

- I. Non participants who are either connected or only minimally connected to participants.
 - A. If they are not connected at all they are called Isolate, Type One;
 - B. If they have a single link to a participant, they are called connected isolates, or Isolate Type Two;
 - C. The category of Isolate Type One can be expanded to include Isolated Dyads and so on;
 - D. The category of Isolate Type Two can be expanded to include cases in which there is a chain of Isolate Type Two nodes with only a single link to any participant node. All the nodes between the participant and the end of the chain are called tree nodes.
- II. Participants are either group members or linkers.
 - A. The members of a group must meet the following five criteria;
 1. There must be at least three members,
 2. Each member must have the majority of his interactions with other members of the same group,

⁴Appendix One provides the current instrument and describes its updated scales.

3. There must be some path, lying entirely within the group, from each member to every other member,
4. There may be no subset of nodes, making up less than some small percentage of all the nodes in the group which, if removed, causes the group to become disconnected,
5. There may be no subset of links, making up less than some small percentage of all within-group links, which, if removed, causes the group to become disconnected (Richards, 1974c, p. 31).

After identifying participants and non-participants, linkages are established within and between groups. Clearly, if one can identify different communication networks and, for example, describe task interactions as opposed to social interactions or interactions based on formal authority, he can compare organizations on these various networks or compare networks within a single organization. Monge and Lindsey (1974) offer an example of the latter kind of comparison. In addition, it is possible to examine group properties such as intra-group connectedness, size, etc., in relation to other group and individual phenomena. Finally, individual role occupancy can be related possibly to other individual characteristics of organizational life.

Nosanchuk (1963) compares various sociometric partitioning techniques noting some limitations in matrix manipulations. However, the group and network outcomes of the Michigan State approach are conceptually more consistent with our work at the individual level than are the outcomes of other large scale sociometric techniques we reviewed.

Monge and Lindsey note a major problem in collecting data in large organizations using their approach. The questionnaire which must be used is slightly unwieldy. It either lists the names of all organizational participants asking respondents to indicate the frequency and importance of their contacts with each other person in the organization, or respondents are asked to fill in the names of all others with whom he is in contact in a particular (i.e., task or social) network. When this is done for several networks within the same organization the process becomes tiring for the respondent.

In an attempt to develop a simpler means for securing isomorphic data the ONR #2 instrument package included a series of questions about group interactions (instrument #10). At this writing analyses concerned with the isomorphism of the two instruments are not complete; what comparisons exist will be reported in chapter four, and the rest later.

A reduced instrument set

Subsequent to the ONR #2 data collection a series of analyses were engaged (Blood, 1974) for purposes of reducing the instrument package. The rationale to these analyses was to identify instruments or scales which accounted for the same response variance and then to eliminate overlap. A second approach to instrument reduction was simply to eliminate all instruments, based on ONR #2 findings, which did not show promise in describing organizational life. The ONR #3 instrument package contained most of the demographic questions asked previously and:

- 1 - The Job Orientation Inventory
- 2 - The Occupational Venturesomeness items
- 3 - The Job Descriptive Index and overall satisfaction rating
- 4 - The individual communication assessment device
- 5 - Items concerned with commitment to the squadron
- 6 - Organizational climate work group factors
- 7 - The large scale sociometric
- 8 - A perceptual measure of work group effectiveness (Mott, 1972) which includes assessment of production quality, quantity, and efficiency; adaptation in terms of problem anticipation and solving, awareness of potential solutions, and promptness and prevalence of adjustment; and flexibility.

Note that by and large individual perceptions concerned with organizations as total entities were not providing useful results. It appears that while participants might have rather definite perceptions about their work groups, the organization is certainly more vague in one's perceptions.

Instruments used in ancillary organizational samples

Since for scientific and practical reasons it is necessary to compare attitudes and behaviors across different types of organizations we attempted to extend and develop on the Navy data. Because it was never possible to collect the vast amount of data obtained in the Navy in any other single locale, each of the other samples should be thought of as providing adjunct information to some one small part of the organizational picture being developed in the Navy. Briefly, then, the complementary data obtained in other organizations (refer to page 11) included:

- 1 - Mental Health Center: The individual communication measure and assessments of job satisfaction using the Job Descriptive Index, the overall job satisfaction measure, and the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England, & Lofquist, 1957). Gough's (1957) Adjective Check List was used to assess personality characteristics.
- 2 - ER Field Experiment: The individual communication instrument and assessments of job satisfaction using the Job Descriptive Index, the overall measure of job satisfaction, and two scales (creativity and responsibility) from the Minnesota Satisfaction Questionnaire.
- 3 - PA Data: An approach to differentiating interpersonal trust drawn from Berlo, Lemert, and Mertz (1969), and experimental items concerned with communication openness and accuracy. The rationale for these extensions will be discussed later. Respondents also completed the Job Descriptive Index and overall satisfaction scales, and provided small scale sociometric information.
- 4 - Bank Data: The work group and organizational climate factors and the individual communication device.

The nature of the observations made in the two experiments will be discussed along with discussion of the studies themselves.

As previously indicated (see page 2) an objective of this research program was to assess communication (process and structure) and other related variables at the individual, group, and organizational levels of analysis. Figure 2.1 indicated our categorization of instrumentation described, and the kinds of additional assessments which can be derived from the available data. The figure also indicates the different samples for which various measures are available. At this writing every attempt

INDIVIDUAL VARIABLES		GROUP VARIABLES		ORGANIZATIONAL VARIABLES	
TRAITS	TRAITS	TRAITS	TRAITS	TRAITS	TRAITS
Demographic (all samples)	Aggregate Demographics (all samples)	Aggregate Demographics (all samples)	Aggregate Demographics (all samples)	Aggregate Demographics (all samples)	Aggregate Demographics (all samples)
Personal characteristics	Aggregate Personal Characteristics	Aggregate Personal Characteristics	Aggregate Personal Characteristics	Aggregate Personal Characteristics	Aggregate Personal Characteristics
Self Descriptive Index (ONR #2)	Self Description Inventory (ONR #2,#3)	Self Description Inventory (ONR #2,#3)	Self Description Inventory (ONR #2,#3)	Self Description Inventory (ONR #2,#3)	Self Description Inventory (ONR #2,#3)
Gough's Adjective Check List (MHC)	Aggregate Occupational Venturesomeness (ONR #2,#3)	Aggregate Occupational Venturesomeness (ONR #2,#3)	Aggregate Occupational Venturesomeness (ONR #2,#3)	Aggregate Occupational Venturesomeness (ONR #2,#3)	Aggregate Occupational Venturesomeness (ONR #2,#3)
Occupational Venturesomeness (ONR #2,#3)	General Interpersonal Trust-aggregate (ONR #2,#3, PA, MHC)	General Interpersonal Trust-aggregate (ONR #2,#3, PA, MHC)	General Interpersonal Trust-aggregate (ONR #2,#3, PA, MHC)	General Interpersonal Trust-aggregate (ONR #2,#3, PA, MHC)	General Interpersonal Trust-aggregate (ONR #2,#3, PA, MHC)
Trust, Mobility, Influence assessments (all samples)					
ATTITUDES	ATTITUDES	ATTITUDES	ATTITUDES	ATTITUDES	ATTITUDES
Job Descriptive Index and Overall Satisfaction (ONR #2,#3, MHC, FE)	Leadership description by group (ONR#2)	Leadership description by group (ONR#2)	Leadership description by group (ONR#2)	Leadership description by group (ONR#2)	Leadership description by group (ONR#2)
Minn Sat Questionnaire (MHC)	Work Group Climate Factors (ONR #2,#3 bank)	Work Group Climate Factors (ONR #2,#3 bank)	Work Group Climate Factors (ONR #2,#3 bank)	Work Group Climate Factors (ONR #2,#3 bank)	Work Group Climate Factors (ONR #2,#3 bank)
Commitment to Work Group and/or Organization (ONR #2,#3)	Morale-aggregate Individual Data (ONR #2,#3, MHC)	Morale-aggregate Individual Data (ONR #2,#3, MHC)	Morale-aggregate Individual Data (ONR #2,#3, MHC)	Morale-aggregate Individual Data (ONR #2,#3, MHC)	Morale-aggregate Individual Data (ONR #2,#3, MHC)
Job Orientation Inventory (ONR #2,#3)					
PROCESS/STRUCTURE	PROCESS/STRUCTURE	PROCESS/STRUCTURE	PROCESS/STRUCTURE	PROCESS/STRUCTURE	PROCESS/STRUCTURE
Perceptions of Communication (all samples except PA data)	Aggregation of Communication perceptions (ONR #2,#3, MHC, bank)	Aggregation of Communication perceptions (ONR #2,#3, MHC, bank)	Aggregation of Communication perceptions (ONR #2,#3, MHC, bank)	Aggregation of Communication perceptions (ONR #2,#3, MHC, bank)	Aggregation of Communication perceptions (ONR #2,#3, MHC, bank)
Accuracy-openness of Communication (PA)	Work Group Size (ONR #2,#3, MHC)	Work Group Size (ONR #2,#3, MHC)	Work Group Size (ONR #2,#3, MHC)	Work Group Size (ONR #2,#3, MHC)	Work Group Size (ONR #2,#3, MHC)
Communication Roles (ONR #2,#3)	Quality of Group Interaction for Task, Social-formal authority purposes-Connectedness, Differentiation, and Hierarchy (ONR #2,#3)	Quality of Group Interaction for Task, Social-formal authority purposes-Connectedness, Differentiation, and Hierarchy (ONR #2,#3)	Quality of Group Interaction for Task, Social-formal authority purposes-Connectedness, Differentiation, and Hierarchy (ONR #2,#3)	Quality of Group Interaction for Task, Social-formal authority purposes-Connectedness, Differentiation, and Hierarchy (ONR #2,#3)	Quality of Group Interaction for Task, Social-formal authority purposes-Connectedness, Differentiation, and Hierarchy (ONR #2,#3)
Individual Frequency of Contact (ONR #2,#3)					
Individual Importance of Contact (ONR #2,#3)					
Individual Centrality (ONR #2,#3)					
PERFORMANCE	PERFORMANCE	PERFORMANCE	PERFORMANCE	PERFORMANCE	PERFORMANCE
Enlisted Personnel Training Grades (ONR #2)	Aggregate Enlisted Personnel Individual Training Grades--Performance Ratings (ONR #2)	Aggregate Enlisted Personnel Individual Training Grades--Performance Ratings (ONR #2)	Aggregate Enlisted Personnel Individual Training Grades--Performance Ratings (ONR #2)	Aggregate Enlisted Personnel Individual Training Grades--Performance Ratings (ONR #2)	Aggregate Enlisted Personnel Individual Training Grades--Performance Ratings (ONR #2)
Enlisted Personnel Performance Ratings (ONR #2)	Perceptions of Group Effectiveness (ONR#3)	Perceptions of Group Effectiveness (ONR#3)	Perceptions of Group Effectiveness (ONR#3)	Perceptions of Group Effectiveness (ONR#3)	Perceptions of Group Effectiveness (ONR#3)
				</	

Figure 2.1. Instrumentation used in field studies

MHC=Mental Health Center
FE=Field Experiment

is being made to obtain performance data commensurate with the ONR #3 attitude data collection.

Note two important features in Figure 2.1. The first is that data concerned with groups can only be obtained from sources in which different groups (defined one way or another) can be compared. In our case group data are available for ONR #2, #3, and the Mental Health Center. Similarly, at the organizational level comparisons are only viable where different organizations undergo identical measurement. Thus, comparisons can be made for a few variables across the Mental Health Center, the banks, ONR #2, and #3. More numerous comparisons are possible at the organizational level by restricting them to ONR #2 and #3 samples because there are more identical data in these two samples, each composed of three organizations (VF1, VF2, and VF124). Two cautions are in order. First ONR #2 data were collected before the three organizations really became distinct from one another. In fact the changes over time will be discussed in Technical Report #8 from this project. Second, at the organizational level any comparisons based on these data are suspect because of the small number of organizations involved. Small samples can hardly represent important dimensions on which organizations are thought to differ.

A second important feature of Figure 2.1 is the way the data are illustrated. Returning to Roberts and Hulin (1974) and looking from the individual, to group, to organizational levels it is possible to consider traits as characteristics of, say, responding individuals (Us), attitudes and performances as responses (Rs), and then to embed these in appropriate setting characteristics (Es) at the group level. Similarly, if one wished to begin with group characteristics (Us) and responses (Rs) it is possible to embed these in appropriate organizational setting characteristics. Here what we think are process as opposed to state variables are more clearly delineated than in Roberts and Hulin's discussion. Change and feedback processes as they are pointed to by Roberts and Hulin could be studied with longitudinal data on the variables in Figure 2.1. Recall, however, that the purposes of the research reported here did not include building

models such as those implied by these statements. The purposes of the current contract are much more limited.

CHAPTER THREE

In this chapter we report our analyses of the relationships among individual communication phenomena and other characteristics. The individual is focused on as the transmitter of information. This will be accomplished by summarizing a variety of completed investigations. We will also mention work in progress and some future work which should be done in this domain. Finally, we will attempt to summarize our findings, suggest some gaps existing at the individual level of organizational communication analyses, and begin to think about how individual and group communication might be related. Chapter four will focus more specifically on group communication processes and related phenomena.

Individual Communication Phenomena and Their Antecedents

Returning to chapter one (page 3) we note that a major reason organizations might be interested in the nature of their internal communications is the possibility that information useful in making good decisions exists in organizations but often is not transmitted to decision makers. It seems fitting, then, to begin our analyses of individual communication in organizations by focusing on some of the reasons for various perceptions about communication and on mechanisms of distortion.

In our discussion of the development of the individual communication instrument it was noted that a number of writers consider interpersonal trust, perceived influence of the information recipient, and individual mobility aspirations as precursors of the quality and quantity of information passed. However, researchers tended to differently define trust, mobility, and influence, and measurements of information transmission, particularly in field studies, were suspect. Thus, four field investigations were conducted to explicate the influence of individual interpersonal trust, perceived influence of the information recipient, and respondent mobility aspirations on perceptions about communication processes in organizations. Three laboratory studies supplemented some of the field findings and focused more specifically on information blockage.

One other study was for the purpose of refining one of the antecedent variables thought most important to communication, by operationalizing differently two communication phenomena discussed in the early studies. Finally, two investigations, one in the field and one in the laboratory, are in progress for the purpose of further refining findings concerned with distortion.

Field investigations of perceptions about information flow

The primary interest in these field studies was to examine possible antecedents of "failures" in upward organizational communication (Roberts & O'Reilly, 1974a). The subjects included 101 members from MHC (tested at two points in time, seven months apart), 95 ONR #1 officers and enlisted men, the 54 ER field experiment participants, 179 overseas and local bank personnel, and 42 managers from various companies (tested at two points in time, two weeks apart)¹. In all organizations respondents had superiors to whom they were required to transmit information. The MHC, however, deliberately attempts to minimize status differences among participants.

Method. Each respondent completed the individual communication measure previously described. These studies only examined, however, relationships among the three antecedent variables and questions concerned with upward communication. Obvious weaknesses in using this measure are that it employs the same methodology to assess independent and dependent variables, the measures of communication are perceptual, and they are incomplete descriptions of the possible communication behaviors in superior-subordinate relationships.

Results. The relationships of trust and upward communication in the four organizations are presented in Table 3.1. Trust is positively related in either three or all four organizations to subordinates estimates of the accuracy of information received from their superiors, their perceptions of superior influence, desire for interaction with superiors, and satisfaction with communication in general.

¹This sample was not described in chapter two because this is the only place it is used, Here it was used for only one analysis.

Upward communication measures	Organizations			
	A (N=101)	B (N=95)	C (N=54)	D (N=179)
1. Perceived influence of superior	.36***	.25*	.28*	.34***
2. Respondent's mobility aspirations		.37***		
3. Percentage of time in contact with superior				
4. Percentage of information received from superior			.63***	
5. Percentage of information sent to superior			.43**	
Percentage of time the following methods are used to communicate:				
6. Written				
7. Face-to-face			.32*	
8. Telephone				
9. Propensity to withhold information	.24*		.34*	
10. Forces leading to distortion		.22*		.40***
11. Propensity to summarize information		.25*		
12. Estimate of accuracy of information received from superior	.50***	.26*	.32*	.39***
13. Overload of information				
14. Desire for interaction with superior		.36***	.56***	.38***
15. Satisfaction with communication in general	.39***		.43**	.41***

* p < .05
 ** p < .01
 *** p < .001

Table 3.1. Significant correlations between the subordinate's trust in superiors and aspects of upward communication with the superior.

Low trust is associated with subordinate reports that they block or withhold information (gatekeep) and that there exist forces leading to distortion in upward information flow.

Table 3.2 presents the intercorrelations for the influence index and upward communication. In three or all four organizations subordinates' perceptions of superior influence are positively associated with desire for interaction with superiors, estimated accuracy of information received from superiors, and satisfaction with communication. Influence is not as strongly related to information distortion or blockage as is trust.

Relationships of subordinate mobility aspirations to upward communication phenomena are minimal. Using data from MHC #1 and from the 42 managers cross-lagged panel correlations were computed for the relationships of trust and other variables. Appropriate methods for analyzing and interpreting cross-lagged correlations have been the subject of much methodological debate (Campbell and Stanley, 1963; Duncan, 1969; Heise, 1970; Howard and Krause, 1970; Pelz and Andrews, 1964; Rozelle and Campbell, 1969; Sandell, 1971; Yee and Gage, 1968). Thus, the data presented here should be considered as only suggestive of the causal impact of trust and influence on organizational communication. Figure 3.1 presents the cross-lagged relationships between trust and propensity of subordinates to withhold (gatekeep) information from superiors. These data suggest that trust impacts more on gatekeeping than the opposite ($r_{t_1 g_2} > r_{g_1 t_2}$). Growing trust, then, may act to reduce distorting influences on information transmission.

For the same sample, the impact of trust on desire for interaction is shown in Figure 3.2. Perceived influence and mobility aspirations did not impact these same communication variables. However, Figure 3.3 indicates that high perceived superior influence results in high subordinate satisfaction with communication. There were no differences in cross-lagged correlations for MHC #1. It may be that the causal interval was shorter than the sampling interval for this group (Pelz and Andrews, 1964).

Discussion. Intuitively interpersonal trust seems an important antecedent to communication openness and accuracy. Gibb (1964) and

Upward communication measures	Organizations			
	A (N=101)	B (N=95)	C (N=54)	D (N=179)
1. Trust in the superior	.36***	.25*	.28*	.34***
2. Respondent's mobility aspirations	.27**	.43***	.31*	
3. Percentage of time in contact with superior			.33*	.22**
4. Percentage of information received from superior			.36*	
5. Percentage of information sent to superior				.17*
Percentage of time the following methods are used to communicate:				
6. Written				
7. Face-to-face			.28*	
8. Telephone				
9. Propensity to withhold information				.29***
10. Forces leading to distortion				.22**
11. Propensity to summarize information	-.21*			
12. Estimate of accuracy of information received from superior	.44***	.27**	.34*	.23**
13. Overload of information				
14. Desire for interaction with superior	.21*	.29**	.46***	.32***
15. Satisfaction with communication in general	.33*			.16*

* p < .05
 ** p < .01
 *** p < .001

Table 3.2 Significant correlations between the perceived influence of the superior and aspects of upward communication with the superior

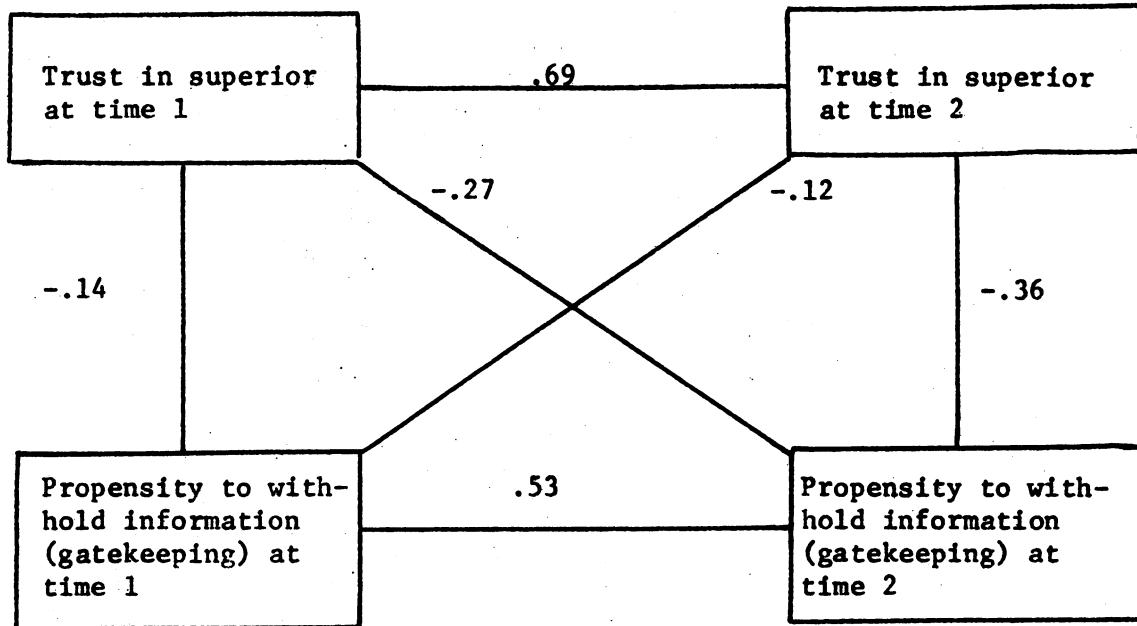


Figure 3.1 Relationship between interpersonal trust and propensity to withhold information across time

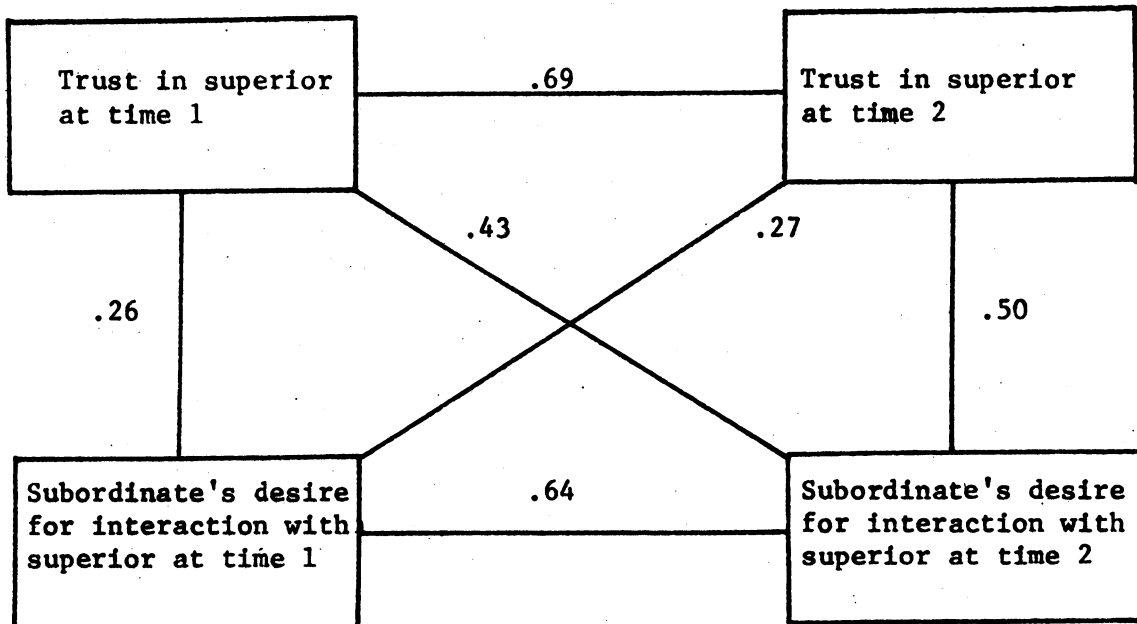


Figure 3.2 Relationship between interpersonal trust and desire for interaction across time

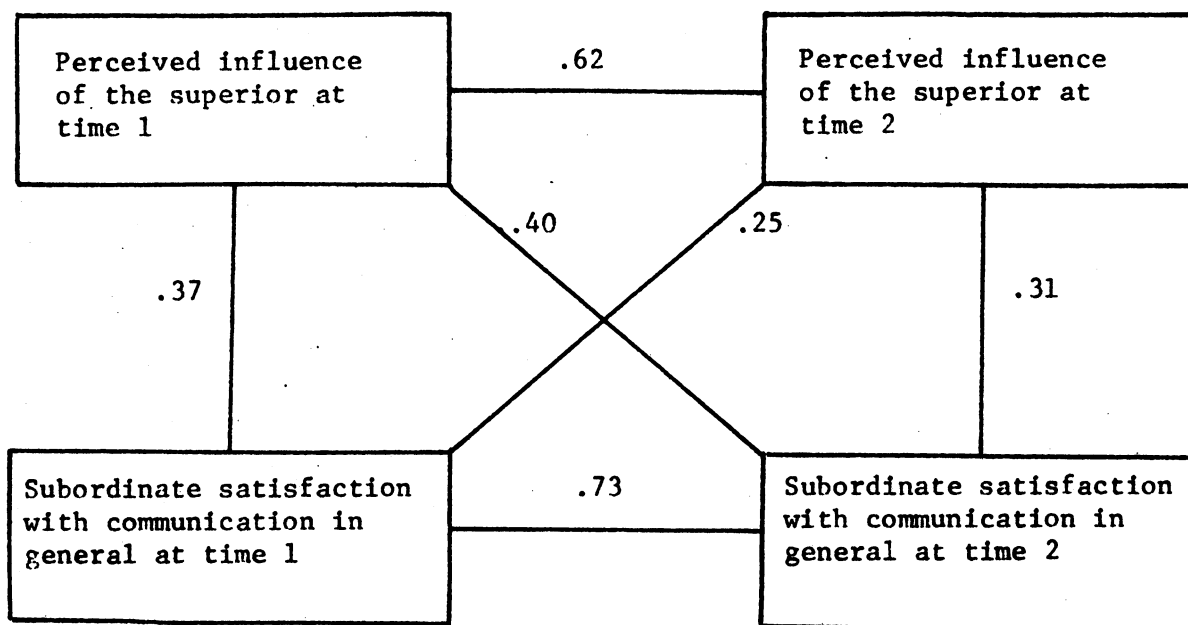


Figure 3.3 Relationship between perceived influence of superior and satisfaction with communication across time

Zand (1972) provide evidence of the deleterious effects of low interpersonal trust on information flow. Our findings further support this general notion while simultaneously examining the impact of perceived superior influence and subordinate mobility on upward information transmission. The impact of influence on transmission is not as clear as is that of trust, and it seems unrelated to variables which might reflect inaccurate communication. It is, however, related to other important aspects of communication, such as one's satisfaction with it. Contrary to Read (1962) mobility aspirations do not appear to negatively influence communication. The trend from these data is clear. Trust significantly impacts communication (including distortion), influence has less and qualitatively different impact than trust, and mobility has little effect on upward information flow.

Laboratory investigations of information blockage

Of the dependent variables observed in field settings, mechanisms of information blockage and distortion still seemed the most interesting to investigate, for reasons mentioned previously (chapter one, page 3). Most of the available empirical work concerned with organizational information transmission discusses only upward information flows. Yet there is evidence that a preponderance of people's organizational communication is not upward, but rather lateral and downward (for example, Burns, 1954; Dubin & Spray, 1964; Kelly, 1964; Klemmer & Snyder, 1972; Lawler, Porter & Tenenbaum, 1968). Thus, this set of experiments examined information distortion in transmission to superiors, subordinates, and peers, and is concerned only with intentional blocking of information.

One simple, effective method for filtering information is to select only certain aspects of it for transmission. Simon (1957) indicates that individuals are most likely to pass information when (1) no unfavorable consequences are anticipated, and (2) their superiors are likely to hear it anyway. Argyris (1951) says that subordinates send information upward which emphasizes their successes, minimizes problems, and is detrimental to superiors other than their own. Sharpening, levelling, and gatekeeping are terms often used to describe these behaviors. Extending on Argyris one might be concerned with the degree to which information is transmitted which is perceived by the sender as favorable or unfavorable to him/her. Following Simon, information might be categorized as (1) important or unimportant, and (2) favorable or unfavorable to the sender.

Hypotheses. Based on existing evidence about directionality of information flows in organizations, and the previous findings concerned with the impact of trust and influence on these flows two sets of hypotheses were developed (O'Reilly & Roberts, 1974b).

A - Directionality of information flow and filtration

- 1 - Less total information is passed upward than downward or laterally

- 2 - More information favorable to the sender is transmitted upward than laterally or downward
- 3 - More information unfavorable to the sender is passed downward than upward or laterally

B - Effects of trust and influence on information

- 4 - Under conditions in which the sender has high trust in the receiver:
 - a - More total information is transmitted than under conditions of low trust
 - b - More unfavorable information is transmitted than under conditions of low trust
 - c - More important information is transmitted than under conditions of low trust
 - d - More unfavorable and important information is transmitted than under conditions of low trust
- 5 - Under conditions in which the sender perceives the receiver to have a high influence over his future:
 - a - More total information is transmitted than under low influence conditions
 - b - More favorable information is transmitted than under low influence conditions

Method. Interpersonal trust and perceived influence of the information receiver were manipulated and related to three aspects of filtration (total information transmitted, important versus unimportant information transmitted, and favorable versus unfavorable information transmitted) in three (upward, downward, lateral) 2 x 2 factorial experiments. Subjects were 171 undergraduate and graduate students at the University of California, Berkeley, over 88% with previous organizational work experience. Information to be passed was pre-coded by an independent set of subjects. The manipulation and experimental procedures are discussed in detail in O'Reilly and Roberts (1974b). A post-experimental questionnaire verified the manipulation.

Results. Table 3.3 presents the results concerned with the effects of directionality on information flow. Only hypothesis #2 is partially supported (more favorable information is passed up than down). Reasonably

enough, favorable and important information receives priority in upward transmission. An interesting pattern in Table 3.3 is that more unfavorable, important, and total information is passed laterally than either upward or downward. More unfavorable and important, and unfavorable and unimportant information is also transmitted laterally. It appears that unfavorable, important information is often denied high level decision makers. Note that the pattern of lateral flow generally looks different than that of vertical flow.

Results concerned with the effects of trust and influence on information filtration for each of the three experiments and for the aggregate sample are given in Table 3.4. In aggregate all the relevant hypotheses are supported. Looking at the results for each of the three experiments it is clear that all the relationships discussed for aggregate data are only significant in the upward flow condition. Additionally, high trust subjects pass significantly more favorable, favorable and important, and unfavorable and unimportant information upward than laterally or downward. Thus, upward information filtration is more heavily influenced by trust than is lateral or downward transmission. In aggregate none of the hypotheses concerned with influence are supported. However, it is extremely difficult to manipulate real fate control in the laboratory and this experiment may have failed to do so.

Discussion. The implications of these data are complex. They document the notion of differential selection and omission as a mechanism for altering information, and show how filtration differs according to directionality of information flow. They suggest that the processes of lateral and vertical communication are different. Favorable and important materials seem to move upward. Not so, unfavorable and often important messages. This surely has implications for top level decisions makers who may frequently make decisions in a vacuum of important information. The impact of trust is again highlighted. From the laboratory and field data it is clear that trust impacts a number of communication phenomena which have not previously been delineated for upward, downward, and lateral information transmission. As in the field studies the

Dependent variables: types of information being transmitted	Independent variables: direction of information flow						
	Upward (N = 72)		Lateral (N = 46)		Downward (N = 52)		F-ratio (df 2,169)
	\bar{X}	SD	\bar{X}	SD	\bar{X}	SD	
1. Favorable	13.6	3.0	12.8	3.2	11.8	4.1	3.86*
2. Unfavorable	8.8	5.0	10.7	4.0	8.7	5.0	2.78
3. Important	14.4	3.6	15.1	3.6	13.4	4.8	2.21
4. Unimportant	4.9	3.6	5.1	3.8	4.5	3.4	0.38
5. Total	42.4	9.7	44.6	12.1	39.2	13.6	2.68
6. Favorable- important	5.6	0.8	5.1	0.9	4.5	1.5	17.72**
7. Favorable- unimportant	1.9	1.6	1.8	1.4	1.8	1.5	0.14
8. Unfavorable- important	3.2	2.0	4.0	1.5	3.7	2.0	3.32*
9. Unfavorable- unimportant	1.4	1.4	1.9	1.5	1.1	1.3	3.54*
							.03

*p < .05

**p < .01

Table 3.3 Analysis of variance for the effects of directionality of information flow on types of information filtered

Dependent

variables:

types of

information

being

transmitted

Direction of information flows:² 3 experiments plus aggregate sample analysis

	Upward (N = 73)		Lateral (N = 46)		Downward (N = 52)		Aggregate (N = 171)	
	Trust	Influence	Trust	Influence	Trust	Influence	Trust	Influence
1. Favorable	HT > LT**	HI > LI*						
2. Unfavorable	HT > LT***		HT > LT**		HT > LT*		HT > LT***	
3. Important	HT > LT**						HT > LT***	
4. Unimportant								
5. Total	HT > LT*						HT > LT**	
6. Favorable- important								
7. Favorable- unimportant	LT > HT**						LT > HT*	
8. Unfavorable- important	HT > LT***		HT > LT**				HT > LT***	
9. Unfavorable- unimportant	HT > LT*						HT > LT***	

¹No significant interaction effects. Only significant F-ratios are reported.

²Abbreviations: HT -- high trust, LT -- low trust, HI -- high influence, LI -- low influence.

*p < .05

**p < .01

***p < .001

Table 3.4¹ Summary of significant two-factor analyses of variance examining the effects of interpersonal trust and influence on types of information filtered

importance of influence on information transmission is overshadowed by that of trust. An integration of part of the field data and one of the laboratory experiments is available in O'Reilly (1972).

Further differentiation of communication antecedents and consequences

While the foregoing research sufficiently illustrated that trust is an important communication antecedent we did not feel that the notion of trust was sufficiently explicated by our three-item scale to be scientifically useful. In addition, note the foregoing implication that trust causes differences in communication accuracy or its relative openness. As a consequence of this view a study was done to differentiate trust and to assess the relevant communication variables using a slightly different methodology than that used in either of the previously reported laboratory or field studies. Thus, a beginning is made at convergence on at least a subset of the communication phenomena. The current study also provided an opportunity to show that communication antecedents do not impact other aspects of organizational life in the same way they influence communication.

The trust questions in the individual communication index were primarily drawn from Likert (1967) and Read (1962). Many definitions of trust exist other than those put forth by these researchers. Early writers, such as Deutsch (1958), noted that the concept involved such components as predictability, expectation, and risk. This early work has been extended considerably. Mass media and attitude change researchers (e.g., McGuire, 1969; Weiss, 1969) often refer to trust as "source credibility" or components anchored in the characteristics of the sender. Several recent reviews of the literature (Giffin, 1967; Simons, Berkowitz, & Moyer, 1970; Berlo, Lemert, & Mertz, 1969) agree on at least three empirically derived dimensions of source credibility; safety, expertise, and dynamism. These source credibility elements appear to differentiate trust, yet there is no research which simultaneously examines a differentiated notion of trust, specific communication perceptions and behaviors, and other attitudes in organizations.

Again, this seems surprising given the frequent necessity for reliable and valid information to reach appropriate places in organizations.

Method. The trust notions used here were selected after review of the source credibility research. An 18 item bi-polar adjective check list, including six items each assessing safety, expertise, and dynamism was drawn from a factor analytic investigation reported by Berlo, Lemert and Mertz (1969). O'Reilly and Roberts (submitted for publication, b) discuss the specific items used in this investigation. Eleven statements forming two indices were used to assess communication openness and accuracy. See O'Reilly and Roberts for evidence of the construct validity of these indices. Sociometric information was available to assess the total and average interaction rates for all respondents, as supplementary data to their responses about communication openness and accuracy in their organizations. Job satisfaction was assessed using the Job Descriptive Index and the overall job satisfaction measure. The respondents were 79 employees in fifteen medical practices ranging in size from two to thirteen members (PA data).

Results. Table 3.5 presents the correlations among the three dimensions of source credibility, indices of perceived accuracy and openness, and five communication measures derived from the sociometric. While all three credibility dimensions are positively related to accuracy and openness, the safety dimension, or that aspect conceptually closest to trustworthiness is also related to reports of communication behaviors derived from the sociometric.

The relationships among source credibility, communication, and job satisfaction are shown in Table 3.6. Note that credibility is an antecedent differently influencing communication and job satisfaction. While credibility is more strongly reflected in communication than in job satisfaction there are a number of associations among communication and job satisfaction factors. These kinds of relationship will be returned to later.

Communication Index	Source Credibility		
	Dynamism	Safety	Expertise
1. Perceived accuracy	.20*	.31***	.20*
2. Perceived openness	.09	.29**	.12
3. Number of others contacted	.36***	.46***	.26*
4. Frequency of contact	.04	.23*	.08
5. Number of task contacts	.10	.26*	.09
6. Number of social contacts	.20	.04	.13
7. Total time spend in interactions (weekly)	.18	.23*	.04

* p < .05, one tailed test
 ** p < .01, one tailed test
 *** p < .001, one tailed test

Table 3.5 Correlations among communication variables and source credibility factors

INDEX	Job Satisfaction					overall satisfaction
	JDIW	JDIPA	JDIPR	JDICO	JDISU	
<u>Source Credibility</u>						
1. Dynamism	-.02	.17	.09	.07	.13	.00
2. Safety	.17	.17	-.06	.14	.19	.25**
3. Expertise	.09	-.12	-.19	.05	.02	.02
<u>Communication</u>						
4. Perceived accuracy	.20*	.09	-.21	.49***	.20	.07
5. Perceived openness	.28**	.26**	.08	.34***	.38***	.35***
6. Number of others contacted	-.10	-.29**	.03	-.02	.09	.07
7. Frequency of contact	-.01	-.20	-.08	-.10	-.01	-.04
8. Number of task contacts	-.01	-.21	.06	-.11	-.01	-.03
9. Number of social contacts	.05	-.11	-.19	.13	-.14	-.02
10. Total time spent in inter- actions (weekly)	.12	-.02	-.01	-.02	-.03	-.05

* $p < .05$, one tailed test
 ** $p < .01$, one tailed test
 *** $p < .001$, one tailed test

Table 3.6 Correlations of source credibility factions and communication variables with job satisfaction scales

Discussion. O'Reilly and Roberts (submitted for publication, b) mention some of the reasons these findings may be heavily dependent on the nature of the sample involved. The data, however, are clear. Safety has a greater impact on accuracy and openness than do either dynamism or expertise. A considerable amount of the variance in number of contacts (41%) is accounted for by the three source credibility scales. Again, trust wins out, this time itself explicated. Its components are differently related to various communication variables (here operationalized differently than in our previous work). There is a plethora of evidence that suggests job satisfaction, considerate supervision, and supportive work environments are interrelated. This study supports previous findings (Bowers, 1969; Lawler, Hall, & Oldham, 1974; Pritchard & Karasick, 1973; Yukl, 1971) through the relationship between safety and overall satisfaction but not through the other credibility-satisfaction correlations. In fact, the relationships among credibility, communication, and job satisfaction facets suggest that credibility might act on satisfaction through communication, a point in need of investigation.

Investigations underway to round out knowledge about distortion

To this point we have primarily discussed the major impact of interpersonal trust, the secondary impact of perceived influence of the recipient of information, and the possible impact of respondent mobility aspirations on a number of communication perceptions (field data) and behaviors (laboratory data and the last field study reported). Two investigations are underway to add further knowledge in this area. Specifically, they extend on the distortion mechanisms (only two means for blocking information were considered in the previous studies), add two additional possible antecedents of distortion, and two mechanisms which might intervene between antecedents and communication behaviors. The antecedents are not individual attitudes of the type looked at in the previous work, but are group (or even organizational) variables; degree of hierarchy, and work specialization or rivalry.

Wilensky (1967) adds these latter variables to those already discussed as precursors of distortion. Blau and Scott (1962, p. 139) state that "hierarchical differentiation of status tends to block the free flow of communication in a group..." Specialization may impede communication as conflict and competition arise.

Conscious or intentional mechanisms of distortion are extended here from the previously reported laboratory and field investigations. The selection of distortion mechanisms (in addition to blocking unfavorable and/or important information) to be investigated in these studies is predicated by those most frequently alluded to in descriptions of information failures. A number of authors primarily interested in memory and rumor transmission (Allport & Postman, 1947; Berkowitz, 1971; Deese, 1961; Paul, 1959; Shibutani, 1966, etc.) suggest a useful dichotomy of distortion; levelling and sharpening. Sharpening is the selective perception, retention, and reporting of a limited number of details from a large content. Levelling is the tendency for messages to grow shorter, more concise, etc. Four mechanisms in which sharpening and levelling can occur were selected for investigation: blockage, summarization, changing the form of the information, and expansion. There exists no research which helps carefully define and discriminate among these dimensions, or assess their precursors in organizational life.

As suggested by our own previous work one variable which may mediate the antecedent-communication relationship is the directionality of information flow. Another is the type of information being transmitted (Simon, 1957; Argyris, 1957; Downs, 1967, etc.).

In aggregate, the general hypothesis of the two studies to be done is that three interpersonal variables (trust, influence, and mobility) and two work group (or organizational) structural variables (hierarchy and specialization), are significantly associated with changing information in the following ways: blocking it, summarizing it, changing its form, and expanding it. Changes will be mediated by directionality of flow and type of information transmitted.

Method. The exploration of this general hypothesis and its specific

subparts will be done in the laboratory and in the field. Participants in the laboratory study will again be drawn from the University of California, Berkeley, student body. Field respondents are the over 800 officers and enlisted men who participated in ONR #3. The investigation is detailed in O'Reilly (working paper, 1974).

Summary. This group of investigations which all look at antecedents (individual and two group or organizational) to both perceptions about communication and actual communication behaviors will be returned to at the end of this chapter where we will attempt to integrate them with the other investigations of individual communication.

An Alternative Way to View Individual Communication in Organizations

Since the research program must shift view at some point to group level organizational phenomena it was apparent that the method for assessing group level communication factors should have some relationship to individual communication outcroppings. While this research program has as its purpose only the demonstration of outcroppings at various levels and their relationship to other similar level variables, it will someday be necessary to hook together variables across levels if adequate theories or models of organizational communication are to be developed.

In chapter two (page 16) we briefly describe and reference the methodology employed to assess group level phenomena. The astute reader will note however, that individuals occupy various roles in this schema and that we should be able to use role identification as a characteristic of individuals. Roles here are determined solely by the number of links each person has with other persons. For all of our data, primarily because of the difficulties faced in data collection, we placed no restriction of reciprocation in identifying role occupants. If one person reported a contact it was implied to be reciprocated even if the person named did not in turn name the first individual. The possibility of forgetting was assumed.

For any kind of a communication network (for example, task, social,

authority, etc.) people can be broadly differentiated as isolates and participants. Participants are further subdivided into group members, liaisons, bridges, and others (others are operationally defined as having more interpersonal contacts than do isolates). Isolates are of four sorts. Attached isolates have one other link with another network participant, tree nodes have one link with a participant and any number of links with attached isolates, true isolates have no links, and isolated dyads only interact with each other (Richards, 1974a; 1974b; 1974c).

Our initial analyses have only used the isolate-participant dichotomy rather than the full dimension from total participation to total lack of participation. Additionally, we have only been interested in roles in task networks, though data exist for social and formal authority networks, and these will be discussed later.

This first investigation hypothesizes that individuals who are participants in task networks are characterized by different demographics than are individuals who are isolates. Further, isolates and participants can be described differently by our other communication device. For example, intuitively and on the basis of our previous data concerned with total amount of information sent and desire for interaction, we can hypothesize that isolates will be less trusting of their fellow workers than are participants. Participants should report a different pattern of communication directionality than isolates, be more interested in interaction with others, and be more sensitive to information flow, accuracy and change.

Method. For the 579 respondents at all hierarchical levels in ONR #2, the task or expertise network was extracted using the Michigan State computer programs. Respondents provided information about demographic characteristics, and completed an expanded version of the individual communication device (the added scales are concerned with underload, expansion and redundancy) and noted in appendix one. A caution is in order. At the time of the ONR #2 data collection the three F-14 squadrons were in initial formation phases. Consequently, stable roles may

not yet have emerged. This factor was an important consideration in the decision to analyze only the isolate-participant dichotomy at this time. Comparable data were obtained in the ONR #3 data collection at a time when squadron activities and personnel interactions were much more fixed. However, at this writing the initial analyses of these data have not been completed at Michigan State. They will be discussed in greater detail later.

Results. Table 3.7 presents comparisons for isolates and participants on a number of demographic characteristics. These data should be considered descriptive and are not at all surprising. Participants are of higher rank, have been in the squadron and Navy longer, and are older than are isolates. Except for officers, who are few in number in this sample, rank, Navy tenure and age are highly interrelated, and consequently should show similar relationships to other variables.

Table 3.8 provides information about the way isolates and participants perceive other aspects of communication and the three antecedents to communication. Note that indeed participants indicate higher interpersonal trust and feel information transmitted in their organization is more accurate, more often summarized, less gatekept, less changed, and more frequently expanded than do isolates. These data are consistent with the notion that participants more often "get the word" than isolates.

Discussion. In sum, the data presented in Tables 3.7 and 3.8 add to the consistency of the picture we are beginning to develop about individual communication in organizations. While the results concerned with directionality may seem somewhat strange, the questions comprising each of the directionality indices are not aimed at assessing how much the respondent communicates, but rather at providing information about his perceptions of the general direction of information flow and of his information transmission (whatever its volume).

Participants appear to have a much different picture of what happens to information when it flows through organizations than do isolates. The implication is one of the trusting participant who finds

Demographics	Mean	Standard Deviation	Mean	Standard Deviation	t-statistic
1. Rank	3.7	1.7	5.5	2.7	5.4***
2. Tenure - Navy	5.4	6.3	8.3	6.3	3.6***
3. Tenure - Squadrons	4.7	4.0	7.9	6.7	3.7***
4. Age	24.3	7.1	27.3	6.5	3.5***
5. Education	12.0	1.1	12.3	2.0	NS
6. Population of community where raised	3.1	1.7	3.3	1.9	NS

*** $p < .01$

Table 3.7 Demographic characteristics for
isolates and participants in task
networks (ONR #2)

Communication	Communication Role				
	Isolate		Participant		t
	Mean	Standard Deviation	Mean	Standard Deviation	
1. Trust	9.3	3.1	10.4	3.0	2.8***
2. Influence	10.0	3.3	9.6	3.4	NS
3. Mobility	4.1	3.1	3.6	2.9	NS
4. Directionality - Upward	12.2	6.4	10.8	5.7	2.0*
5. Directionality - Downward	7.0	6.1	9.4	6.7	2.8***
6. Directionality - Lateral	9.2	6.6	8.1	6.0	NS
7. Accuracy	13.5	3.2	14.3	3.2	1.9*
8. Summarization	13.6	3.6	15.2	3.5	3.7***
9. Gate 1	13.3	4.0	14.0	3.9	NS
10. Desire for interaction	14.2	3.8	15.8	3.7	3.3***
11. Gate 2	9.3	5.0	7.3	4.1	3.6***
12. Change	10.2	4.9	8.8	4.2	2.5***
13. Written	0.9	1.5	0.9	1.4	NS
14. Face	7.1	2.6	7.6	1.9	1.8*
15. Phone	1.1	2.0	0.8	1.3	NS
16. Overload	3.1	1.7	2.9	1.7	NS
17. Underload	11.9	3.8	12.4	3.7	NS
18. Expansion	13.0	3.3	14.4	3.8	2.9***
19. Redundancy	4.7	1.4	4.6	1.5	NS
20. Communication - Satisfaction	4.6	1.4	4.6	1.3	NS

Table 3.8 Perceptions about communication phenomena by isolates and participants in task networks (ONR #2)

communication generally more open and accurate as opposed to the skeptical isolate who does not believe he obtains information which is useful to him. Note that isolates and participants are not differently satisfied with communication in their organizations, suggesting that people may self select roles most appropriate for them, a point which should be further explored.

Investigations underway to extend on the current knowledge about role occupancy

A number of directions our research is taking are discussed here. At the outset a major limitation to explaining some important issues and to generalizing results must be mentioned. As previously indicated, the strategy for obtaining information necessary to do large scale organizational sociometric analyses is cumbersome and becomes increasingly so the larger the organization. Consequently, data are available for only the three F-14 squadrons, at two points in time (ONR #2 - ONR #3). While it is not possible for us to compare role acquisition or occupancy across various kinds of organizations, it will be possible to show how communication roles develop in one organization across time.

Kahn, et al. (1964) in their thorough discussion of organizational role dynamics, use the term "personality" to refer to all of a person's propensities to behave in certain ways. These authors go on to suggest broadly a number of ways in which such factors can affect role episodes, but they fail to specifically delineate personality variables or their specific effects. Rogers and Bhowmik (1970), in their discussion of heterophily-homophily, note that people who are alike communicate with one another. This suggests to us the necessity for investigating further personal attributes of different role occupants. Note that the data reported in the previous section indicates that participants and isolates differ in interpersonal trust. It is possible that people are generally trusting or non-trusting, and that level of trust is not always a product of the situation. While it will not be possible for us to further explore here trust as a characteristic of different role occupants we will be able to assess role occupants on Ghiselli's thirteen intrinsic

characteristics and on occupational venturesomeness as a personal attribute. As a part of this general line of investigation the sociometric "stars" will be identified for groups within each network. The intrinsic characteristics of opinion leaders can then be compared with those of other group members. Findings here should have important implications for understanding the kinds of personal characteristics which lead people to central positions in various kinds of decision making, and provide additional data concerned with the degree to which people occupy similar roles regardless of the communication network content (Bates, 1971; McGuire, 1969; Wade, 1968).

A second extension of the data reported in the previous section is obvious. Roles for each of the networks should be dimensionalized (rather than dichotomized) and related to other assessments of individual communication. As indicated earlier, these analyses will have to be done using ONR #3 data which includes sufficient respondents and was obtained at a time when the communication roles were expected to have stabilized. The next logical step in the research will be to assess organizational role-communication stability over time.

In the following sections of this chapter we report investigations of the relationships of communication perceptions and other attributes and behaviors experienced by individuals in organizations. Some comparable data will be reported for role occupants in order to flesh out network relationships between individual communication phenomena operationalized in different ways and other aspects of organizational life. Subsequently, time series data concerned with these relationships will also be available and attempts can be made to develop relevant causal models.

Two final research tasks concerned with individual role behaviors are of immediate importance in this project. One is the investigation of the relationship of role characteristics to more macro aspects of organizational life. For example, one's job function may determine the communication role he occupies. An organization's hierarchy or other structural components (Child & Ellis, 1973; Harrison, 1973; Hill, 1973, etc.) may influence role occupancy. Perception of more macro

aspects of organizations, such as their climate, may be quite dependent on job function and/or communication role. One of the initial attempts to relate communication and more macro characteristics is reported at the end of this chapter. The more inclusive investigation is forthcoming.

The last task of immediate importance is the attempt at identifying individual role characteristics through a simpler methodology than that required by the large scale sociometric. Initial findings in this area will be included in the discussion of the next chapter and will be reported in Roberts and O'Reilly (working paper, 1974b).

Individual Communication Phenomena and Other Organizationally Relevant Attitudes

Returning to Figure 1 in chapter two (page 20), it is clear that we have begun to delineate the individual communication process variables. A forthcoming study will examine more carefully various additional antecedents (in Figure 1) to those processes. It is now time to be concerned with the way in which communication might predict (or at least be related to) other attitudes expressed in organizations.

We have chosen here for focus the relationship among various communication phenomena and job satisfaction components, and the relationship of communication to commitment. There exists a plethora of job satisfaction investigations. While many writers discuss the importance of "good" communication if employees are to be satisfied, almost no empirical investigations exist concerned with this relationship (as an exception see Lawler, Porter & Tenenbaum, 1968). There is beginning to be, however, some slight research attention given to role occupancy and job satisfaction (Bruce, Bonjean, & Williams, 1968; Green & Organ, 1973; Hoeur & Stevenson, 1968; Richards, 1968, etc.) Similarly, it is intuitively logical that satisfaction and commitment are related and intuitively logical that if communication and job satisfaction are related then communication and work group or organizational commitment should be related. To our knowledge there are no investigations which

simultaneously consider these multiple relationships.

A purpose of the investigation reported here was to show for respondents from two organizations with different goals and activities the relationships of their perceptions about communication and job satisfaction. For one of the organizations, communication roles are also looked at in relation to satisfaction, communication perceptions, and commitment. It is generally hypothesized for members of this organization that participants who show higher interpersonal trust and view communications as open and accurate will exhibit higher job satisfaction on those satisfaction facets relevant to communication, but not necessarily to other facets of job satisfaction. These same individuals should be more committed to their work groups than people who perceive organizational communication negatively. Similarly, organizational participants (one role) should be more highly satisfied with job satisfaction characteristics which are communication related than organizational isolates (another role), and participants should be more highly committed to their work groups.

Method. The 89 respondents from the first data collection in MHC (MHC #1), the 579 officers and enlisted men from ONR #2, and the 813 participants in ONR #3 participated in this investigation. In MHC, the individual communication instrument, the Job Descriptive Index, an estimate of overall job satisfaction, and the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England, & Lofquist, 1967) were administered. Recall that the Job Descriptive Index measures five aspects of job satisfaction: with work (JDIW), pay (JDIPA), promotion (JDIPR), supervision (JDISU), and co-workers (JDICO). The Minnesota Satisfaction Scales are: Social service (SSE), creativity (CRE), moral values (MV), independence (IND), variety (VAR), authority (AUT), ability utilization (AU), social status (SST), company policies and practices (CPP), supervision-human relations (SHR), security (SEC), compensation (COM), working conditions (WC), advancement (ADV), supervision-technical (ST), coworkers (CW), responsibility (RES), recognition (REC), achievement (ACH), activity (ACT), and general satisfaction (GEN).

ONR #2 respondents completed the Job Descriptive Index and overall

estimate of job satisfaction, the squadron commitment index (Porter & Smith, 1970), and provided information which allowed communication role identification through the use of large scale sociometrics. The same data are available for ONR #3. However, it is not possible to report role data for ONR #3 here as the initial analyses have not been returned from the Michigan State computer at this writing.

Results. Initially it was felt important to discriminate as finely as possible the communication-satisfaction relationship. Thus, the data reported here for the MHC #1 respondents related the various satisfaction scales to communication items. Table 3.9 presents the associations of communication items to the MSQ scales for the 89 MHC #1 respondents. Note the heavy impact of the two trust items used in this sample on a number of satisfaction scales. Trust seems not only a precursor to communication but possibly also to job satisfaction. Here, perceived influence of one's superior also shows a strong relationship to job satisfaction (a not surprising finding reported previously by Pelz, 1952, among others), but mobility is generally unrelated to job satisfaction. The relationships reported here are simply too numerous to discuss in detail. They seem however, generally to support the notion that communication / ^{and its antecedents are} related to relevant aspects of job satisfaction. For example, satisfaction with human relations supervision is significantly associated with trust, influence, accuracy of information received from superior, amount of information passed to superior (a low score reflects a high value), and desire for interaction with superiors (again reverse scored). The perception that there are forces leading to information distortion is significantly associated with low moral values, poor company policies and practices, poor human relations supervision, poor working conditions, poor technical supervision, lack of recognition, and low general satisfaction.

Table 3.10 shows the communication item relationships to the five Job Descriptive Index scales and the estimate of overall satisfaction. Again, note the relationship of trust in superior (two items) to satisfaction with work and supervision. Perceived accuracy of

Communication Items	SSL	CRE	MV	IND	MSQ			AU	SST	CPP	SHR	SEC
					VAR	AUT						
Trust	-.11	-.22*	-.24*	-.31**	-.27*	-.16	-.14	-.21	-.15	-.47**	-.34*	
Influence	-.18	-.30**	-.22*	-.23*	-.19	-.10	-.18	-.28**	-.45***	-.52***	-.49***	
Trust	-.20	-.28**	-.36***	-.32**	-.28**	-.33**	-.25*	-.24	-.45***	-.50***	-.44***	
Influence	-.29**	-.44***	-.21	-.30**	-.41***	-.16	-.41***	-.20	-.29**	-.25*	-.25*	
Influence	-.19	-.09	-.23*	-.18	-.26*	-.32**	-.21	-.39***	-.41***	-.31**	-.33**	
Mobility	.18	-.15	-.07	-.01	-.04	-.12	-.14	-.07	-.04	-.09	.08	
Mobility	.25*	.17	.21*	.12	.13	.19	.19	.22*	.13	.14	.18	
Inter - Sup	-.10	-.03	-.02	-.18	.05	-.16	-.11	.20	.05	.14	.03	
Inter - Sub	.13	.14	.19	.21*	.14	.35***	.09	.20	.14	.01	.26***	
Inter - Peer	-.04	-.12	-.14	-.18	-.17	-.21	-.17	.29**	-.18	-.12	-.21	
Mode Writ.	.04	.06	.07	.20	.12	.13	.14	.27*	.16	.16	.16	
Mode FF	-.02	-.05	.14	-.07	-.08	-.09	-.17	-.26*	-.13	-.11	-.16	
Mode PH	.01	-.03	-.19	-.05	-.01	.07	.07	.16	.11	.06	.09	
Acc from Sup	-.24*	-.09	-.35***	-.17	-.18	-.19	-.20	-.27*	-.53***	-.58***	-.27**	
Acc from Sub	-.07	-.10	-.13	-.18	-.12	-.20	-.09	-.13	-.19	-.17	-.19	
Acc from Peer	-.24*	-.15	-.30**	-.34**	-.27*	-.24*	-.18	-.12	-.19	-.17	-.32**	
Overload	.03	.04	-.17	-.14	-.05	-.15	.03	-.11	-.05	.06	-.11	
Overload	.07	.07	-.08	.13	.14	-.02	.08	.06	-.01	-.13	.03	
Direct from Sup	.07	.00	.03	-.11	-.04	-.16	-.01	.06	-.01	.19	-.05	

*** p < .001

** p < .01

* p < .05

Table 3.9 Correlations between the Minnesota Satisfaction Questionnaire (MSQ) and communication items for MIC

Communication Items	SSE	CRE	MV	IND	MSQ				CPP	SHR	SEC
					VAR	AUT	AU	SST			
Direct from Peer	-.23*	-.18	-.11	-.09	-.11	-.11	-.12	-.16	-.01	.06	-.17
Send to Sup.	.10	.01	.11	-.03	-.02	-.15	.04	.01	.01	.23*	-.06
Send to Sub.	.08	.18	.04	.17	.17	.35***	.13	.24*	.15	-.09	.28**
Send to Peer	-.22*	-.19	-.10	-.11	-.12	-.23*	-.14	-.15	-.11	-.04	-.19
SVM	.21	.13	.23*	.13	.17	.24*	.11	.06	-.02	.03	.14
SUM	-.11	-.05	-.02	-.03	-.01	-.17	-.06	.10	-.02	.05	-.13
SUM	-.07	.11	-.13	.08	.0	-.14	.10	-.02	-.05	.04	-.06
Pass to Sup.	-.08	-.09	-.12	.08	.03	.03	-.04	-.07	-.12	-.29**	-.12
Pass to Sub.	-.16	-.03	-.24*	-.01	.01	-.19	-.02	-.14	-.09	-.15	-.17
Pass to Peer	-.06	-.02	-.16	-.04	-.10	-.05	-.03	-.16	-.04	.21*	-.11
Desire Int. Sup.	-.19	-.27**	-.21*	-.15	-.09	-.07	-.13	-.24*	-.08	-.31**	-.27*
Des. Int. Sub.	-.21*	-.21*	-.34**	-.15	-.15	-.16	-.09	-.26*	-.08	-.15	-.27*
Des. Int. Peers	-.13	-.20	-.24*	-.24*	-.13	-.02	-.07	-.10	-.05	-.19	-.08
Forces Distort	-.10	-.01	-.33**	-.07	-.02	-.22*	-.12	-.17	-.50***	-.43***	-.19
Sat. with Comm.	.32**	.49***	.19	.32**	.44***	.10	.49***	.29**	.49***	.49***	.51***

Table 3.9 Continued

Communication Items	COM	WC	ADV	ST	MSQ				ACH	ACT	GEN
					CW	RES	REC				
Trust	-.08	-.06	-.33**	-.40***	-.26*	-.29**	-.28**		-.18	-.24*	-.36
Influence	-.25*	-.31**	-.51***	-.36***	-.24*	-.22*	-.31**		-.22*	-.18	-.46***
Trust	-.26*	-.23*	-.46***	-.49***	-.25*	-.37***	-.36***		-.30**	-.19	-.49***
Influence	-.06	.03	-.33**	-.29**	-.16	-.34**	-.22*		-.39***	-.32**	-.42***
Influence	-.16	-.08	-.29**	-.39***	-.22*	-.17	-.34**		-.24*	-.21*	-.41***
Mobility	.41***	-.02	.24	-.11	-.04	.01	-.13		-.13	-.12	-.05
Mobility	-.18	.01	-.03	.14	-.02	.13	-.04		.24*	.27**	.18
Inter - Sup.	-.15	.15	-.16	.09	.04	-.17	.22*		-.11	-.11	-.01
Inter - Sub.	.13	-.11	.31**	-.05	.04	.27	.02		.07	.12	.18
Inter - Peer	-.05	.12	-.16	-.13	.05	-.22*	-.07		-.16	-.01	-.18
Mode Writ.	.13	.21*	.18	.17	.05	.20	.07		.17	.18	.23*
Mode FF	-.05	-.17	-.19	-.12	.04	-.05	-.02		-.14	-.07	-.20
Mode PH	.07	.21	.16	.04	-.01	-.08	-.09q		.10	.03	.13
Acc. from Sup.	-.03	-.20	-.26	-.55***	-.19	-.18	-.46***		-.34***	-.26*	-.40***
Acc. from Sub.	-.15	.02	-.12	-.21*	-.20	-.18	-.22*		-.20	-.11	-.23*
Acc. from Peer	-.25*	.01	-.23*	-.28**	-.32**	-.33**	-.24*		-.26*	-.28**	-.35***
Overload	-.25*	.06	-.14	-.00	-.01	.09	-.04		-.07	.11	.01
Overload	.01	-.24*	.03	.08	-.12	.11	.05		.06	.10	.01
Direct from Sup.	-.13	-.01	-.13	.24*	-.08	-.12	.11		.05	.10	.01
Direct from Sub.	.16	-.12	.28**	.13	.06	.30**	-.12		.19	.21	.21
Direct from Peer	-.04	.12	-.13	-.11	.02	-.15	.01		.17	-.23*	.15

Table 3.9 Continued

Communication Items	COM	WC	ADV	ST	MSQ					GEN
					CW	RES	REC	ACH	ACT	
Send from Sup.	-.17	.10	-.13	.26*	.01	-.13	.16	.11	.12	.05
Send from Sub.	.24*	-.16	.34**	-.07	-.02	.31**	-.10	.12	.22*	.19
Send from Peer	-.04	.09	-.15	-.07	.06	-.25*	.05	-.17	-.28**	-.18
SUM	-.05	.03	.13	.03	.05	.18	.15	.16	.17	.16
SUM	-.04	-.14	-.15	.1	-.05	-.10	-.01	-.03	-.05	-.03
SUM	.11	.21*	-.07	.07	-.05	.05	-.03	.12	.01	-.01
Pass to Sup.	.01	-.35***	-.18	-.23*	.02	-.10	-.24*	-.08	-.06	-.17
Pass to Sub.	-.05	-.16	-.27*	-.14	-.14	-.21	-.18	-.05	-.03	-.19
Des. Int. Sup.	.02	-.18	-.14	-.21*	-.10	-.20	-.16	-.23*	-.14	-.27**
Des. Int. Sub.	-.08	-.13	-.12	-.09	-.14	.29**	-.18	-.22*	-.12	-.24*
Des Int. Peers	-.09	-.13	-.11	-.20	-.10	-.30**	-.08	-.15	-.08	-.18
Forces Distort	-.10	-.26*	-.09	-.34**	-.15	-.07	-.31**	-.14	-.05	-.27**
Sat. with Comm.	.15	.16	.36***	.44***	.42***	.42***	.45***	.50***	.32**	.58***

Table 3.9 Continued

Communication Items	JDI					Overall Satisfaction
	JDIW	JDIPA	JDIPR	JDISU	JDICO	
Trust	-.26*	-.15	-.02	-.25*	-.06	-.13
Influence	-.20	-.07	.10	-.26*	-.01	-.29**
Trust	-.33**	-.15	-.09	-.24*	-.09	-.18
Influence	-.18	-.12	-.02	-.22*	-.14	-.26*
Influence	-.10	-.16	-.10	-.38***	-.08	-.20
Mobility	-.03	-.07	.03	.00	-.28**	-.17
Mobility	.07	.29**	.12	.16	.21*	.16
Inter - Sup.	-.07	-.11	-.07	-.01	.15	.03
Inter - Sub.	.02	.02	-.01	.09	.10	.03
Inter - Peers	-.15	-.17	-.13	-.11	-.06	-.20
Mode writ.	.25*	.03	-.03	.14	-.01	.16
Mode FF	-.08	-.25*	.01	-.10	-.05	-.03
Mode PH	.02	.13	.02	.05	.06	-.07
Acc from Sup.	-.32**	-.19	-.23*	-.26*	-.15	-.27*
Acc from Sub.	-.13	-.10	-.15	-.16	-.12	.03
Acc from Peers	-.33**	-.19	-.15	-.20	-.01	-.02
Overload	-.26*	-.03	-.16	.03	-.00	-.09
Overload	-.08	-.02	-.12	.05	-.02	-.08
Dir. from Sup.	-.07	.03	.06	.09	.03	.02
Dir. from Sub.	.10	.15	.04	.15	.05	-.04
Dir. from Peers	-.01	-.19	-.08	-.20	-.03	.02

*** p .001
 ** p .01
 * p .05

Table 3.10 Correlations between the job descriptive index (JDI) and communication items for MIC

Communication Items	JDI					Overall Satisfaction
	JDIW	JDIPA	JDIPR	JDISU	JDICO	
Send to Sup.	-.04	.14	.13	-.02	.00	-.05
Send to Sub.	.09	.15	.07	.23*	.07	.09
Send to Peers	-.05	-.27*	-.13	-.13	-.03	.01
SUM	.16	.01	.16	.12	.19	.11
SUM	-.23*	-.12	-.03	-.01	-.07	.13
SUM	-.04	.01	-.24*	-.04	-.15	.10
Pass to Sup.	-.10	-.13	-.22*	-.10	-.03	-.08
Pass to Sub.	-.15	-.15	-.31**	-.25*	-.13	-.16
Pass to Peers	-.13	-.10	-.15	-.28**	-.16	-.13
Des. Int. Sup.	-.09	-.25*	-.09	-.26*	-.10	-.03
Des. Int. Sub.	-.23*	-.24*	-.15	-.28**	.02	-.03
Des. Int. Peers	-.23*	-.20	-.10	-.16	.06	-.02
Forces Distort	-.12	-.14	-.18	-.19	-.05	-.03
Sat. with Comm.	.60***	.28**	.09	.29**	.06	.21*

Table 3.10 Continued

information received from superiors (reverse scored) is significantly related to satisfaction with work, promotional opportunities, supervision, and overall satisfaction. Overall the results in Tables 3.9 and 3.10 show relationships expected and suggest the use of scale scores for the communication instrument as a data reduction technique in the interest of more easily interpretable results. The form of the communication instrument used in this study was different from the updated form currently in use.

Table 3.11 shows the relationship of the communication scales to the JDI scales, the measure of overall job satisfaction, and the squadron commitment scale for the 570 respondents in ONR #2. Trust impacts all aspects of satisfaction as does perceived influence of superior. This second finding is somewhat inconsistent with our previously reported results. Note that in this sample those respondents with high mobility aspirations are relatively dissatisfied. Degree of upward communication and satisfaction with supervision are significantly related (as is satisfaction with work). Communication accuracy is significantly associated to all aspects of job satisfaction as is desire for interaction with one's colleagues. Information summarization is, as might be expected, only significantly related to satisfaction with work.

Table 3.12 generally supports the results of Table 3.11 for the 813 participants in ONR #3. Specific job satisfaction-communication items or scale relationships of interest to the reader might be examined more carefully in a) assessing the logic of the communication-job satisfaction facet relationships, and b) thinking about specific aspects of communication which might be altered in the interest of improving job satisfaction.

Table 3.13 presents the differences in job satisfaction and squadron commitment for isolates and participants in ONR #2. Here the patterns are slightly different from those reported in Tables 3.9 through 3.12. Note that isolates are less satisfied than participants with supervision and coworkers, and they are less committed to their squadrons. Yet they are not less satisfied with work, pay, or promotion. Nor do they exhibit

Communication Indices	JOIN	JDIPA	JDIPR	JDISU	JDICO	Overall Satisfaction	SDQ COMM
Trust	.26***	.21***	.20***	.37***	.22***	.28***	.29***
Influence	.19***	.09*	.14**	.16***	.15**	.22***	.28***
Mobility	-.20***	-.09*	.14**	.16***	.15**	.22***	.28***
Up Comm.	.09*	.05	.07	.17***	.08	-.01	-.03
Down Comm.	.06	.05	-.06	-.01	-.01	.04	.09*
Lat. Comm.	-.04	-.05	.03	-.08	-.01	-.06	-.06
Acc.	.14**	.11*	.10*	.12**	.15**	.14**	.19***
Sum	.10*	.04	-.01	.04	.04	.10*	.20***
Gatekeeping	.07	-.08	-.02	.05	.04	.07	.08
Desire	.17***	.09*	.09*	.10*	.13**	.18***	.24***
Mode Writ.	.01	-.02	.02	.01	.03	.00	-.03
Mode FF	.03	.06	.06	.03	.01	.01	.04
Mode PH	.03	.05	.02	.02	.01	.02	-.02
Overload	.04	.08	.01	-.06	-.03	-.07	-.10*
Sat with Comm.	.17***	.14**	.20***	.20***	.15**	.36***	.34***

*** p < .001

** p < .01

* p < .05

Table 3.11 Correlations among job descriptive index (JDI), communication indices, and squadron commitment for ONR #2

Communication Indices	JDI					Overall	
	JOIN	JDIPA	JDIPR	JDISU	JDICO	Satisfaction	SDQ COMM
Trust	.26***	.06	.07	.46***	.26***	.30***	.18***
Influence	.26***	.12**	.17***	.29***	.21***	.27***	.24***
Mobility	-.31***	.02	-.00	.18***	-.10*	-.28***	-.13***
Up Comm.	.05	.02	.09*	.12**	-.01	.12**	-.04
Down Comm.	.11**	-.02	-.05	.08*	.13**	.13**	.06
Lat. Comm.	-.05	-.06	.08*	-.12**	-.01	-.09*	-.10**
Acc.	.10*	.07	-.03	.11**	.13***	.11**	.09*
Sum	.09*	.04	-.11**	.03	.12**	.13***	.09*
Gatekeeping	.12**	-.01	-.04	.10**	.08*	.13***	.13***
Desire	.22***	.13***	.03	.19***	.22***	.29***	.19***
Mode Writ.	-.04	.01	-.04	.00	-.09*	-.02	.08*
Mode FF	-.02	-.02	.06	-.05	-.08*	-.03	-.04
Mode PH	-.07	.00	-.04	-.02	-.11**	-.06	.05
Overload	-.08*	.01	.02	-.08*	-.03	-.07	-.05
Sat. with Comm.	.34***	.22***	.18***	.32***	.35***	.44***	.16***

*** p < .001

** p < .01

*p < .05

Table 3.12 Correlations among job descriptive index (JDI), communication indices, and squadron commitment for ONR #3

JDI Indices	Isolates		Participants		t
	Mean	Standard Deviation	Mean	Standard Deviation	
JDI W	30.32	12.98	32.76	11.64]	NS
JDI PA	26.09	15.69	28.54	14.16	NS
JDI PR	30.82	15.07	30.60	16.14	NS
JDI SU	38.51	12.07	41.29	12.20	1.70*
JDI CO	39.03	12.10	41.83	11.85	1.74*
Overall	5.00	1.46	5.07	1.35	NS
Commitment to Navy	69.68	17.79	74.55	18.08	2.08*

* $p < .05$

Table 3.13. Job satisfaction and squadron commitment for isolates and participants in ONR #2 task network

less overall job satisfaction than do participants.

Discussion. The results here are hardly complete. Communication item-satisfaction relationships are shown rather than communication scale-satisfaction relationships for one of the samples so that the reader can scrutinize for himself the relations of components of communication scales to other job factors. The point is supported here, however, that communication facets are related to those job satisfaction scales they logically should be related to and not as often related to satisfaction scales which intuitively have nothing to do with communication. For example, perceived accuracy of information received from superiors (a reverse scored item) is significantly associated / ^{with} human relations and technical supervision for the MHC sample. The information accuracy scale is significantly related to satisfaction with supervision in both the ONR #2 and ONR #3 samples. When we look at roles for ONR #2 respondents the results are slightly different but not surprising. These data support a suggestion previously made in this chapter. Since isolates and participants do not significantly differ in satisfaction with work, pay, promotional opportunities, or overall satisfaction there is again some possibility that job incumbents select communication roles most compatible with their intrinsic characteristics. This issue will be further explored.

A more detailed discussion of these results (using communication scale scores rather than item scores for both samples) is offered by Roberts, O'Reilly, Folkins, Lima, and Miller (working paper, 1974). These authors extend on the results reported here by looking at the changes in communication-satisfaction relationships over time for matched samples of individuals from each of the organizations (MHC and Navy). Communication role-satisfaction relationships are looked at across time for both ONR #2 and ONR #3, the relationships among communication, satisfaction, and performance are discussed, and some causal hypotheses suggested. These authors note that it may be easier to engage in long term communication change attempts in the interest of improving job satisfaction than vice versa.

Individual Communication and Performance

Some previous investigations suggest a possible linkage between communication and job performance. For example, laboratory studies of communication networks have demonstrated the impact of different information flow restrictions on individual attitudes and performance (e.g., Burgess, 1969; Lawson, 1965; Shaw, 1964; Snydowski, 1973). Indik, Georgopolous, and Seashore (1961) generally supported in field research the hypothesis that open communication channels between superiors and subordinates facilitate the exchange of task relevant information. Smith and Brown (1964) also report relevant data concerned with effectiveness and communication flow, while Bowers (1969) notes a significant relationship between communication and managerial performance. Some studies link communication to decision-making behavior (e.g., Porat & Haas, 1969; Streufert, 1973, etc.). While these studies are suggestive of a communication-performance link they are insufficient because they do not adequately explore a range of relationships among relevant individual communication and performance measures.

Campbell (1973) recently reviewed the research on organizational effectiveness and proposed a useful dichotomy for effectiveness measures. Usually organizations have a set of goals which are few enough in number and sufficiently well developed to be understood and measured. Organizations can also usually be characterized by a systems view, which assumes that the best assessment it is possible to make of effectiveness is one of general system health. This view implies the complexity of organizations, and the uselessness of defining and assessing only a few organizational goals. Following the former view, however, one would obviously focus on objective measures of efficiency and productivity. The latter view leads to assessment of climate like measures as reflections of organizational health. Campbell points out that when goal oriented analysts attempt to diagnose why an organization performs in a specific way and when systems analysts speculate about how various system characteristics influence performance they approach a common ground.

It is at this point that the reserach program must become concerned

with showing relationships among variables at the same conceptual level and across conceptual levels. While the communication-individual performance relationship is clearly at the individual level, relating communication to climate is an attempt to look at a systemic characteristic affecting or being affected by individual phenomena. Both this investigation and the next one reported in this chapter are at the individual-group interface. They are reported here rather than in chapter four because the data are handled to reflect an individual (rather than group) viewpoint. That is, here individual perceptions of communication are related to individual performance and to individual perceptions about systemic organizational phenomena.

The general hypotheses of the investigations were that individuals with high objective performance measures would perceive information flow in their organization to be more summarized and expanded (if performance is related to satisfaction, as reported by Porter and Steers (1973) and communication to satisfaction suggested in the last investigation). Isolates might be poorer performers than participants. This notion must be tempered, however, with the fact that we do not yet know whether isolates and participants self select job functions requiring specific role behaviors most suited to them.

When performance is viewed from the systemic or work group perspective individuals reporting that their work groups are more characterized by problem solving ability, concern for excellence, high satisfaction and morale, and openness should report more favorable communication.

Method. The first sample includes 384 enlisted men on whom performance data were available for the time frame of the ONR #2 data collection. These respondents completed both the individual communication device and the work group factors scales on the organizational climate index (Campbell and Beaty, 1971). Climate factors used here were felt most reflective of performance. These include the individuals' perceptions of his work group's (1) achievement orientation, (2) supportiveness, (3) problem solving ability, (4) concern for excellence, (5) satisfaction and morale, and (6) openness vs. defensiveness. The 148 members

in five US locations of a large bank completed the communication and organizational climate measures. Individual performance data were not available for the bank personnel. However, bank aggregate performance will be discussed in a study reported in chapter five.

Some NAMTRA grade performance data were available for a portion of the 384 ONR #2 enlisted men. The primary performance data were drawn from fitness reports which rated individual performance, military behavior, leadership ability (where observed), appearance and adaptability. Junior (E1-E6) and senior (E7-E9) personnel were rated using slightly different forms. For senior people an overall performance score was available. It should be kept in mind that performance ratings are at least one step away from actual performance, suggesting caution in the interpretations of data using such ratings.

Results. Table 3.14 presents the results of a factor analysis with Varimax rotation for the five qualities rated for lower level enlisted personnel. As is apparent only one factor is present, suggesting that performance ratings be treated as a single score. Thus, the scores for lower level enlisted men were summed and subsequent analyses and interpretations based on the aggregate scores. Highly similar results were obtained from a factor analysis of senior personnel ratings; the overall scores provided by the raters were used. The original sample of 384 enlisted men was then divided for analyses into subsamples; 326 lower ranking personnel, and 58 senior enlisted respondents.

Performance Rating (E1-E6)	Varimax Factor Loadings
Professional Performance	.96
Military Behavior	.97
Leadership/Supervision	.95
Military Appearance	.97
Adaptability	.98
Common Factor Variance Accounted For:	.93

Table 3.14 Factor analysis with varimax rotation of performance ratings for junior enlisted respondents (N=326)

Table 3.15 provides the correlations among communication and personnel ratings for the two subsamples.

For junior enlisted personnel (E1-E6) overall performance is positively associated with perceptions of accuracy of information received, desire for interaction with others, frequent information summarization, high communication openness, perceived underload (the implied desire for more information), and frequent expansion of information. As reported earlier previous studies show that both perceived information summarization and accuracy are associated with freer, more open communication. Poor performance is associated with high interaction with superiors, frequent and deliberate withholding of useful information, perceived redundancy, and overload of received information.

For senior enlisted personnel (E7-E9) the pattern is quite different, perhaps reflecting actual job and job orientation differences for junior and senior people and suggesting another reason for more closely scrutinizing job function-communication relationships. For these respondents high performance is positively associated with frequent interaction with superiors and use of written communication. Poor performance is associated with perceptions that insufficient information is available (underload).

Breaking out communication slightly differently, Table 3.16 provides performance comparisons for isolates and participants in the task (or expertise network) for ONR #2 respondents. These data are for lower job grades only (due to the restricted sample at higher levels). Here the various scales are used rather than the overall performance measures for lower grade participants. Participants are rated higher than are isolates on professional performance, military behavior, and adaptability.

Moving to a view of performance as a systemic characteristic, Tables 3.17 and 3.18 present correlations among communication and climate indices for the Navy and bank samples. Several of the communication indices were not in the questionnaire at the time of the bank data collection and are not reported in the tables for either organization.

Communication Index	Overall Performance Rating	
	Junior (N=326) Level	Senior (N=58) Level
1. <u>Directionality - Upward</u> - General indicator of the amount of contact respondent has with his superior	-.13*	.33*
2. <u>Directionality - Downward</u> - General indicator of the amount of contact respondent has with his subordinate	.07	-.27
3. <u>Directionality - Lateral</u> - General indicator of the amount of contact respondent has with others at his job level	.00	.11
4. <u>Accuracy</u> - Respondent's estimate of how accurate he perceives the information he receives to be	.12*	.13
5. <u>Desire For Interaction</u> - General indicator of the degree to which the respondent desires to interact with others in the organization	.12*	.08
6. <u>Summarization</u> - Estimate of how often information is summarized by emphasizing the important and minimizing the unimportant before passing it on	.19**	.12
7. <u>Propensity To Pass Information</u> - Estimate of how much of the information a respondent receives he actually passes on	.16**	.01
8. <u>Gatekeeping</u> - An estimate of how often the respondent deliberately withholds from others information thought to be useful	-.15**	-.27
9. <u>Change</u> - Indicator of the extent to which a respondent changes the nature of information	-.01	.18
10. <u>Underload</u> - Estimate of the amount of time the respondent would like more information than he currently has	.17*	-.32
11. <u>Expansion</u> - Estimate of how often information is expanded and discussed in greater detail	.29**	.12

** p < .01

* p < .05

Table 3.15 The relationship of communication and individual performance ratings

Communication Index	Overall Performance Rating	
	Junior (N=326) Level	Senior (N=58) Level
12. <u>Modality - Written</u> - Percentage of the time the respondent uses this modality at work	.02	.41**
13. <u>Modality - Face-to-Face</u> - Percentage of the time the respondent uses this modality at work	-.10	-.21
14. <u>Modality - Telephone</u> - Percentage of the time the respondent uses this modality	.07	.30
15. <u>Redundancy</u> - Estimate of how often the respondent receives the same information more than once	-.16**	-.07
16. <u>Overload</u> - Estimate of how often the respondent receives more information than he can efficiently use	-.14**	.02
17. <u>Communication Satisfaction</u> - Indicator of how satisfied the respondent is with communication in general at work	-.02	.25

Table 3.15 Continued

Performance (E1-E6)	Communication Role				t-statistic
	Isolate		Participant		
	Mean	Standard Deviation	Mean	Standard Deviation	
1. Professional Performance	36.4	2.6	37.3	2.8	2.71**
2. Military Behavior	36.3	2.6	37.0	3.6	2.10*
3. Leadership/ Supervision	37.4	1.7	37.9	1.8	1.49
4. Military Appearance	36.7	3.9	37.1	2.6	1.25
5. Adaptability	36.8	2.2	37.5	3.1	2.12*
6. NAMTRA grades	73.8	8.6	78.9	19.3	0.97

* $p < .01$

** $p < .05$

Table 3.16 Relationship of communication task group role occupancy to performance ratings for low level Navy personnel

Communication Index	Achievement Orientation	Group Supportiveness	Problem Solving Ability	Concern for Excellence	Satisfaction and Morale	Openness versus Defensiveness
1. Directionality - Upward	.06	.08	.09*	.08*	.04	.09*
2. Directionality - Downward	.06	.07	.06	.11*	.09*	-.07
3. Directionality - Lateral	.04	.02	.01	-.03	.02	.07
4. Accuracy	.11*	.11*	.07	.13**	.17**	-.17**
5. Desire for Interaction	.12**	.13**	.06	.12**	.18**	-.13**
6. Summarization	.05	.08	.05	.07	.07	-.12**
7. Propensity to Pass Information	.06	.07	.01	.05	.10*	-.07
8. Gatekeeping	-.06	-.11*	-.07	-.08	-.09*	.12**
9. Change	.09*	.05	.04	.06	-.02	.16**
10. Underload	-.08	-.13**	-.12**	-.14**	-.16**	.08*
11. Expansion	.19**	.24**	.23**	.24**	.23**	-.02
12. Modality - Written	.08	.06	.10*	.08	.02	.06
13. Modality - Face-to-Face	.03	.06	.01	.04	.12**	-.09
14. Modality - Telephone	.01	.02	.03	.01	-.04	.11**
15. Redundancy	-.04	-.05	-.06	-.06	-.08	.10*
16. Overload	.00	.01	.04	.00	-.06	.10*
17. Communication Satisfaction	.17**	.25**	.19**	.25**	.30**	-.13**

** p < .01

* p < .05

Table 3.17 Relationship of communication to systemic performance characteristics for Navy personnel

Communication Index	Achievement Orientation	Group Supportiveness	Problem Solving Ability	Concern for Excellence	Satisfaction and Morale	Openness versus Defensiveness
1. Directionality - Upward	.09	.05	.03	.11	.04	.16
2. Directionality - Downward	.17*	.20*	.17*	.14	.20*	-.12
3. Directionality - Lateral	.15	.02	-.19*	-.13	-.10	-.09
4. Accuracy	.15	.26**	.27**	.13	.25**	-.37**
5. Desire for Interaction	.11	-.03	.06	.05	-.04	.06
6. Summarization	-.11	.10	.07	.00	.03	.01
7. Propensity to Pass Information	.12	.07	.03	.11	.05	-.04
8. Gatekeeping	-.11	-.16	-.15	-.12	-.19*	.02
9. Change	-.05	-.06	-.09	-.07	-.04	.09
10. Underload						
11. Expansion						
12. Modality - Written	.04	-.01	.01	.12	-.01	.07
13. Modality - Face-to-Face	-.04	-.07	-.14	-.14	-.05	-.07
14. Modality - Telephone	-.07	.07	.06	.03	.06	.03
15. Redundancy						
16. Overload	.09	-.02	.02	.04	.07	-.06
17. Communication Satisfaction	.32*	.60**	.36**	.39**	.54**	-.43**

** p < .01

* p < .05

Table 3.18 Relationship of communication to systemic performance characteristics for bank personnel.

A number of potentially interesting patterns emerge from Table 3.17, which although similar to those in Table 3.18 are more striking. For the Navy personnel, greater upward interaction is significantly associated with perceptions that the work group is concerned with excellence, has high problem solving ability, but is defensive (an understandable but potentially awkward situation). High downward communication is correlated with perceptions of concern for excellence,^{and}/satisfaction and morale. Perceptions about high accuracy, desire for interaction, information deprivation (underload), and message expansion are all positively related to five of the six systems performance characteristics. Frequently information withholding is associated with perceptions of low group support, morale and satisfaction, and high defensiveness. Deliberately changing messages and defensiveness are associated, suggesting something of the nature of systems which foster distortion.

Once again, looking at communication differently, Table 3.19 provides differences in perceptions about work group factors by isolates and participants in the ONR #2 task network. Participants clearly view their work groups as significantly higher performing units than do isolates. This may be because isolates are so removed from work groups as to be little committed to them, because they have been forced out (recall they tend to be poorer performers than participants), etc.

Discussion. Despite the fact that performance ratings are at least a step away from actual performance the results of the relationships between communication and performance for the two Navy subsamples suggests that ratings may monitor communication or vice versa more closely than do perceptions of systemic work groups characteristics. Senior people who tend to perform well also seem more closely tied to the system; that is they interact with superiors, make sure directions, information, etc. are transmitted in writing, and feel they obtain sufficient information. Junior level high performers seem more responsive to open, accurate, less monitored situations (low performers receive more redundant information, interact with superiors more frequently, etc.). The performance comparisons for isolates and participants further support

Work Group Climate	Communication Role					t
	Isolate		Participant			
	Mean	Standard Deviation	Mean	Standard Deviation		
1. Decision Centralization	7.0	3.4	7.7	2.6	2.2**	
2. Work Group Reputation	8.5	2.2	9.1	2.0	2.4**	
3. Achievement Orientation	12.6	5.8	14.4	3.8	3.5**	
4. Task Structure	14.1	5.7	15.1	3.7	2.0**	
5. Supportiveness	16.8	7.6	19.8	5.6	3.9***	
6. Security - Risk	5.7	2.0	5.0	2.0	2.5**	
7. Training and Development	25.4	5.2	27.4	4.8	3.3***	
8. Initial Job Orientation	7.3	3.6	8.5	2.3	3.7***	
9. Problem Solving Ability	6.7	3.6	7.8	2.7	3.1***	
10. Concern for Excellence	21.0	9.8	24.6	7.2	2.7***	
11. Satisfaction and morale	14.7	6.4	16.7	4.9	3.0***	
12. Reward Contin- gency	16.9	3.9	17.5	3.7	NS	
13. Openness- Defensiveness	13.3	7.0	13.2	5.1	NS	

** p < .01 Table 3.19 Relationship of task role occupancy and systematic
* p < .05 performance for Navy personnel (ONR #2)

the notion that participants are more closely tied to their organizational systems than are outsiders.

Work group climate-communication relationships do not differentiate the two organizations (as rating-communication relationships did among hierarchical subgroups in the Navy organizations), but they do add to a growing picture which suggests that the more people in organizations can communicate across all levels the higher the probability that they at least feel their work groups are successful (and we know from the last study reported, the higher their job satisfaction on factors relevant to communication). The overall picture here is that the more open and accurate communications are perceived to be the better the organizational health, as assessed by respondents. This picture is further verified when we look at the ONR #2 isolate and participant responses to work group systemic characteristics. Those who do not participate overwhelmingly find their organization an unhealthy place to work.

The final report of this investigation will add two additional kinds of knowledge. The / ^{social} network - performance, and authority network - performance relationships for isolates and participants will be compared to the role data (task network) reported here. It is hoped that a matched set of ONR #2 and ONR #3 respondents with performance data can be used to round out the communication-performance relationship. Negotiations are underway for collection of enlisted personnel performance data commensurate in time with ONR #3 data gathering. Time series analyses of changes in communication-performance would add considerably to this investigation. For a more detailed explanation of the study see O'Reilly and Roberts (working paper, 1974b).

Motivation, Rewards, and Performance, with
Communication and Organizational Climate as
Systems Characteristics

While there is a good deal of research concerned with pay as an incentive (Adams, 1965; Andrews, 1965; Bhatt, 1962; Chalupsky, 1964; Ganguli, 1954; Weick, 1968, etc.), very little literature exists concerning the relationship of actual pay and the kinds of organizational attitudes and

behaviors discussed here. In their review of theories and research related to the effects of financial compensation on employee motivation Opsahl and Dunnette note:

Such theories are based on limited studies conducted on subhuman species; no deductions from these theories have been adequately tested in industry. Most compensation practices in industry are based on impressionistic evidence characterized by anecdotal accounts and data gathered by means of self-report questionnaires (1966, p. 94).

Opsahl and Dunnette conclude that a principal research problem is that of discovering how money motivates employees and how this in turn affects their behavior. In a later review of the relationship of theories of motivation to pay Lawler (1971) clearly favors an expectancy approach. However, he notes the various difficulties involved in using this approach to understand the relationship of pay to motivation.

In discussions of pay and performance a frequent difficulty is that of knowing how important pay is to the performer. A number of studies (for example, Gruenfield, 1962) provide evidence that many employees see other aspects of their job as more important than pay. Much of the work in this area concerns pay scheduling and is not relevant to the concerns of the research reported here. However, one investigation (Penner, 1966) found a strong relationship between self ratings of performance and actual pay for managers. In some of the over 4,000 studies of job satisfaction one might expect to find some investigations in which pay and satisfaction have been correlated. A great deal of research shows a high correlation between actual pay and satisfaction with pay (though most of this work is not simultaneously concerned with pay "fairness"). In sum, research does show that people are generally less satisfied with pay than with any other job factor (Hulin and Smith, 1967; Wernimont, 1964, etc.).

We find no theoretical discussions of investigations concerned with the relationship of pay to communication in organizations. Perhaps there is no reason to expect any relationship between these two variables. Neither do we find any investigations of the relationship of pay to organizational climate. However, if climate is viewed as a system performance characteristic (and one viewpoint is that it is a health variable) as noted in the last

investigation reported here, and there is some expectation that individual pay is related to individual performance, then it may also influence individual perceptions about systemic performance characteristics such as communication and climate.

As a framework for organizing our thinking about the possible relationships between pay and the other attitudes and behaviors we have been discussing we selected a part of Lawler's (1971, p. 270) model of pay relationships to other variables. The model (with one addition) is shown in Figure 3.4:

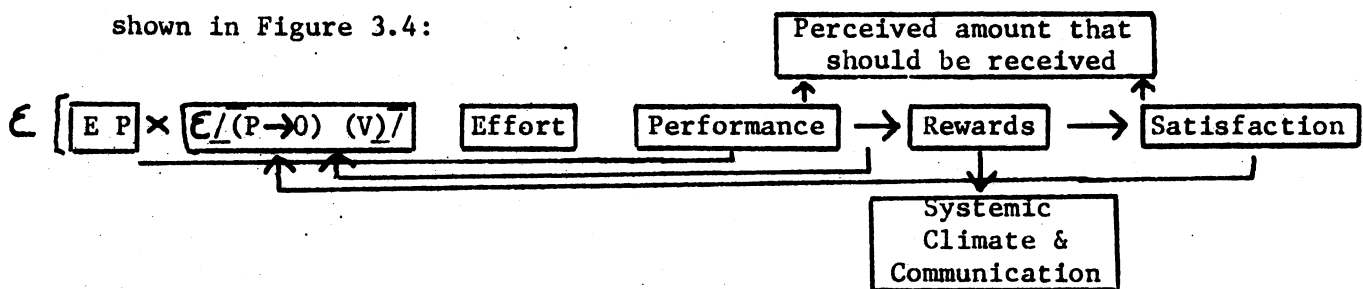


Figure 3.4. A modified version of the motivation-performance-satisfaction cycle (Lawler, 1971)

The first two boxes of the model, take into account effort-outcome and valence probability estimates and are at the heart of Lawler's and of Porter and Lawler's (1968) expectancy theory approach to motivation. However, since they cannot be assessed in the pilot study reported here they will not be discussed. Note that two system characteristics, communication and climate, were added to the original model. The Lawler model states causation as does that portion of the model in which the additional characteristics are added. However, this research cannot assess causation, a point which will be returned to later. Most of the research related to the original model (for example, see Lawler and Porter, 1967) does not adopt causal analytic techniques. The model was adopted here not en toto but merely as suggestive of the kinds of relationships which should be explored in multivariate studies concerned with pay. Pay is then viewed in this investigation as an independent variable with effort, performance, satisfaction and perceptions of systemic characteristics as possible outcome variables.

Method. Actual pay data were obtained for all personnel in ONR #2, as were assessments of the other variables with which this research program in general (and this study in particular) is concerned. At the

low
time of the data collection/paid personnel received a range of \$326.10 to \$438.60 per month, medium paid respondents \$473.10 to \$665.70 per month, and highly paid respondents \$686.70 to \$1725.90 per month. The distribution of pay in the high paid group is highly skewed, very few people are in the top end.

Individual degree of effort is a particularly difficult behavior on which to obtain data. Consequently, it was felt that effort might be reflected in an individual's response to a variety of scales supposedly assessing need achievement. Need achievement is a simple concept to understand. It is according to McClelland and Winter (1969) "the urge to improve (p. 10)," and can be assessed simply by counting the number of achievement related ideas individuals produce (McClelland, 1961, p. 43). In our sample there are the Job Orientation Achievement Index, the Self Description Index achievement scale, the work group and organizational climate achievement orientation factors, the desire for mobility scale from the individual communication device, and the ego strength scale from Bretton (1974).

The performance measure used here was the summed score for lower grade personnel (E1 - E6). While all 579 respondents were used to assess the other relationships discussed here, only the 310 personnel on whom there were complete performance and attitudinal data were used in analyses concerned with performance. Job satisfaction was assessed using the five subparts of the Job Descriptive Index, the overall satisfaction measure, the satisfaction with communication scale from the individual communication device, and the work group and organizational climate satisfaction scales.

The two systemic characteristics were broken out in a different manner than in previously reported data. First, if these characteristics are systemic, group means should be provided and associated with the satisfaction, reward, performance, and effort data for individuals in each group. Since we were unable for this study to break out groups we were dependent on analyses adequate for looking at communication and climate only as individual perceptions. The climate factors are the twelve work group factors provided by Campbell and Beaty. Two kinds of communication were observed; one analysis concerned communication directionality, and another

the way in which respondents felt information was blocked or changed (using relevant scales from the individual communication device.)

Without time series data, it is impossible to show causation and not very fruitful to provide analyses showing all possible relationships among effort, performance, pay, satisfaction, and the two kinds of systemic variables. Consequently a number of multivariate analyses of covariance were computed with pay (three levels) as the independent variable, and effort (need achievement), performance, satisfaction, climate, and the two aspects of communication, as sets of dependent variables.

Rank and age were held constant for several reasons. By holding rank constant fluctuations in tenure within grade are allowed to influence the dependent variable sets. Age is generally associated with tenure but in this sample it was necessary to control for age because the sample consists of a few highly paid young officers and a considerable number of low paid older enlisted men. No officers contributed to those analyses concerned with performance. Gruenfeld's (1962) study and others like it provide evidence of the necessity of controlling for job level (rank), age, and possibly education.

A caution is introduced in interpreting the data. Analyses were done using Multivariate, a program which does not eliminate cases with missing data. The results then are conservative estimates of differences because zeros are entered for missing data.

Results. Table 3.20 shows the relationship between effort (defined as need achievement) and pay. Three of the achievement scales (JOI, Work Group Achievement, and ego strength) are significantly related to pay, suggesting that higher paid people do put more effort (or at least think they do) into their jobs. The organizational climate effort scale relationship to pay are anomolous (perceptions of climate may be too distant from perceptions of self or things which happen to one's self to use in investigations of this sort), and individual mobility aspirations seem to decrease for higher paid people (who may have reached the top grade they can in the Navy).

The relationship between pay and performance for lower grade personnel were quite significant ($F = 12.46^{***}$ $DF = 2, 305$). Only 145¹³⁶ low paid personnel (with a mean performance score of 144.45)/medium

Dependent Variables	Low pay			Medium pay		High pay		Univariate F	F-Ratio for multi- variate test of equality of cell vectors
	Cell Mean	Cell Mean	Cell Mean	Cell Mean	Cell Mean	Cell Mean	Cell Mean		
JDI Achievement	5.56	5.99	6.23	4.72**					
Communication Mobility	5.37	3.39	3.10	54.86***					
SDI Achievement	27.66	31.01	34.62	.01					
WG Climate Factor Achievement Orien- tation	13.50	14.14	14.61	3.38*				11.82***	
Org Climate Factor Achievement Orientation	20.30	19.63	20.67	25.54***					DF 12,1114
Ego Strength (Bretton)	12.77	14.47	14.22	24.50***					

N=567

*** p < .001

** p < .01

* p < .05

Table 3.20 Multivariate analysis of covariance (rank and age)
for achievement variables (low, medium, and high
paid respondents)

paid personnel (with a mean performance score of 153.17), and 25 high paid personnel (mean performance = 169.88) contributed to these analyses. Clearly, the relationship between pay and performance is important.

Table 3.21 provides results for the relationship of pay to job satisfaction. Unlike other investigations we show only three significant relationship between pay and various aspects of satisfaction, and these are not necessarily the ones one would expect to find. Pay is significantly related to satisfaction with work itself, work group climate satisfaction and morale, and organizational climate satisfaction and morale. However, only the first two of these satisfaction variables ascend with pay.

Table 3.22 suggests the way in which low, medium, and high paid Navy personnel perceive their work group climate. Lower paid personnel perceive decisions as being more centralized, tasks structured, and initial job orientation lacking. High paid personnel perceive their work groups as decentralized with lower task structure. They also feel their work groups have good reputations, high achievement orientation, high training and development orientation, concern for excellence, high satisfaction and morale, and good reward contingencies.

Tables 3.23 and 3.24 provide information about the relationship of pay to information directionality and to blockage and change. Note (in Table 3.23) that the lowest paid people have the most upward and lateral communication, the highest paid people have the most frequent downward communication, possibly reflecting the supervisory nature of higher paid personnel. It may also reflect an extension of a previously reported relationship; low paid people tend to be poorer performers and may have to be more in touch with supervisors than high paid personnel.

The results in Table 3.24 are consistent with our previously reported findings concerning communication and performance. High paid personnel perceive greater accuracy in information transmission, more summarization, less blockage, and less change, than low paid personnel. Strikingly, low paid personnel feel there is less gatekeeping than do high paid personnel.

Dependent Variables	Low pay cell mean	Medium pay cell mean	High pay cell mean	Univariate F	F-ratio for multivariate test of equality of cell vectors
JDI Work	26.83	30.35	32.20	3.99*	
JDI Pay	23.72	25.20	29.69	.54	
JDI Promotion	29.07	26.78	29.45	1.14	
JDI Supervision	36.18	37.80	38.57	.16	5.1691***
JDI Co-workers	36.19	38.37	40.03	.33	DF=18, 1108.
Overall Satisfaction	4.35	4.90	5.03	1.27	
Satisfaction with Communication	4.43	4.53	4.78	.82	
Work Group Climate Satisfaction and Morale	15.10	16.43	17.74	4.98***	
Orgl Climate Satisfaction and Morale	23.00	21.44	23.34	4.42**	

Table 3.21 Multivariate analysis of covariance (rank and age) for job satisfaction (low, medium and high paid respondents)

*** p < .001
 ** p < .01
 * p < .05

Dependent Variables	Low pay cell mean	Medium pay cell mean	High pay cell mean	Univariate F	F-ratio for multivar- iate test of equality of cell means
Work group decen- tralization	7.60	7.93	6.98	3.38*	
Work group reputation	8.79	9.03	9.26	5.20*	
Work group achieve- ment orientation	13.50	14.14	14.61	3.37*	
Work group task structure	14.76	15.26	14.57	3.03*	2.97***
Work group sup- portiveness	18.18	19.54	20.32	2.91	DF = 26,1100
Work group security versus risk	5.71	4.88	4.52	.99	
Work group training and development orientation	25.67	27.41	28.22	20.74***	
Work group initial job orientation	7.83	8.54	8.72	5.64**	
Work group problem solving ability	7.28	7.69	7.93	1.99	
Work group concern for excellence	22.67	24.04	25.32	3.79*	
Work group satis- faction and morale	15.10	16.42	17.74	4.98**	
Work group reward contingency	16.28	17.52	18.85	7.20***	
Work group openness versus defensiveness	14.59	12.96	11.18	1.48	

*** p < .001

** p < .01

* p < .05

Table 3.22 Multivariate analysis of covariance (rank and age)
for work group climate factors (low, medium and high
paid respondents)

Dependent Variables	Low pay cell mean	Medium pay cell mean	High pay cell mean	Univariate F	F-ratio for multivar- iate test of equality of cell means
Communication - upward	13.34	11.39	8.34	29.09***	
Communication - downward	6.98	9.79	12.79	10.17***	23.41***
Communication - laterally	9.60	8.32	7.35	25.93***	df = 6, 1120

*** p < .001

** p < .01

* p < .05

Table 3.23 Multivariate analysis of covariance (rank and age)
for communication directionality

Dependent Variables	Low pay cell means	Medium pay cell means	High pay cell means	Univariate F	F-ratio for multivariate test of equality of cell means
Estimated accuracy	13.93	14.51	15.19	46.92***	
Information summarization	14.44	15.43	16.12	4.02**	
Gatekeeping	13.65	14.59	14.11	10.23***	10.32***
Information blockage	8.71	7.47	6.57	8.75***	DF = 10, 1116
Information change	9.35	9.08	8.95	5.37**	

*** $p < .001$

** $p < .01$

* $p < .05$

Table 3.24 Multivariate analysis of covariance (rank and age)
for communication blockage and change scales

Discussion. Figure 3.5 shows a revised model of the relationship of pay to facets important in the Lawler model and in this research. The size of the boxes implies the importance of the relationship as signified by the data reported here. No causation is implied. However, a next step in the overall research will assess causation through a matched sample investigation (using ONR #2 and ONR #3 data). While the cross lagged correlational models (Blalock, 1971) available usually consider only bivariate relationships, Paisley (1973) offers a method for assessing simultaneously multivariate causal relationships. In addition some of the sets of dependent variables should be factor analyzed to see whether each scale in a set does in fact measure what we think it measures. These refinements and an extension on the discussion of the data will be reported in Roberts and O'Reilly (working paper, 1974a).

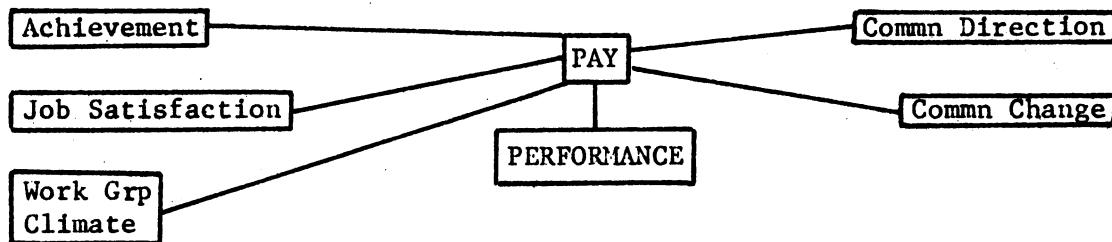


Figure 3.5. A revised model of the relationship of actual pay to performance and various attitudes.

Unlike most studies which relate actual pay to individual attitudes and performance this investigation used data from all hierarchical levels in an organization. Effort (achievement) and satisfaction do not appear to be as strongly related to pay as one might think, particularly from past satisfaction studies. And we find no significant relationship between actual pay and satisfaction with pay. The two sets of variables most clearly related to pay are performance and communication. The directionality relationships are self-evident, but the information blockage and change relationships have implications for organizational practice which have not previously been given a great deal of thought. Supervisors should be aware that low paid personnel at all hierarchical levels perceive

information flow as deleterious. Perhaps special attention can be given to making sure low paid people receive accurate and unchanged information.

How Officers and Enlisted Personnel in High Technology Navy Units Differ

The data reported in this section were obtained to provide specific information about some of the ways in which officers and enlisted men in the F-14 community differ. A second purpose of providing the data was to use the breakdowns here as one example of the kinds of breakdowns of characteristics and attitudes of various job incumbents which might be useful in establishing personnel policy.

Method. The ONR #2 sample was divided into subgroups of officers and enlisted men. These groups were then compared on representative individual characteristics (demographics and personality traits), on job satisfaction and commitment, and on perceptions about individual communication and work group climate. The categorization of comparisons follows that in Figure 1, Chapter Two of this report. Logically it was felt that separate comparisons of groups on attributes, attitudes, and perceptions about organizational processes might help decision makers decide in which areas significant attention should be paid. For example, if officers and enlisted personnel do not differ on job satisfaction one would hardly recommend an organizational effort to increase enlisted personnel job satisfaction while doing nothing in this area for officers. Perhaps neither or both groups should be considered depending on how satisfied they are, not compared to one another, but compared to workers in other similar jobs. On the other hand, if good officers are characterized by different intrinsic characteristics than are good enlisted personnel, one might want to think about selection programs which take such characteristics into account.

This investigation is meant to be suggestive in nature. Unfortunately none of the deficiencies uncovered were related to performance (performance data were unavailable for officers at this time). It is hoped that people in decision making capacities will find and suggest other breakdowns of these kinds of data which can guide their own personnel activities. For example, it is quite possible that people in different functional specialties have different characteristics and attitudes which should be recognized when

planning training, redesigning work, etc.

All comparisons are reported in the form of t-tests. One of the assumptions underlying the use of this tests is that the populations sampled have homogeneous variances. In groups of very unequal size this assumption is often not tenable (and in this case could not be met). Consequently in the t ratios reported here we have computed separate standard errors for each sample (rather than a pooled estimate of variance) and corrected for number of degrees of freedom as a partial correction for this lack of homogeneity in variance (Hays, 1963).

Results. Table 3.25 reports differences for enlisted personnel and officers for four demographic characteristics. None of the significant differences are surprising. In these units, at least, the officers have a reasonable Navy tenure. Table 3.26 compares the two groups on a number of intrinsic traits. Note, again not surprisingly, that officers are significantly higher than enlisted personnel on those traits one might hope to find in Navy pilots; supervisory ability, intelligence, initiative, self assurance, decisiveness, maturity, achievement motivation, and occupational venturesomeness. They also appear to need power. Table 3.27 shows officers to be significantly more satisfied than enlisted personnel with all aspects of their jobs and more committed to both their squadron and Navy.

Table 3.28 compares officers and enlisted personnel perceptions about communication in their units. Note here the fact that lower and higher level personnel do not significantly differ in interpersonal trust (a finding somewhat counter to most other comparisons of trust across job levels), officers perceive their superiors to have significantly more influence than do enlisted personnel, but enlisted personnel have higher mobility aspirations than officers. These results have some interesting implications for training in these specific units. Communication accuracy, summarization, desire for interaction, use of the telephone, and redundancy of information flow is perceived higher by officers than enlisted personnel. In conjunction with the data in Table 3.27 these findings are consistent with the previously reported data concerned with job satisfaction and communication, and with pay and communication. Note that officers feel

Demographics	Enlisted Personnel			Officers			t
	Mean	SD	# Cases	Mean	SD	# Cases	
Years in Navy	7.63	6.36	519	10.21	5.95	43	2.72***
Months in Squadron	7.24	6.21	521	8.79	8.38	43	NS
Age	26.37	6.60	525	31.98	4.89	43	7.01***
Years of Non-Navy Education	11.97	1.53	513	15.88	1.82	42	13.52***

*** $p < .001$

Table 3.25 Comparisons of enlisted personnel and officers in ONR #2 or demographic characteristics

Intrinsic Characteristic	Enlisted Personnel			Officers			t
	Mean	SD	# Cases	Mean	SD	# Cases	
SDI - Supervisory Ability	23.22	5.90	502	27.05	5.40	43	4.43***
SDI - Intelligence	35.76	7.91	502	40.42	6.69	43	4.32***
SDI - Initiative	30.69	7.44	502	34.21	6.20	43	3.51***
SDI - Self Assurance	25.03	5.15	502	28.30	4.63	43	4.41***
SDI - Decisiveness	18.29	4.44	502	20.35	4.25	43	3.03**
SDI - Masculine-Feminine	14.53	2.54	502	14.49	2.32	43	NS
SDI - Maturity	28.64	6.33	502	30.60	5.34	43	2.28*
SDI - Working Class Affinity	14.51	3.67	502	14.91	3.30	43	NS
SDI - Achievement Motivation	31.59	9.75	502	38.07	5.85	43	6.52***
SDI - Self Actualization	8.32	3.91	502	8.95	2.55	43	NS
SDI - Need for Power	10.43	2.71	502	11.63	2.27	43	3.26**
SDI - Need for Financial Reward	4.49	2.33	502	3.90	1.59	43	NS
Occupational Venturesome Tolerance for Ambiguity	11.00	3.90	529	12.53	3.46	43	2.77**
Occupational Venturesome Ego Strength	13.47	4.03	529	14.49	3.28	43	NS
Occupational Venturesome Risk Preference	12.62	3.34	529	15.02	2.63	43	5.63***
Overall Venturesomeness	37.09	6.65	529	42.05	6.80	43	4.60***

*** p < .001

** p < .01

* p < .05

Table 3.26 Comparisons of enlisted personnel and officers in ONR #2 on intrinsic characteristics

Job Satisfaction Variables	Enlisted Personnel			Officers			t
	Mean	SD	# Cases	Mean	SD	# Cases	
JDI - Work	32.07	11.78	486	38.58	8.79	36	4.18***
JDI - Pay	27.14	14.46	487	40.44	7.10	36	9.95***
JDI - Promotion	29.79	16.08	487	41.39	11.82	36	5.52***
JDI - Supervision	40.71	12.23	487	45.58	9.74	36	2.84**
JDI - Coworkers	41.00	12.10	483	49.11	6.72	36	6.49***
Overall Satisfaction	5.03	1.37	490	5.67	1.09	40	3.53***
Commitment to Squadron	68.00	17.68	522	83.21	14.10	43	6.66***
Commitment to Navy	72.46	18.06	522	86.58	10.44	43	7.94***

*** p < .001

** p < .01

Table 3.27 Comparisons of enlisted personnel and officers in ONR #2 on job satisfaction and commitment

Index	Enlisted Personnel			Officers			t
	Mean	SD	# Cases	Mean	SD	# Cases	
Trust	10.16	3.03	529	11.02	2.92	43	NS
Influence	9.52	3.39	529	10.63	3.25	43	2.14*
Mobility	3.79	2.94	529	2.32	.89	43	7.86***
Communication Direction - Up	11.29	5.85	529	8.02	5.09	43	4.00***
Communication Direction - Down	8.93	6.44	529	10.63	7.85	43	NS
Communication Direction - Lateral	8.08	5.98	529	9.81	7.23	43	NS
Communication Accuracy	13.95	3.20	529	15.79	2.43	43	4.63***
Summarization	14.89	3.58	529	16.61	2.41	43	4.27***
Gatekeeping	13.94	3.94	529	13.05	3.01	43	NS
Desire for Interaction	15.25	3.71	529	18.39	2.19	43	8.47***
Blockage	7.79	4.41	529	6.30	2.70	43	3.28*
Change	8.94	4.32	529	9.28	4.04	43	NS
Modality - Written	.911	1.46	529	1.14	.80	43	NS
Modality - Face-to-face	7.56	2.03	529	7.12	1.55	43	NS
Modality - Telephone	.85	1.45	529	1.35	1.54	43	2.05*
Overload	2.98	1.73	527	3.14	1.67	43	NS
Underload	12.32	3.73	529	12.67	3.31	43	NS
Expansion	14.09	3.76	529	14.65	3.50	43	NS
Redundancy	4.64	1.48	527	4.14	1.51	43	2.11*
Satisfaction with Communication	4.63	1.36	519	4.77	1.40	43	NS

*** p < .001

** p < .01

* p < .05

Table 3.28 Comparisons of enlisted personnel and officers in ONR #2 on communication instrument indices

more information is blocked than do enlisted personnel.

Table 3.29 shows how officers and enlisted personnel differ in their perceptions about work group climate. As might be expected, and has been implied by some of the data previously reported, enlisted personnel perceive their work groups as characterized by significantly more decision centralization, task structure, and defensiveness, than officers. Officers feel their groups are more achievement oriented, supportive, capable of problem solving, concerned with excellence, and offering more rewards, than do enlisted personnel. Officers also feel the satisfaction and morale of the groups are higher.

Discussion. Descriptive data such as these offer a number of possibilities for effecting change in organizations. While the demographic comparisons are interesting they probably merely substantiate what is characteristic of most Navy officers and enlisted personnel. However, by knowing that intrinsic traits differ for the two groups it might be possible to relate such traits to performance in different jobs and then to select those people best suited to particular jobs taking these traits into consideration. The job satisfaction data suggest that if units such as the ones assessed do not want to live with the often deleterious consequences of low job satisfaction they might give special consideration to satisfaction among low level employees. Recall that low versus high paid employees did not substantially differ in this area, suggesting that the answer is not simply to raise the wages of low level personnel.

Those aspects of communication having to do with information accuracy and change should receive some attention. Other research (O'Reilly & Roberts, 1974a) shows the relationship of communication to work group climate, and argues that by improving one of these sets of perceptions (or associated behaviors) it may be possible to alter associated perceptions. By assessing communication health in an organization it is possible to highlight specific areas in need of attention and develop training modules relevant to these areas. Roberts, Cerruti and O'Reilly (1974) argue against most short term interventions based on their field experiment with emergency room personnel, but have developed for organizations training packages with modules directed to specific communication

Climate Scale	Enlisted Personnel			Officers		t
	Mean	SD	# Cases	Mean	SD	
Decision Cen- tralization	7.71	2.74	529	6.60	1.79	3.70***
Work Group Reputation	9.06	2.01	529	0.16	1.78	NS
Achievement Orientation	14.04	4.25	529	15.70	2.02	4.62***
Task Structure	15.18	4.04	529	13.23	3.11	2.85***
Supportiveness	19.21	6.11	529	21.53	3.42	3.97***
Security vs. Risk	5.18	2.00	529	4.67	1.63	NS
Training & Development	27.19	4.98	529	26.67	3.98	NS
Initial Job Orientation	8.38	2.60	529	8.51	1.50	NS
Problem Solving Ability	7.61	2.90	529	8.40	1.79	2.62**
Concern for Excellence	23.80	7.79	529	27.35	3.90	5.19***
Satisfaction Morale	16.27	5.25	529	18.26	3.16	3.73***
Reward Contingency	17.30	3.76	529	18.46	2.68	2.64**
Openness vs. Defensiveness	13.36	5.48	529	11.49	2.13	4.65***

*** p < .001

** p < .01

* p < .05

Table 3.29 Comparisons of enlisted personnel and officers in ONR #2
on perceptions of work group climate characteristics

problems uncovered using the individual communication instrument. One can select from the entire training package only those modules necessary in his/her organization.

In these units the climate data clearly show need for improvement at least for enlisted personnel. One could attempt a number of strategies; for example, beginning by attempting to change specific communication dimensions and assessing changes in climate variables shown in other research to be associated with communication. One might see, for example, the discussion in this chapter on communication and job satisfaction (based on data from more than one kind of organization) or O'Reilly and Roberts (1974a) mention of the communication work group climate association in thinking about where to begin.

Obviously units which have reason to be more interested in different breakdowns than those reported here. Difficulties in particular work groups, among job functional specialties (MOS), etc., might suggest the need to assess and change certain behaviors and attitudes. Recall that the data reported here are "old"; that is, they were obtained in units at their inception and many things were done in those units to correct particular and anticipated problems.

Summary

Restricting ourselves still to a discussion of individual communication in organizations how do we make sense of our findings to date (which should imply the necessity for the kinds of extensions currently underway or planned). At the outset, very few of the relationships discussed in this chapter rest on causal analyses. Thus, an obvious next step involves time series analyses of the relationships reported here. Such analyses are currently underway. Not only can causation then be discussed but communication stability and responsiveness to other factors can be explored.

Figure 3.6 lists the primary variables investigated or still under investigation here concerned with individual communication in organizations. Those variables starred and broken connecting lines indicate variables and relationships not fully explored. Recall that much of the effort in this research has simply involved disentangling the components of various concepts (for example, communication and trust) so that they could be meaningfully related to one another.

It is still too early to develop a reasonable conceptual framework to explain organizational communication processes (in part because causal analyses are needed), but we have made some beginning. We know, for example,

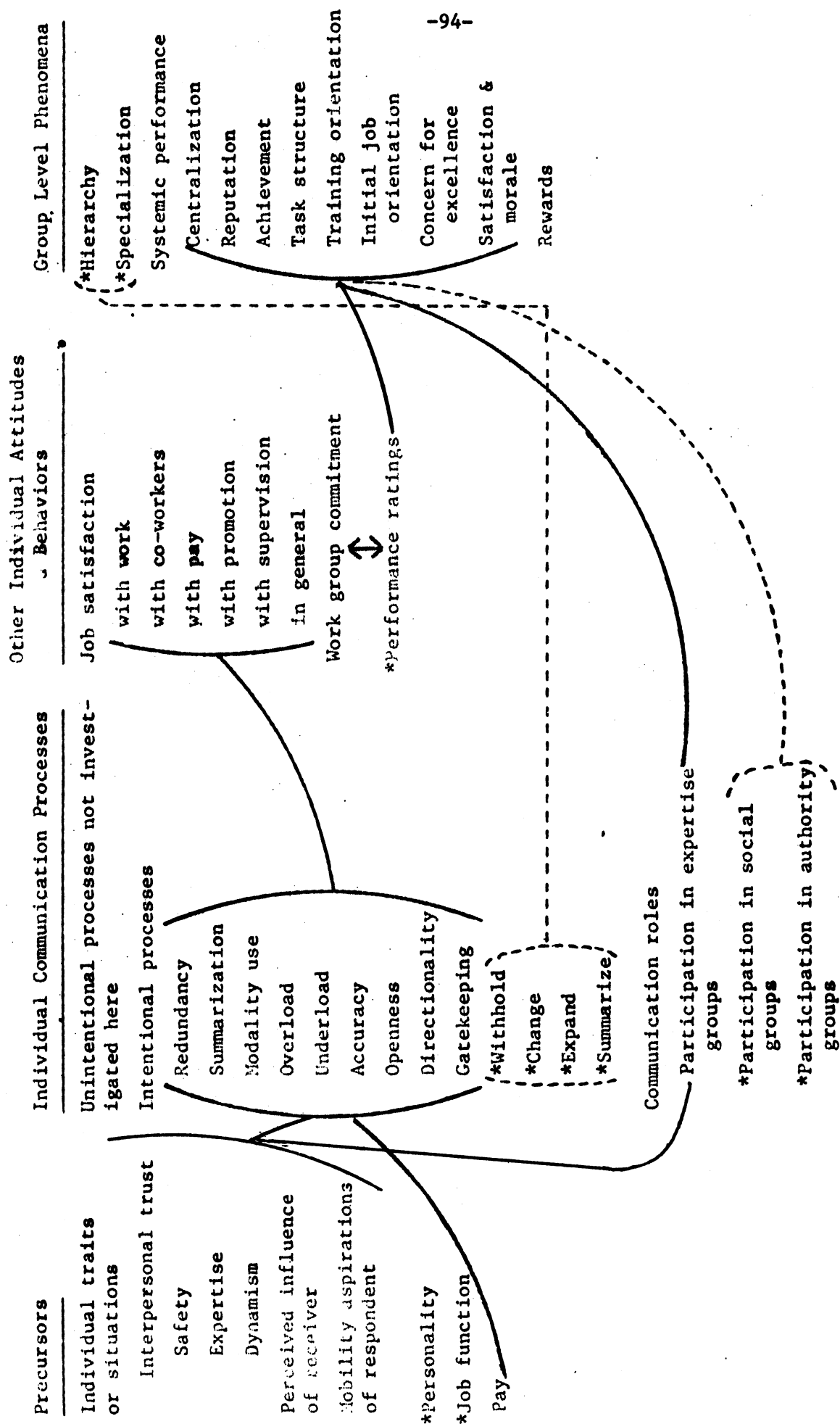


Figure 3.6. Variables and relationships investigated and under investigation. (Starred variables and broken lines indicate variables and relationships thus far incompletely examined.)

that interpersonal trust has greater impact on a variety of dimensions than does perceived influence of superior or mobility aspirations of respondents. This finding is causal and has been demonstrated across a number of different kinds of organizations. While trust is shown related to aspects of communication (for example, accuracy, openness, etc.) which are thought to possibly reflect distortion, influence appears to impact different communication phenomena, and usually not those thought to be components of distortion. Mobility aspirations appear to have little direct impact on communication facets. Trust also differentiates isolates and participants at least in task networks leading one to wonder whether people become untrusting when they find themselves isolates or whether people who generally have low interpersonal trust seek out isolate communication roles in organizations. Both of these possibilities will be explored.

Various components of trust are further differentiated related to communication phenomena. In fact the feeling of safety concerned with the information source (or receiver?) may be more important in the transmission of accurate, unchanged information than is either his/her expertise or dynamism. Note, too, that the processes of vertical and lateral communication appear to be different. These findings have some strong implications for action which will be discussed in Chapter 6.

Obviously, it is necessary to dimensionalize roles for at least task, social, and authority networks and to show whether the precursors and communication instrument responses are similar for ^{various} role occupants in all three networks. Another obvious task that is underway is that of finding easier ways to assess role occupancy. Since communication accuracy and blockage have been most frequently related to both communication precursors and other individual attitudes and behaviors, further differentiations of information blockage and change mechanisms are in order. Finally, the precursors investigated to date are few in number. One suspects that individual intrinsic characteristics (Berkowitz, 1956; Deray, 1972; Hanson & Fiedler, 1973) explain some of the variance in both communication perceptions and communication role behavior. Thus, personality variables and job function are under investigation in relation to communication. Clearly job function, where one finds himself in the organization, etc., are dependent in part on structure and hierarchy. While structure and hierarchy are generally topics for the next chapter one beginning investigation in this area is underway

and was mentioned here. When this part of the work is complete it should be possible to at least suggest the proportion of variance in say, accurate information flow (explicated), accounted for by interpersonal trust versus intrinsic individual characteristics and higher order organizational characteristics. The complete research is needed for theoretical development; some practical action can be taken on what has now been demonstrated.

The relationships of communication and job satisfaction components produce no real surprises. "Good" communications (that is, information flow in all directions, accuracy, expansion, openness, summarization) are associated in a number of organizations with satisfaction with work, co-workers, and supervision. Not surprisingly they are not generally associated with such aspects of satisfaction as pay or promotional opportunities. Good communications are also associated with work group commitment. Again, there are implications here for organizational policies concerned with turnover. The relationship reported here of actual pay to communication and job satisfaction is based on scant data. However, it suggests the hypothesis that pay may be related to satisfaction through communication (at least in an organization in which the pay one receives is public information). This relationship bears further scrutiny.

Communication and pay are significantly related to individual performance ratings and to perceptions about systemic performance characteristics. These relationships should be investigated in a causal framework because it is unclear whether highly paid people are rewarded for performance and performance may be based on greater sensitivity to and satisfaction with communication; or whether some other hypothesis is more tenable. Even the currently available data, however, indicate some policies organizations might consider to improve performance.

One small finding deserves some further mention. We hear many complaints from people at all levels in organizations regarding the degree to which they are overloaded with information and the dysfunctional consequences of overload. Yet nowhere in our research does overload emerge as a major problem. In fact in a number of the studies reported thus far, underload has emerged as the more significant problem. This

may be because overload is not a problem or it may be because we have incorrectly measured overload. To more fully understand the dynamics concerned with overload we have designed a laboratory experiment, simulating an organization as closely as possible, which simultaneously observes the effect on information recalled of overload and redundancy. Once the laboratory experiment is complete results should lead us to appropriate analyses of field data to uncover consequences on attitudes and performance of overload and redundancy.

While we have discussed and investigated throughout this chapter four separate mechanisms for information blockage or change, one method of change frequently mentioned in the literature (see March & Simon, 1958; Weick, 1969; etc.) is the kind of change information undergoes when one needs to turn quantitative data into qualitative inferences or vice versa. An experiment has been designed to assess the quality of information alteration as such changes are made.

A number of specific implications and extensions of the research in this chapter are discussed commensurate with reporting each specific investigation. Many obvious extensions are primarily concerned with phenomena other than communication (and are consequently not reiterated here). Some of the practical implications will be returned to in the last chapter.

CHAPTER FOUR

Social structures function...as anchorages for shared attitudes and values, or in other words, for culture. By the same token roles are anchorages for certain individual differences in outlook and personality (Katz, Levin & Hamilton, 1963, p. 249).

Here we begin to discuss group communication phenomena (as one aspect of social structure) and their correlates. This chapter and the following one are considerably shorter than was chapter three. The reason is obvious. Relevant research concerned with group and organizational phenomena which explicates communication and other variables such that they can be related in the future across organizational levels has not yet been completed. It is our purpose here to indicate the direction of our thinking, report the data available, and indicate research underway and planned for the future. It is in this chapter that we cross the boundary from psychology to sociology and begin to consider more macro aspects of organizational life.

Recall that in chapter three we discussed task role occupancy, some of its possible antecedents, and some individual attitudes and behaviors associated with various roles. Lewis (1972) notes that most uses of the concept of role differentiation assume task and social roles are incompatible. His own review offers little support for this notion. While it is an ultimate goal of this research to compare task, social, and authority roles, groups, and networks, for the purposes of this chapter that will not be possible. Here our focus primarily is on characteristics and responses of task groups (as it was on task roles in chapter three). We know that groups which are together for any length of time develop and change their internal structure and relationships to other groups. This aspect of our research will be reported subsequently. A limitation to our final as well as current report was mentioned in chapter two. The available role, group, and organizational network data come from high technology Navy organizations only (and then were collected as these organizations developed from birth to one year). This reduces the degree to which generalizations of findings can be made to other kinds of organizations.

Defining Group Properties

There is a great deal of research in social psychology concerned with small

group characteristics. However, even though in laboratory investigations communication structure is more easily imposed than, say power or other forms of structure, most of the available small group research is not concerned simultaneously with the kinds of communication phenomena of interest here, and almost none of it was conducted in work organizations

One obvious strategy has been to impose structure on small groups as an independent variable and to observe its consequences. Thus, in the laboratory network studies the issue of centrality has been of primary concern (referred to in chapter three in our mention of sociometric stars - p. 47) and group performance and individual job satisfaction examined as outcome variables. Group size and task structure have also received considerable attention as independent variables (Lucy, May, & Hay, 1954; Glanzer & Glazer, 1959; Shaw, 1964). All of these studies take a slightly different view than is in the ultimate plan of this research. Here we intend to view communication structure as an emerging process rather than as something imposed. Certainly group structure is imposed by organizational structure, and it emerges and changes in response to various organizational conditions, a point which will be returned to in chapter 5.

Davis (1969) in his review of the communication network literature says that the findings from these small group network studies have not been as orderly as one might have hoped. However, the summarization that communication structure is related to a number of group outcome variables (at least for small laboratory groups) is a major conclusion. Davis notes:

First, the imposition of communication restrictions and regulations of communication flow is a technique, not a close analog of particular groups or organizations. As a technique for experimentation, the chief importance of the communication network lies more in its potential as a tool for basic investigation than in the immediate production of findings applicable to existing groups that have a prima facie similarity to a Wheel, a "Y", or the like....

Second, in the past there has been insufficient attention devoted to the question of how and why the imposition of a communication network yields its effects. Clearly, "something happens" differently in different networks (p. 103 - Italics, Davis).

The literature concerned with various aspects of group communication in organizations is considerably more diffuse than is the small group literature in general. And, in fact, much of the literature is unclear about whether authors

are referring to internal dynamics of groups, organizations, or larger social systems. However, Secord and Backman (1961) state that as group size increases the nature of communication content increases, and that small groups inhibit expressions of tension and dissatisfaction. Burns (1954) found that, surprisingly, managers devote more communication to personnel matters than they think they do. He also noted that most managerial interactions are with managers in their own work groups; that there is little interaction with people outside one's own work group. Finally, Burns' data indicates that even within work groups managers interact only with a few other people. Wade (1968) in a study of the Bureau of the Budget finds almost the opposite phenomenon. He notes that people who have many interactions within their work groups also have a considerable number of interactions outside their groups. Finally, Wickesberg (1968) reports that many different kinds of communication networks exist within any organization, and that specific networks seem not to exclude either managerial or nonmanagerial personnel. He reports large numbers of both horizontal and vertical contacts (see chapter three for discussion of possible precursors and consequences of horizontal versus vertical contacts).

There have been a large number of approaches to identifying communication structures (rather than imposing them). Many such efforts, though, have not been concerned with the transfer of information or the process of communication. Krippendorff indicates that these efforts failed to provide direct evidence about process. He says:

To explain social behavior in terms of the relations among individuals or any societal units presupposes that the relations of interest are explicitly defined in relevant data, and not merely inferred from their behavioral consequents (1970, p. 252).

Krippendorff suggests network data as a basic step toward generating objective communication data but notes that even the results of this method are static in nature.

A number of authors have decomposed social systems into components they think most important in the everyday operations of various kinds of systems. Oeser and Harary (1962; 1964), for example, provide a model which indicates that groups can be decomposed into three classes of elements; tasks, positions, and persons. Homans (1960) talks about interactions, sentiments, and activities in various systems. Whatever their approach to system decomposition almost no author forgets task input problems (Oeser & Harary, 1962; Roby & Lanzetta, 1958; etc.).

As indicated in chapter two we adopted a method for assessing system components compatible with the individual communication phenomena in which we are interested. That strategy identifies communication roles, functions, system levels, and various communication flow aspects within levels. Some of these are detailed in chapter two (page 16). The approach used in this research is fully described in MacDonald and Farace (1972); Monge and Lindsey (1974), and Richards (1971; 1974a; 1974b; 1974c).

Method. In both the ONR #2 and ONR #3, data collections respondents were asked (following Richards, 1971; 1974a; 1974b; 1974c) to list by name those individuals they talked to when:

1-Seeking technical advice (task or expertise)

2-They had social conversations (not work related) during the course of the work day

3-Wishing to file a "gripe" through formal channels

For every contact listed respondents were asked to indicate its frequency and importance. These data were then subjected to matrix manipulation analyses at Michigan State University. Besides identifying communication roles (group members, isolates, liaisons, bridges, etc.), for individuals (discussed in chapter three), the program identifies groups for each of the networks asked about (task, social, and formal authority in this case).

The number of people in each group is identified (this may be different from the number of individuals in a group on whom we were able to collect other information) as is the degree to which the group is interconnected. In addition, for each group information is obtained about the percentage of two-way links, the percentage of outgoing and incoming links, the percentage of within group links, the percentage of between group links, the percentage of liaisons with the group, and the percentage of "others" (not group members but having some association with group members) attached to the group. The strength of linkages (not just the percentages) were also computed for each of the above characteristics; two-way linkages, outgoing linkages, incoming linkages, within group linkages, between group linkages, linkages with liaisons, with others, etc.

Following these initial data analyses done at Michigan State we derived three additional measures of intra-group structure (in addition to group size and internal connectedness); number of military occupational specialties in a group (as an indicator of specialization), number of ranks in a group, and number of ranks divided by group size (as indicators of hierarchy).¹

1. This estimate, while probably more reflective of group hierarchy than is number of ranks, is anything but perfect.

Results. Thus far we have been able to define the group properties indicated above for the twenty seven groups identified from ONR #2 as task groups. Table 4.1 provides the relationships among the linkage variables. Table 4.2 shows the relationships among the strength of linkage variables.

Note that the results in Table 4.1 refute Wade (1968). Groups with a great deal of outgoing information also have a great deal of incoming information. But outgoing information is significantly negatively correlated with internal contacts. Extending on this, when the percentage of internal contacts is low contacts with liaisons are high.

Table 4.2 adds to an increasingly consistent picture of information transmission within and between groups. Perceptions about the strength of incoming contacts are negatively correlated with the strength of two-way contacts. Strength of outgoing and incoming contacts are highly intercorrelated, but the strength of outgoing contacts and strength of contacts with others are negatively associated with the strength of within group contacts.

It might seem useful to compare the number of links and linkage strength. However, such comparisons are inappropriate because the methodology used in obtaining the linkage data is contaminated by that used to obtain the strength data.

Table 4.3 provides intercorrelations among four commonly considered group or organizational structural measures. Connectedness is a possible surrogate of cohesiveness and is here a ratio of the total number of possible links in a group to the actual number of links. Note that as groups grow larger their connectedness diminishes. However, group size is significantly and positively related here to the other aspects of structure. Intergroup connectedness is negatively associated with number of specialties in the group (but number of specialties is positively associated with group size).

Discussion. The analysis of task group data here are hardly complete

Group size	# specialties	Hierarchy rank/size	Frequency of interaction	Connectedness
Group size	50**	40*	50**	-68***
# specialties		-.05	.02	-41*
Hierarchy rank/size			.17	-10
Frequency of interaction within group				.13

*** p < .001
 ** p < .01
 * p < .05

Table 4.3 Intercorrelations among four commonly used concepts of group or organizational structure for 27 task groups (ONR #2)

	% 2-way	% outgoing	% incoming	% within group	% between group	% with liaison	% with others
% 2-way		-.26	-.64***	.37	.03	.08	-.48**
% outgoing			-.58**	-.42*	-.26	.21	.43*
% incoming				.02	.18	.24	.06
% within group					.10	-.39*	-.79
% between group						.30	-.10
% with liaison							-.12

*** p < .001

** p < .01

* p < .05

Table 4.1 Intercorrelations among linkage scores for task groups in ONR #2 (27 groups)

-104-

	Strength 2-way	Strength outgoing	Strength incoming	Strength within	Strength between	Strength liaison	Strength with other
Strength 2-way		.33	-.66***	.22	.17	.16	-.44**
Strength outgoing			-.49**	-.48**	-.29	.32	.38
Strength incoming				.17	.06	-.40*	.10
Strength within					.02	-.48***	-.71***
Strength between						-.23	-.24
Strength liaison							-.17

Table 4.2 Intercorrelations among linkage strength scores for task groups in ONR #2 (N=27)

and obviously lack in comparison with similar data from other kinds of communication groups. As they stand they generally show that groups in which members seek their contacts from within may run the difficulty of losing sensitivity to outside demands, or if they are sensitive to outside contingencies they appear to risk losing internal interconnectedness. As the number of specialists in group size increase, groups appear to diminish in connectedness. Yet as group size increases so do within group contacts; it simply does not increase rapidly enough to increase connectedness. One perhaps can change group connectedness depending on the nature of the particular tasks or operations required of the groups, and depending on whether sensitivity to internal issues or monitoring of the environment is more important.

The intercorrelations among the structural indices further support notions mentioned by a number of writers (Blau and Schoenherr, 1971; Haire, 1959; Pugh, Hickson, Hinings, MacDonald, Turner & Lipton, 1963; Pugh, Hickson, Hinings, & Turner, 1968, et seq.). Size is clearly an important indicator of other ways in which group structures are described.

Antecedents and Consequences to Group Communication

Antecedents to group communication

In the usual discussions about forming efficient task groups, reference is made to what the size of the group should be, and sometimes to skills or effective dimensions required to complete tasks (Davis, 1969). Hackman (1973) points out that "which summary variables are important in determining performance effectiveness very much depends upon the Central Task Contingencies" (p. 124). Hackman is generally concerned with group influences on the individual. Here our concern is with the influence of aggregated individual characteristics or composites on group behavior.

Returning to Figure 2.1, note that the antecedents to group process and structure, or traits by which groups can be characterized (referring to Roberts and Hulin, 1974), are all aggregates of individual level traits. Undoubtedly there are other characteristics which might describe groups and which could ultimately better predict group processes than the aggregates noted in Figure 2.1. However, in keeping with the notion of limiting variables so that a reasonable set is explicated and can be compared across organizational conceptual levels in the future, the antecedents related here to group characteristics are a few of those in Figure 2.1.

Method. As illustrative of the kinds of relationships discussed in

extensions of the work reported in this chapter, several linkage variables and two of the derived structural variables referred to most frequently in the small group literature were selected and related to a set of aggregate demographics and the three intrinsic characteristics (mean scores for each of the twenty-seven tasks groups) which are at the base of our own investigations of individual communication phenomena.

The group characteristics are frequency and strength of interaction within groups, group size, and group connectedness. The other structural variables are number of specialties and hierarchy. Again, frequency and strength of interaction and connectedness have some intuitive relationship to group cohesiveness, a topic researched and discussed ad nauseum in social psychology (see, for example, Cartwright & Zander, 1968; Davis, 1969; Hackman, 1973; McGhire, 1969; Zimbardo and Ebbesen, 1969, etc.). And, as stated before, group size is frequently discussed in relation to all kinds of outcome variables. The importance of communication and related phenomena to specialization and hierarchy was alluded to in chapter three. Our own research suggests that group communication as well as individual communication might be related to interpersonal trust, perceived influence of superior, and respondent mobility aspirations. Moreover, an investigation by Jain (1973) showed that task related interchange occurs in situations of high trust. It was decided not to focus on personality or other intrinsic traits and group communication initially because of the considerable existing literature relating personality and group characteristics has lead us almost nowhere.

Results. Table 4.4 presents the relationships among group linkage and other structural characteristics and aggregated demographics for groups. The very significant results for rank divided by group size indicate that this is probably a poor indicator of hierarchy. Education is not surprisingly significantly related to group size and to frequency and strength of interactions in groups. Here, as groups grow they include better educated people who are probably increasingly verbal and speak to one another often.

Table 4.5 provides some rather surprising results given the individual data reported in chapter three. Intergroup interactions for task groups and other estimates of structure seem not to be significantly affected by or to influence interpersonal trust, perceived influence of superior, or mobility aspirations. These relationships will be explored further.

	Tenure in Navy	Tenure in Sqdn	Age	Education
Frequency of interaction within group	.04	.28	.11	.45*
Strength of interaction within group	.08	.24	.16	.43*
Group size	-.08	.06	.11	.58**
Group connectedness	.36	.25	.14	-.21
# specialties	-.16	-.22	-.13	.21
Ranks/size	.48**	.51	.70***	.74***

N = 27

*** p < .001

** p < .01

* p < .05

Table 4.4 The relationship of group linkage and other structural characteristics and aggregate demographics for task groups

	Trust	Influence	Mobility
Frequency of interaction within group	-.10	.06	+.32
Strength of interaction within group	-.09	.19	+.35
Group size	-.15	.06	+.22
Group connectedness	.34	.16	+.03
# specialties	-.23	.13	-.09
Rank/size	-.06	.03	-.17

N = 27

Table 4.5 The relationships of group linkage and other structural characteristics and aggregate perceptions of trust, influence, and mobility for task groups

Discussion. In some ways the results here are surprising and will be further explored. For example, one might think groups in which members have been

in the squadron longer would interact more than those in which membership in squadrons is of shorter duration. Perhaps because at the time of the data collection the squadrons were newly forming this posited relationship does not appear. A comparison of these task groups with those in the same squadron one year later will be interesting.

The lack of association between interpersonal trust and group interaction is also surprising. This research may be using an inappropriate measure of trust. Perhaps aggregate trust is related to social but not to task group interaction. A variety of hypotheses such as this one will be explored in Roberts and O'Reilly (working paper, 1974 a).

Group properties and group attitudes

A number of investigators have been interested in the related problems of how group characteristics are associated with group morale and with other aspects of work group climate. Most of the group - job satisfaction findings are historically based in the small group network investigations and examine the satisfaction of members occupying specific roles. Worthy's (1950) investigation suggested that individuals in "flat" organizations have higher job satisfaction than those in "tall" organizations, but Porter and Lawler (1964) found no evidence for the advantage of flat over tall organizations. As noted earlier in this chapter structural variables discussed in relation to organizations are often also relevant to work groups and these characteristics should be looked at in relation to aggregate perceptions of work group morale. Vannoy and Morrisette (1969) report that satisfaction with job and group are not necessarily concurrent states, and may be mediated by different conditions. They observed the effects of position centrality and group effectiveness on these two attitudinal states. Johnson, Goodchilds, and Raven (1972) found group efficiency and satisfaction to be dependent on the degree of status congruency or consistency within groups. Indik (1965) notes that organizational size creates communication problems and consequent job dissatisfaction. However, Porter and Lawler's (1964) review of the relationship of organizational characteristics to job satisfaction indicates that sub-unit or group size may be a more important determinant of job satisfaction than is organizational size.

One might conceive of composite assessments of job satisfaction as one aspect of group climate. If most members of a particular group are satisfied with various facets of their work this affect should come to characterize the group (and may in turn influence other individual responses). Other aspects of group climate exist, too, as indicated in chapter three. While in that

chapter individual perceptions of climate were related to other perceptions and behaviors, it seems most appropriate (as shown in Figure 2.1) to investigate climate as one aggregate phenomena of groups which simultaneously exhibit other phenomena. Recently, there has been considerable debate in the literature concerned with what precise facets actually define organizational climate (Campbell & Beaty, 1971; Campbell, Dunnette, Lawler & Weick, 1970; Hall & Schneider, 1973; Lawler, Hall & Oldham, 1974; Meyer, 1969; Pritchard & Karasick, 1973). It is not our purpose here, nor was it in chapter three, to engage the debate. We note that Kahn et al. (1964) discuss the importance of communication in contributing to climate, but do not elucidate specific climate-communication relationships for work groups.

Payne and Mansfield (1973) state the necessity for organizational theorists to develop a framework which spans the three conceptual levels discussed in this report. They feel that climate may be the appropriate vehicle for doing this, while we sense that communication is intuitively a better concept from which to develop multi-level nomological networks. Payne and Mansfield continue that larger organizations (and perhaps groups) will score higher on climate characteristics relevant to intellectual and scientific pursuit. Size, they say, is also correlated with specialization, a finding corroborated in Table 4.3.

Finally, individuals are thought to be more highly committed to groups in which the ambience (climate, satisfaction, etc.) is optimal. A great deal of literature is concerned with group attractions, generally going under the heading of "cohesiveness" (Cartwright & Zander, 1968; Collins & Raven, 1968; Lott & Lott, 1961, etc.). Cohesiveness is a group variable possibly corresponding to an aggregate of individual commitments (as well as to frequency of interaction in groups, a measure derived very differently in this research). If groups are attractive to individuals, perhaps their attractiveness generalizes to organizations. The relationships between group and organizational commitment and associated group characteristics have not been investigated. Their inclusion here is a beginning effort to relate group and organizational phenomena.

When we come to deal with such variables as group size, morale, climate, commitment, and communication, etc., the literature is rather fuzzy concerning the applicability of empirical findings to groups and/or entire organizations. The methodology imposed here to define groups forces considerations of distinctly

group related attitudinal and behavioral characteristics and, at another level organizational (that is interlocked groups) correlates of yet other phenomena.

Method. Group mean scores were derived for the ONR #2 task groups for the five aspects of job satisfaction assessed by the Job Descriptive Index, and overall satisfaction as general group ambience. Commitment to the squadron and commitment to the Navy (as a generalized extension of group commitment) were assessed. At least two problems are inherent in the assessment of commitment for the purpose of group analyses. Squadron commitment probably only partially overlaps with other perceptions or facts (for example, degree of connectedness which is assessed using a method different from individual perceptions of connectedness) about work groups. And squadron and Navy commitment assessments are not methodologically independent. For each group mean scores were also derived from the thirteen work group climate factors.

These responses to group characteristics were then examined in relation to the linkage and other structural variables identified previously as referred to most extensively in the small group literature.

Results. Table 4.6 provides the correlations among the group linkage and other structural variables and group estimates of job satisfaction and commitment. There are no significant differences for any of the satisfaction relationships. Commitment to the squadron is negatively associated with the degree to which the squadron is internally connected. As group size increases both commitment to the squadron and to the Navy increases.

Table 4.7 provides information about the relationship of connectedness and other structural variables to work group climate. Again, the results are disappointing. Note that task structure increases in smaller groups in which there are few specialties. Work group reputation appears to decrease as connectedness increases.

Discussion. The job satisfaction - internal group interaction results do not support the data provided in chapter three. These results and the previous ones reported in this chapter increasingly suggest the necessity of

	Job Description Index					Overall job satisfaction	Commitment	
	JDI-W	JDI-PA	JDI-PR	JDI-SU	JDI-CO		Sqdn	Navy
Frequency of interaction	-.23	-.07	.14	-.19	.03	-.18	-.10	.13
Strength of interaction	-.09	-.07	.13	-.16	.06	-.10	-.16	.12
Group size	-.11	.18	.29	-.18	.03	.05	.39*	.44*
Connectedness	.27	-.04	-.08	.31	.28	.16	-.50**	-.29
# specialties	-.08	.11	.31	-.10	-.20	.13	.27	.12
Rank/size	.18	.22	.11	.19	.30	.07	.08	.37*

** p < .01

* p < .05

Table 4.6 Correlations among group linkage and hierarchy variables and job satisfaction-commitment for task groups

	Frequency of interaction	Strength of interaction	Group size	Connectedness	# specialties	Rank/size
Decision centralization	-.32	-.32	-.36	.00	-.29	-.12
Work group reputation	-.30	-.27	-.33	.38*	-.29	.13
Achievement orientation	-.10	-.12	-.12	.26	.09	.40*
Task structure	-.32	-.33	-.47**	.05	-.37*	-.22
Supportiveness	-.33	-.36	-.26	.10	-.21	.21
Security versus risk	.46*	.41	-.31	-.14	.22	-.04
Training and development orientation	-.25	-.19	-.23	.23	-.06	-.11
Initial job orientation	-.19	-.25	-.23	.13	-.12	.12
Problem solving ability	-.18	-.20	-.12	.00	-.04	.14
Concern for excellence	-.27	-.30	-.18	.05	-.15	.29
Satisfaction and morale	-.12	-.13	-.06	.08	-.06	.28
Reward contingency	-.19	.13	-.12	.28	-.14	.15
Openness vs. defensive- ness	-.19	-.28	.01	-.28	-.11	-.20

Table 4.7 Correlations among group linkage and hierarchy variables
and work group climate for task groups

**p < .01

*p < .05

comparing the same relationships for task, social, and formal authority groups. For example, ^{in chapter three} perceptions of high communication accuracy and information flow are associated with individual job satisfaction on relevant dimensions. Here interaction frequency for task groups is not associated with group satisfaction ambience. It may be associated in this way for social groups, which would further clarify relationships reported in chapter three and begin to tie individual and group communication phenomena together. The commitment results suggest that if squadron commitment is valued, decreasing internal group connections (which will possibly increase external connections, according to Tables 4.1 and 4.2) is one method for obtaining it.

The organizational climate data relationships are also puzzling. If climate is more appropriately a "group" phenomena than is individual job satisfaction it should be more significantly related to group linkage and other structural properties. Assessing whether variables are appropriately classified (in terms of conceptual level) as individual, group, or organizational, is part of the research planned for the future. The data reported in Tables 4.6 and 4.7 provide no information about this, yet we cannot build cross level theories of organization without at least appropriately classifying variables. Another testable hypothesis is that the group level climate phenomena are inappropriately measured. The linkage phenomena at least have higher face validity. Testing this hypothesis is also a part of our planned future research.

Group properties and individual communication phenomena

As a partial effort to understand the relationships among outcroppings of a concept at one level of organizational analysis to different outcroppings of the same concept at other organizational levels of analysis it is plausible to relate individual communication phenomena to group communication phenomena. To do this requires that every individual in a sample of respondents be assigned the assessments for his group (at least task, social, and authority groups) on those variables detailed in Figures 4.1 and 4.2, and on internal group connectedness. Those group characteristics can be related to individual perceptions of communication phenomena such as those discussed in chapter three. This research is underway.

Another step which should be taken in exploring relationships across conceptual levels is to examine whether group communication facets and the manner in which they are operationalized are nothing other than aggregate

individual communication facets. By having these two pieces of information a researcher comes closer to identifying similarities and differences within a concept across levels of analysis. Obviously these two steps should be taken for manifestations of communication in comparisons across all three levels (individual, group, and organizational) of interest in organizational research, rather than just for individual and group outcroppings. This strategy should provide the basic building blocks for theoretical development. For example, it should identify outcroppings which describe communication behavior and explain other phenomena at one level which are inappropriate at other levels. The approach would also provide information about communication aspects of organizations, groups, or individuals, which could be changed (assuming communication is a changeable phenomenon) in the interest of whatever practical outcome one has in mind. For example, if the data reported previously in this chapter (Tables 4.1 and 4.6) are valid across groups and one is interested in increasing squadron commitment an appropriate technique might be to attempt to decrease within group connectedness (Table 4.6).

Method. For the purposes of this report we can only provide data for a small part of the research program underway. The mean group scores were computed for individual communication phenomena for the ONR #2 task groups. These aggregate individual scores were then related to group communication characteristics (derived using a different methodology). This is one aspect of the second analytic approach mentioned above. Table 4.8 provides the results for the relationship of communication group characteristics we have previously focused on in this chapter (frequency in intra-group contacts, strength of intra-group contacts, communication group size, and within group connectedness) to the individual phenomena focused on in chapter three. The other group structural characteristics mentioned in this chapter (specialization and hierarchy) are not included in these analyses.

It appears from Table 4.8 that group and individual communication phenomena are manifest in different ways or one would expect high interaction frequency or high interaction strength to be significantly associated with perceptions of high information redundancy, desire for interaction, etc. The aspects of aggregate/^{individual}communication phenomena most reflected in the group characteristics thus far investigated (and then only for the 27 ONR #2 task groups) is modality use. These results make some sense. As connectedness increases, face-to-face contacts increase and use of the telephone decreases.

As group size increases the use of the telephone increases and as strength of contact increases the use of written messages decreases.

Discussion. Even these few results have some implication for changing task groups. Decreasing task group size and increasing inter-group connectedness may decrease the use of the telephone and possibly increase face-to-face interaction. There is considerable evidence (Argyle & Kendon, 1967; Ekman & Friesen, 1969a, 1969b; Hall, 1959) that more information is transferred when people interact in a face-to-face manner than when they interpose mechanical devices and written messages between them. Obviously, however, face-to-face contact information cannot be stored as easily as recorded information.

Little really can be said about this analysis until it is compared with the other kinds of analyses mentioned obviously to be done as this part of the ongoing research. In addition, cross-validation of all findings are required. Within the framework of the ongoing research it will only be possible to complete the examination of group-individual manifestations of communication because as one moves to the organizational level the unit of observation becomes the organization and the number of data points available is too small to make adequate comparisons across organizations. For further information about the relationship of group and individual communication phenomena, see Roberts and O'Reilly (working paper, 1974b).

An Alternative Means for Defining Group Communication Properties

As indicated previously data collection to assess group communication properties using a sociometric approach is cumbersome, particularly so the larger the organization. Consequently, the approach often cannot be used in large organizations in which employers are less interested in employees providing research data than in completing their daily tasks. While there are a number of sociometric techniques which can be used (Lindzey & Byrne, 1968; Nosanchuk, 1963, etc.) they all suffer from the same problem. Additionally, different measurement approaches should be used to assess similar phenomena in the interest of convergent validity. Our survey of the literature uncovered no easily administered techniques which would provide information similar to that obtained with the Michigan State developed sociometrics, though the procedure described by Lorenzen (1969) seemed somewhat appropriate.

A less precise but potentially quicker and cheaper technique than the

	Frequency of interaction	Strength of interaction	Group size	Group connectedness
Directionality				
Up	-.28	-.34	-.29	.21
Down	.00	.06	-.36	.42*
Lateral	.19	.15	.53**	-.41*
Accuracy	.03	.06	-.15	.18
Summarization	-.08	-.18	.27	-.26
Gatekeeping	-.11	-.13	-.01	.22
Desire to interact	.29	.26	.45*	-.23
Gatekeeping	.07	.14	.24	-.18
Change	.05	-.02	.38*	-.32
Overload	-.14	-.21	-.15	.05
Underload	-.23	-.14	-.18	.15
Expansion	.22	.15	.35	-.19
Redundancy	.04	-.00	.28	-.58**
Satisfaction with communication	.06	.05	.09	.05
Modality				
Written	-.32	-.48*	.08	-.24
Face	.17	.27	-.30	.42*
Phone	-.13	-.18	.40*	-.42*

N = 27

**p < .01

*p < .05

Table 4.8 Relationships among group communication characteristics and aggregate individual communication facets for the ONR #2 task groups

sociometric for assessing group communication characteristics is to use the survey approach, asking respondents to complete a series of simple questions about their group memberships. This approach does not involve the labor of explicitly identifying by name those with whom the respondent is in contact.

Using this approach data, of course, are lost because respondents summarize their group memberships without identifying its precise composition. Further, there is the possibility of significant method error when comparing communication group survey results to individually provided survey information concerning other aspects of communication and other attitudes and behaviors. That is, the sociometric approach is methodologically more distant from the other data reported for our large samples than is an additional survey. With these assets and limitations in mind it was still considered useful to develop a few simple questions the analyses of which might parallel the sociometric output already used in the research

Method. In conjunction with the other information provided by the 579 members (at all levels) of the ONR #2 data collection the respondents answered the questions listed in Figure 4.1 concerned with task and social groups. The question concerned with frequency of contact within each group was designed to parallel the sociometric within group contact linkage output, the importance question to parallel the sociometric "strength" question, the parallel in the group size data is obvious, and the "tightly or loosely knit" question was designed as complementary to the connectedness measure.

Where in the previously reported partially completed investigation group means for individual communication indices were correlated with group properties, and then only for the task groups (N=27), here each individual response concerning group membership was correlated with antecedents to intrinsic characteristics and with the individual communication responses of interest throughout this research. Responses about group membership are also related to job satisfaction (morale) and commitment to the organization. However, a step mentioned in the introduction to the last study (pages identifying individuals (here in social and task groups) by their analogous sociometrically defined group properties, must be taken before the data reported here will be complete. At that point a comparison can be made between the utility of the sociometric and the simpler method for assessing group properties,

Task groups

Task or work groups are groups of people who deal with each other primarily about their everyday work activities. To be a work group the people involved probably see a lot of each other (that is, they spend more than 50% of their time on the job involved with each other rather than with some other group). Answer the following questions in relation to the one task or work group which is most important to you and of which you feel you are a member.

1. How frequently do you interact with others in this group?
2. In general, how important are these interactions to you?
3. About how many people are in this group?
4. Would you say this group is tightly or loosely knit?

Social groups

Social groups are groups which deal primarily with things which people are interested in other than specific tasks of work. To be a social group, the people involved usually see a lot of each other (that is, they spend more than 50% of their total social time involved in social interaction with each other). Answer the following questions only if you feel one social group is more important to you than the others.

1. How frequently do you interact with others in this group?
2. In general, how important are these interactions to you?
3. About how many people are in this group?
4. Would you say this group is tightly or loosely knit?
5. Estimate (in months) the average length of time the present members have been in this group.

Figure 4.1 Questions asked
about task-social group
membership

and for relating group and individual communication outcroppings. Note again that it is not possible to form individuals into specific groups on the basis of the survey questions. These comparisons will be fully reported in Roberts and O'Reilly (working paper, 1974b).

Results. Table 4.9 reports the relationships between perceptions about task and social group memberships and demographic characteristics, using the survey approach to identifying group membership. Heretofore our discussion has been limited to task group membership and its correlates. The pattern of relationships for the top half of Table 4.9 and for Table 4.4 are somewhat parallel and quite different. They cannot be fully explained until the entire data analyses are complete.

However, within Table 4.9 itself for task groups rank is positively associated with perceived importance of interaction with other group members and inversely associated with the number of people in the group. This picture is reversed for the social grouping suggesting that there are more people and less hierarchy in social groups.

Table 4.10 provides the correlations among task and social group dimensions and individual intrinsic measures (and slightly parallels Table 4.5). Note again the difference in patterns between Table 4.5 and the top half of Table 4.10. The results of Table 4.10 support those discussed in chapter three. It appears that trust again is importantly associated with communication, this time at the group level. Perceived influence of superior also appears to be important for task and social interaction.

Interestingly, trust in superior in task groups is strongly and negatively related to the perceived importance of the interaction. Trust is also positively related to the size of both social and task groups as well as positively related to cohesiveness in task groups and frequency of interaction in social groups.

A similar pattern is revealed for superior's influence with one reasonable exception; influence of the superior is negatively associated with the size of the social group, suggesting that either large groups exist when the superior has little influence or small groups exist when the superior has high influence. Both are reasonable in this sample. High ranking personnel are likely to associate with their peers of which there are few due to rank.

	Rank	Tenure Navy	Tenure sqdn	Age	Education
Task groups					
Frequency of interaction	-.00	.01	-.04	-.01	-.00
Importance of interaction	.17***	.03	-.05	.04	.20***
Number of people	-.26***	-.00	.13**	-.03	-.27***
Cohesiveness	.02	.08	-.06	.06	-.08
Social groups					
Frequency of interaction	-.10	-.02	.03	-.02	-.16***
Importance of interaction	-.37***	-.16***	.00	-.20***	-.27***
Number of people	.49***	.19***	-.08	.23***	.36***
Cohesiveness	-.05	-.01	-.08	-.03	-.04

For N = 500, 2 tailed

***p < .001

**p < .01

Table 4.9 Relationships among responses
about group membership and
demographic variables

Conversely, larger social groups are likely for low ranking personnel for whom the superior is less likely to have high influence.

The relationship among work groups and social group dimensions and job attitudes are reported in Table 4.11. The top half of the table is somewhat analogous to Table 4.6. The relationship between group size and commitment to both squadron and Navy are similarly significantly positive in both tables for task groups. Connectedness (Table 4.6) and cohesiveness (Table 4.11) show opposite relationships to commitment.

Again, though just within Table 4.11 only 5 of the 38 possible relationships among group communication and job satisfaction are significant, not an overwhelming number. Task group cohesiveness is positively related to satisfaction with coworkers and overall job satisfaction. Social group cohesiveness is positively related to satisfaction with supervision and with coworker satisfaction. These relationships support the intuitive notion that cohesive groups are more satisfying to members than less cohesive groups.

A more interesting set of relationships compares magnitude and directions of the correlation between task and social groups. For example, frequency of interaction is positively related to squadron and Navy commitment, but only for small groups. Commitment is also higher in small social groups; the opposite is true for task groups. Commitment and cohesiveness are also positively related in task groups (but not in social groups). The negative relationship in task groups (but not in social groups) between commitment and the importance of interaction suggests that there may be some risk involved in being committed to groups in which interactions are important.

Table 4.12 relates perceptions of individual communication phenomena to perceptions of group communication phenomena (and is partially comparable to Table 4.8). Note the many more significant relationships in Table 4.12 than in Table 4.8. Possible reasons for these will be mentioned later.

Just within Table 4.12 in task groups increased interaction frequency is associated with decreased open communication (summarization, expansion, etc.), decreased satisfaction with communication and decreased use of the

	Trust	Influence	Mobility
Task groups			
Frequency of interaction	-.08	-.06	.05
Importance of interaction	-.50***	-.34***	-.05
Number of people	.73***	.42***	.01
Cohesiveness	.25***	.14**	.06
Social groups			
Frequency of interaction	.29***	.19***	.10
Importance of interaction	.61***	.38***	-.02
Number of people	.68***	-.49***	-.05
Cohesiveness	.11	.12**	.02

For N = 500, 2-tailed

Table 4.10 Relationships among responses about group membership and antecedents to communication

***p < .001

**p < .01

Task groups	Job Description Index					Overall job satisfaction	Commitment	
	JDI-W	JDI-PA	JDI-FR	JDI-SU	JDI-CO		Sqdn	Navy
Frequency of interaction	.09	.08	.07	-.01	.06	.04	-.09	-.06
Importance of interaction	.02	.02	.02	-.01	-.01	.03	-.44***	-.51***
Number of people	.04	-.08	-.01	.10	.07	.10	.60***	.72***
Cohesiveness	.08	.02	.02	-.11	.19***	.14**	.18***	.19***
Social groups								
Frequency of interaction	.02	.03	.02	.08	.00	-.02	.20***	.28**
Importance of interaction	.03	-.04	-.04	.05	-.02	.00	.51***	.56***
Number of people	-.01	.13**	.05	-.06	.06	.01	-.56***	.68***
Cohesiveness	.00	.08	-.07	.16***	.18***	.05	.04	.00

For N = 500, 2-tailed

Table 4.11 Relationships among responses about group membership, commitment and job satisfaction

*** p < .001

** p < .01

telephone. The situation is reversed for social groups. Perceived importance of task interaction is negatively associated with hierarchical information flow. As importance increases perceptions of information accuracy decrease desire for interaction, openness and satisfaction with communication also decrease. The results for social groups again provide a mirror image to these findings. Correlations with group size again show striking magnitudes and reversals of direction for task and social communication. In task groups large size is related to increased openness, and a possible dilution of some of the negative aspects of task communication just reported. In social groups large size is associated with increased communication dysfunctionality. Cohesiveness seems to have some benefit in perceptions about communication in task groups but lesser influence in social groups.

Discussion. It is important to remember that the results of relationships to other variables of the sociometrically defined group phenomena is not really comparable to the same relationships reported for the survey methodology. The degree of isomorphism between the two approaches has yet to be assessed (Roberts & O'Reilly, working paper, 1974b). The apparently different results could be due to the fact that one set of analyses is based on groups (N=27) and the other on individuals (N=579). It could obviously be due to measurement error. For the time being we can only comment on the results of the data available using the survey approach to identifying group properties.

Looking sequentially at the relationships reported here, the negative correlations between rank, age, education and tenure in the Navy, with the importance of social group interaction may reflect the emphasis younger personnel place on social group membership. As one becomes more senior (older, higher in rank, more educated, etc.) he places more emphasis on task groups, a finding which may have some implication for improving life in organizations.

The overall picture for the relationship of trust, influence, and mobility, to group phenomena seems to be that trust facilitates interaction in both social and task groups. Perceived influence of supervisors exhibits similar impacts while respondent mobility aspirations are again rather unimportant aspects of group interaction. When looking at job attitudes one

	Task groups				Social groups			
	Frequency of interaction	Importance of interaction	Number of people	Cohesiveness	Frequency of interaction	Importance of interaction	Number of people	Cohesiveness
Directionality								
Up	-.09	-.27***	.35***	-.06	.18***	.38***	-.34***	.05
Down	.02	-.05	.13**	.09	-.03	.03	-.06	.06
Lateral	-.02	-.28***	.30***	.03	.12**	.25***	-.37***	-.07
Accuracy	-.10	-.49***	.69***	.27***	.33***	.62***	.69***	.02
Summarization	-.12**	-.46***	.65***	.16***	.29***	.61***	-.70***	.05
Gatekeeping	-.03	-.39***	.51***	.18***	.18***	.46***	.52***	.09
Desire to interact	-.02	-.44***	.63***	.17***	.35***	.53***	-.58***	.05
Gatekeeping	-.01	-.05	-.01	.05	.12**	.11	-.04	-.01
Change	-.07	-.14**	.14**	.01	.08	.17***	-.23***	-.09
Overload	-.03	-.34***	.48***	.08	.25***	.48***	-.55***	-.06
Underload	-.08	-.46***	.55***	.07	.24***	.54***	-.67***	-.17***
Expansion	-.12**	-.55***	.79***	.19***	.29***	.67***	-.76***	-.00
Redundancy	-.08	-.51***	.71***	.13**	.33***	.65***	-.78***	.03
Satisfaction with communication	.13**	-.56***	.81***	.23***	.34***	.71***	-.80***	-.00
Modality								
Written	-.09	-.07	.09	.09	.02	.03	-.11	.12**
Face	-.04	-.56***	.78***	.18***	.36***	.71***	-.83***	-.05
Phone	-.17***	-.17***	.31***	.03	.06	.15***	-.18***	.04

-125-

For N = 500, 2-tailed

Table 4.12 Relationships among responses about group membership and individual communication phenomena

***p < .001

**p < .01

generalization might be that group communication is strikingly associated with commitment but not with job satisfaction. Individual job satisfaction may be inappropriately aggregated as an estimate of group morale and is possibly an appropriate outcropping only at the individual level. Social group interaction seems far more important to positive commitment than task group interaction. In fact task groups seem to have deleterious influences on commitment.

Finally, the impact of task and social group interaction on one's perceptions of individual communication is striking. The data show clearly that task groups are characterized by less open information exchange and lower satisfaction with communication than are social groups.

Summary

In this chapter we moved up one conceptual level of analysis to examine group communication facets and their impact on other group phenomena. It is clear that one problem still unsolved in the research is that of appropriately classifying variables. As stated earlier in this chapter it is impossible to develop multi-level theoretical frameworks to understand and explain communication phenomena without categorizing variables at appropriate levels. Another research problem here is that of assessing the convergence of two different approaches to uncovering group communication phenomena. And a third difficulty is that we have as yet been unable to compare different kinds of communication networks -- across time. Finally, we do not completely understand relationships between communication structures and other ways of describing group or organizational structure. The measures used here to describe group structure in other than communication terms are in need of refinement. Rank (hierarchy) and number of different military occupational specialties (specialization) need to be controlled for group size. We need to understand the differentials in increase in group of rank and specialization as size increases and we need to look at all of this relative to communication structural aspects. A question left completely unanswered here is how communication and other group structural variables differentially influence other group manifestations. This question cannot be asked until uniquely group phenomena are identified.

Recall again that the purpose of this grant has not been to embed findings from one psycho-social systemic level into findings at the next macro level. It has been, rather to uncover relationships within various

levels. While most of the studies reported in this chapter are yet incomplete a few observations are theoretically important and suggest some practical applications (see the last chapter).

It is clear that for task groups the frequency and strength of all kinds of intergroup linkages are negatively associated with external group linkages. It is now important to look at other characteristics of links. For example, Allen and Cohen (1969) report that expert internal group "stars" make great use of contacts outside their groups. In highly interlocked task groups these kinds of people (expert stars) may be the only ones bringing relevant information from the outside. It is also fairly clear that communication in task groups is importantly related to commitment to squadron and to the Navy.

If our group survey data are at all valid they show that task and social groups serve different purposes. Derry (1972) notes that task and social groups are patterned on very different lines, and Richetto (1969) proposes that messages with different content might flow over different networks. The obvious extensions of our work comparing task, social, and authority groups will further explore these notions.

The absence of interpersonal trust seems to have extreme negative consequences for interaction in both task and social groups. Small groups lead to more positive work attitudes in social groups and to more negative work attitudes in task groups. The degree to which task groups are important is negatively associated with perceptions of communication in task groups and positively associated with communication perceptions in social groups. It may be possible to influence some of the outcomes one wishes in terms of obtaining communication accuracy, particular directionality of information flow, etc., through changing group interaction qualities.

CHAPTER FIVE

Social structure may...be taken simply as behavior writ large or generalized, behavior itself being explained in some other way. Or behavior may simply be regarded as the concrete manifestation of structural imperatives, those imperatives being explained in some other way (Moore, 1969, p. 28⁷).

A major problem for any kind of organization is that of breaking tasks into units doable by single individuals or groups of individuals. Accomplishing this goal creates the opposite problem, that of coordination. No discussion of organizational life can be complete without some attention being given these coordinative problems; the ways in which they are carried out, and the antecedents and outcomes of various forms of coordination. Such discussions are generally found under the heading organizational structure. Here structure will refer to a pattern, or an observable uniformity of action or operation.

Numerous concepts of organizational structure can be found in the literature (for example, Dunnette, in press; Hall, 1972; March, 1965, etc.). There is considerable argument about which of the many ways structure can be described are theoretically or practically most useful. For example, Blau and Schoenherr (1971) argue that organizational size has greater impact on other aspects of structure and functioning than does any other structure variable. Woodward (1965) states that technical complexity of the production system, not size, accounts for many other changes in organizations. Pugh and his group (Pugh, Hickson, Hinings, MacDonald, Turner, and Lupton, 1963, et seq.) indicate size to be more important than technology in influencing other structural facets. Porter and Lawler (1965) in an early review and Hall (1962; 1963), drawing conclusions based on his own research, suggest variables other than organizational size make great differences to organizational functioning. Hall (1972) concludes:

The analysis of organizational structure can be, and often is, somewhat dry and unnecessarily static; but it is vital for understanding what goes on in an organization, for behavior is an outgrowth of structure. Organizational processes occur

within a structural framework. At the same time, of course, processes transform structures. This transformation can be abrupt or gradual. Whatever the pace of change, a new structure emerges within which the continuing processes of organizational behavior are found (p. 199).

Most of the existing work on organizational structure suffers, from our point of view, two major problems. First, there is a tendency, regardless of the academic discipline of the researcher (for example, political scientists, psychologists, or sociologists) to discuss macro organizational structural phenomena in relation to one another and/or to individual responses. For example, Kahn, et al. (1964) indicate three conditions which lead to role ambiguity (an individual response): rapid organizational change, organizational complexity, and managerial philosophy concerned with communication. Role ambiguity (as they briefly mention) is no doubt influenced by sent roles from individuals representing different groups with different goals. These groups in turn respond to organizational change and complexity. Note that two of Kahn et al.'s conditions leading to individual responses are organizational, and a third is another individual characteristic. Referring back to Roberts and Hulin (1974), this skips entirely giving specific attention to an important conceptual level. The impact of organizational structure on individuals is possibly mediated through group processes.

The second problem in usual treatments of organizational structure is that they fail to consider communication as one way (a dynamic one at that) of defining macro structure. Conrath (1973) notes that few of the numerous concepts of organizational structure can be related to communication properties:

...and those that can are primarily restricted to the study of small groups.... The literature on the analyses of communication patterns data in macro-organizations is rather limited.... In no case were the communication data used directly to evidence properties of structure. Neither was there any representation of structure that would permit one to compare a variety of structural properties, particularly those that could be extended from communication patterns data - the networks of messages between pairs of persons (p. 592).

Going back to role occupancy and specifically to role ambiguity Kahn, et al. (1964) speak of the importance of restricted information flow in

organizations in contributing to ambiguity. Sometimes information is blocked through individual insensitivity to the needs of others. Often, however, blockage is overdetermined, great efforts are made to keep secrets. Kahn et al. describe vividly how organizations usually operate:

In The Caine Mutiny Herman Wouk describes one organization in terms which have been echoed by members of many. "The Navy was designed by geniuses to be run by idiots." A more flattering statement of this theoretical position would assert that although the organization as a whole must be coordinated within the framework of rational over-all design, each member need not understand that design. As long as each man performs his own role and abides by the regulations the system will run itself. All that is required of individual members...is that they know the general rules and their own responsibilities. If they have the information required for performing their own jobs, the rest is none of their business. In deciding whether or not to pass on certain information, the question, according to this set of assumptions, is not whether the other person would like to know, but whether he needs to know in order to get his job done. Logical requirements are acknowledged; psychological requirements are denied.

Generally this is not an impossible set of assumptions. Many a system comes near to running itself on this basis. Members do muddle through without knowing "where they fit in the infinite scheme of things" (pp. 77-78 -- *Italics Kahn, et al.*).

Within the framework of this research program it is necessary that organizational characteristics serve as environmental indicators. As we moved from the analyses of individual, to group, and finally to organizations as entities, comparison became more difficult due to a reduction in number of units which could be compared. At this level it will only be possible to compare the three Navy organizations across time on a number of organizationally relevant dimensions. The method for doing this will be described. One cross-sectional attempt to look at macro-organizational characteristics as aggregates of individual and group level communication is also mentioned. That these communication dimensions are viewed as aspects of structure will be discussed later. Our analyses present and planned organizational analyses are scant compared to those/discussed

in chapters three and four.

If we are to move ultimately to a systems approach to describing organizations macro structural characteristics must be further developed. Laszlo, Levine and Milsum (1974) note that there is a lack of data on which evaluations of societal functions can be based, and limitations of existing methodologies to deal with the full range of complex social systems. Behavioral scientists have not been able to translate general system constructs into terminology particularly useful in understanding organizations. The attempt here is merely to identify a few macro-level communication phenomena which might one day be merged in theory to other macro structural phenomena and to aspects of less inclusive sub-systems (groups and individuals). As Buckley (1967) warns:

...a viable theory must incorporate not only the separate laboratory laws, but the composition effects - the complex interactions of a number of internal processes interdependent with a complex of interrelated external events, both together making up a systemic field. If psychology is socially indifferent, then it is environmentally indifferent in general - a view which when so stated brings us face to face with grave difficulties (p. 11 - *Italics Buckley's*).

In the rest of this chapter we will describe one small attempt to understand how communication facets operate at the macro-organizational level. We will then discuss another ongoing project with the same goals, including in the discussion mention of some of our research directions in the future.

Can Aggregation of Individual Communication Phenomena Describe Organizations?

As mentioned throughout this report, for a component of organizational behavior to be of theoretical and practical significance in understanding and comparing organizations, and making decisions about them, it must be sensitive enough to describe and discriminate among a variety of dimensions across organizations. A demonstration that communication, for example, differs across organizations with very different functions, technologies, etc., would not be as convincing as evidence of the sensitivity of the concept (its operationalization) to subtleties in organizational life as would a demonstration of differences in seemingly homogeneous units. Thus, we selected for this investigation organizations in which the general attitudes of respondents were thought to be as diverse as possible, while holding constant organizational function,

physical working arrangements, technology, company policy, structure, etc.

The rationale is obvious. One's perceptions about communication are probably closely tied to and change with other attitudes. Yet structural variables also influence these perceptions, possibly through mediating group phenomena. By holding constant as much of the structure as possible it was hoped we could assess whether the aggregate individual responses are different across organizations and whether such differences are useful descriptors of organizational life. A problem of the research, discussed in chapter four, once again comes up. Do outcroppings at the individual level of these particular communication facets make sense in aggregation for describing organizations at conceptually different levels?

Method. The ten overseas and U.S. branches of a multi-national bank are the sample. One hundred forty eight respondents in the five U.S. branches and one hundred seventy nine respondents in the five matched overseas branches completed the individual measure of communication perceptions. The overseas banks are all located in the same country. Organizational performance data were available for the U.S. banks. The hypothesis was that there should be fewer differences in communication within either the five overseas or the five U.S. units than between the U.S. and overseas units. However, within national sets of organizations some differentiation in communication should exist if the measurement used is sensitive enough to uniquely describe organizations.

Results. Table 5.1 provides t-test comparisons of the five U.S. and the five overseas banks on fifteen communication dimensions. Note that organizational participants in each of the two national samples perceive communication in their organizations as significantly different on a variety of dimensions. Some of the differences appear to be reflective of the culturally developed attitudes and feelings toward work in the two national subsets.

Tables 5.2 and 5.3 are one way analyses of variance results for the five banks within each sample. There are differences in the way people in different banks in a single nation view communication but these differences are less striking than are cross-nation differences. Here we can refine the cross-nation comparisons through examination of branch patterns.

Table 5.1

T-Tests Comparing US and Overseas Perceptions
of Organizational Communication

Communication variable	t-statistic	Sample Mean Scores	
		US (N=148)	Overseas (N=179)
1. Desire for interaction	0.4	5.5	5.4
2. Directionality - upward	2.1*	11.0	12.6
3. Directionality - downward	3.6**	6.4	9.7
4. Directionality - lateral	0.7	8.8	9.4
5. Accuracy	2.3*	6.3	5.8
6. Summarization	5.0**	6.7	8.1
7. Gatekeeping 1	1.0	8.0	7.6
8. Gatekeeping 2	1.2	12.4	12.8
9. Change information	1.6	5.4	5.9
10. Modality - written	6.4**	1.2	2.8
11. Modality - face-to-face	3.3**	5.8	4.7
12. Modality - telephone	0.0	1.9	2.0
13. Modality - other	5.6**	0.1	0.9
14. Overload	1.3	2.1	2.3
15. Satisfaction with communication	2.6**	2.4	2.7

*p < .05

**p < .01

Table 5.2

One-Way Analysis of Variance for Overseas Units

Communication variable	F-Ratio	Organization Mean Scores					
		1 (N=21)	2 (N=46)	3 (N=27)	4 (N=42)	5 (N=29)	6 (N=12)
1. Desire for interaction	0.97	5.6	5.3	4.5	6.0	5.4	5.9
2. Directionality - upward	2.15**	11.8	12.5	9.3	15.8	13.9	13.9
3. Directionality - downward	2.47**	7.5	5.5	13.0	8.0	3.3	5.7
4. Directionality - lateral	1.27	7.8	11.0	6.5	10.4	9.0	7.5
5. Accuracy	1.13	5.8	6.0	6.3	5.0	5.7	4.0
6. Summarization	2.00**	7.5	7.5	7.6	7.5	8.1	9.0
7. Gatekeeping 1	2.35**	11.0	8.8	7.4	7.6	7.8	8.4
8. Gatekeeping 2	1.68	12.1	12.4	15.0	12.8	13.6	12.1
9. Change information	1.14	6.2	6.3	6.5	5.9	6.0	3.5
10. Modality - written	1.11	2.9	2.1	2.3	1.9	2.7	1.7
11. Modality - face-to-face	1.34	3.8	3.3	3.9	5.1	3.9	6.5
12. Modality - telephone	0.48	1.5	1.9	2.1	1.4	1.7	1.9
13. Modality - other	1.90*	0.0	0.4	1.1	1.0	0.3	0.6
14. Overload	1.27	2.0	2.3	3.0	2.0	2.2	2.4
15. Satisfaction with communication	2.58**	2.5	3.2	2.5	2.8	2.7	2.9

*p < .10

**p < .05

Table 5.3

One-Way Analysis of Variance for US Units

Communication variable	F-Ratio	Organization Mean Scores				
		1 (N=31)	2 (N=32)	3 (N=37)	4 (N=22)	5 (N=24)
1. Desire for interaction	0.94	5.0	5.2	5.4	6.1	5.5
2. Directionality - upward	1.15	9.7	9.6	11.1	12.3	12.5
3. Directionality - downward	0.31	5.8	7.1	5.8	7.2	5.7
4. Directionality - lateral	1.12	9.9	6.8	8.7	10.0	7.4
5. Accuracy	1.34	6.9	5.9	6.2	5.8	6.9
6. Summarization	2.22*	7.0	7.8	6.0	6.4	6.4
7. Gatekeeping 1	0.89	7.5	8.7	8.0	8.4	7.5
8. Gatekeeping 2	2.21*	12.9	13.3	11.7	11.4	12.7
9. Change information	1.05	6.0	4.8	5.0	5.3	5.7
10. Modality - written	2.01*	1.5	0.7	0.8	1.2	1.8
11. Modality - face-to-face	3.46**	5.6	6.5	6.5	4.3	5.9
12. Modality - telephone	1.84	1.7	1.8	1.8	1.5	2.6
13. Modality - other	2.22*	0.0	0.0	0.4	0.0	0.0
14. Overload	0.48	2.0	2.2	1.9	2.1	2.2
15. Satisfaction	4.29**	2.8	1.7	2.4	2.5	2.6

*p < .10

**p < .05

Two categories of performance data were available for the U.S. banks; financial and personnel performance. Spearman rank order correlations showed both financial and personnel performance to be significantly related to communication. Unfortunately, the number of organizations on which communication and overall organizational performance data were available is too small to be anything but suggestive.

Discussion. The problem of assessing the degree to which successive aggregations of individual communication responses can adequately describe organizations is not solved here. As discussed in chapter four it is receiving attention. However, using aggregates of perceptual measures of a number of communication facets, it was demonstrated that seemingly homogeneous organizations can have very different communication patterns. Although the data are tentative, these perceptual differences also seem related to organizational (as opposed to individual) performance. A more complete discussion of this investigation is in O'Reilly and Roberts (1974a).

Analyzing Organizational Communication from a Different Perspective

The use of the large scale sociometric approach to describing organizational communication appears to have major promise when interest is focused on group or organizational communication. In developing the computerized strategy used in this research Richards and Steinberg (1974) indicate that large scale communication systems can be treated as multi-level structures. The entire system is composed of groups, which are in turn composed of individuals. These authors note that the bulk of even the largest systems they have studied fit this three level model. In another paper Richards (1974c) states that the difference between the whole and the sum of the parts must be due somehow to interaction among parts and that it is useful to look simultaneously at several levels of a system's composition since whatever happens at one level must be related to the freedom and constraints imposed at both lower and higher levels. It seems useful to go one step at a time from level to level, thereby avoiding an abundance of incorrect logical shifts. For that reason most of our research is yet at the most differentiated of organizational levels (the individual). In moving from level to level appropriate shifts must be made in parallel in both level of analysis and level of abstraction.

At present we are looking at the organizational level sociometric data provided by ONR #2 and ONR #3 respondents. Roberts and Bretton (1973) used

organizational communication structuring as an alternative to other ways of describing organizational structure, and stated that because the purpose of most descriptions is to provide a picture of complex living systems it is surprising that few of them consider the element which ties organizations together -- the actual communication. The purpose of the work now in progress is to examine how organizations change from birth through their first year of life. While the methodology of the research can be described, results are forthcoming in Technical Report #8 from this grant.

Method. It may be recalled that respondents were asked to identify those people with whom they talked about task matters, had social interactions, and reported to in the authority system of their organization. This was done in three fighter squadrons twice, at an interval of one year. The formal organization charts are also available for the three squadrons.

Discussion. At the simplest level the three emergent sociometric communication structures and the organizational chart can be compared for each of the three organizations. This static view can be extended by comparing the communication and formal structures across time. Hypotheses will be developed about possible reasons for changes which are observed. For example, all three organizations have increased considerably in size over the year. In an early discussion of the relationship of size to organizational form Haire (1959) notes that, "in general as physical objects get bigger but retain the same proportions, they get weaker, and a larger and larger proportion must go to supporting their own mass. Consequently, with increase in size their forms are modified to resist the forces associated with size. The appropriate modification is a clue to force (p. 276)." Modifications can occur in growth of supervision, increases in clerical functions, proportion of staff versus line personnel, span of control, etc. By observing changes of size in relation to these other variables some conclusions can be drawn about the nature and extent of forces impinging organizations.

Since size is probably the most frequently investigated of the organizational structural variables some hypotheses, supported in previous research, can be tested in the three Navy squadrons. Results of testing simple hypotheses could then be combined in thinking further about multi-level frameworks to explain behavior in organizations. For example, large size supposedly leads to greater individual stress (lower job satisfaction?) and the building of informal groups (social groups?).

Another way these squadrons are changing is in terms of mission. Again, though it is only descriptive we can elucidate how the organizations internally adjust (in communication terms) to changing goals. All of this suggests the necessity for attempting to understand the processes through which growing organizational stabilizations occur. We expect to find rapid stabilization for formal relationships, less rapid stabilization for social relationships. However, what might be hypothesized about early stabilization of social interaction? An initial thought is that organizations in which this happens should be characterized by higher morale than organizations in which social groups are slow to develop and stabilize.

A final task of this part of the research will be to identify the linkers or connectors in organizations to see if squadrons more highly interconnected differ in outcome variables of importance and perhaps provide practical answers about how to better "connect" or "de-connect" systems in the interest of specific goals. The research approach and the tasks at hand are detailed in Roberts and Bretton (1973).

Unfortunately, findings from our analyses of change will not be generalizable to organizations with different kinds of technologies, external environments, goals, etc. Another limitation is that they may be specific to only these three organizations. This is a case study, with all of the assets and limitations of case studies, as opposed to a truly comparative approach to macro-organizational characteristics. For the purposes of this research macro organizational characteristics provide, again, the work environment in which groups and individuals exist.

CHAPTER SIX

This final chapter has two almost mutually exclusive purposes. The first objective is to discuss both the short term and long term directions we have in mind for this research. Second, is to indicate how the results of the research thus far completed can be applied in the Navy.

Tying Together Research Projects Discussed in Chapters Three, Four, and Five

Clearly much of the work mentioned to this point is incomplete. At the individual level of analysis we have explicated and refined explications of a number of perceptions about communication. We related these to problems of information transmission and to some important intrinsic, attitudinal, and performance characteristics. Even in this chapter, however, the continuing "fuzziness" about appropriate categorizations of variables (individual, group, etc.) is clear. It is planned that as the final investigations discussed are completed our logic in viewing communication perceptions as individual, on the one hand, and aggregating them to reflect a higher system level perspective, on the other hand, is clarified. An alternative is to decide that such aggregations of individual characteristics inappropriately reflect group properties. A decision about this problem can only be made after group characteristics are better understood. Note that nothing has yet been done about the three tiered relationships among individual, group, and organizational communication phenomena. However, within the milieu of simply understanding relationships among individual communication facets and other organizationally relevant individual responses we have made some progress. The various investigations in Chapter 3 will be brought together in the O'Reilly thesis detailed there.

At the group level our foundation is less firm. Here we focused primarily on communication operationalized differently than at the individual level. The strategy adopted seemed intuitively more appropriate as a way to look at information flow in groups than did simply aggregating individual perceptions. However, in Chapter 4 we talk about the relationship of sociometrically obtained communication flow characteristics to aggregates

of perceptions about other group properties (morale and climate). Again, the adequacy of using these kinds of aggregations is not solved. Another major string left untied in Chapter 4 concerns completing analyses to indicate which of two methods for assessing group communication is optimal.

A primary task remaining is simply that of more fully articulating communication processes at the group level. For example, we have not completed our analyses of the relationships among internal information flow in groups and information coming into and leaving them. We have yet to compare different kinds of communication structures and we need to extend the work begun in Chapter 4 which compares communication as a structural variable with other means of assessing group structure. We have yet to look very specifically at possible causes (group task, etc.?) and consequences (high or low production, etc.?) of various group communication patterns. The relevant observations and conclusions based on them will be reported in Roberts and O'Reilly (working paper, 1974a).

Because of the limitations in sample, problems with completing data analyses, etc., the presentation of data appropriate to Chapter 5 will be reported primarily in Technical Report #8. Chapter 5 suffers again from yet unsolved problem of aggregation. There are some problems also concerned with the meaning of organization level communication components. Some of these are being worked on by the Michigan State group, some by us. For example, what does it mean when an organization is highly interconnected (Richards, personal communication).

Chapter 5 suggests some of the kinds of data which will be reported in Technical Report #8 and points out that our emphasis there is at the organizational level and is in attempting to understand primarily in communication terms how organizations are conceived and draw through time. That is, where are pressures brought to bear, how are they generally dealt with, how can they be more effectively met as organizations grow and respond to changing circumstances?

interactive influences, their causes and consequences, can help the Navy more efficiently build the next novel system, and perhaps ward off some expected negative consequences (such as low morale which has been known to result in sabotage, or the development of inadequate mechanisms for transmitting information).

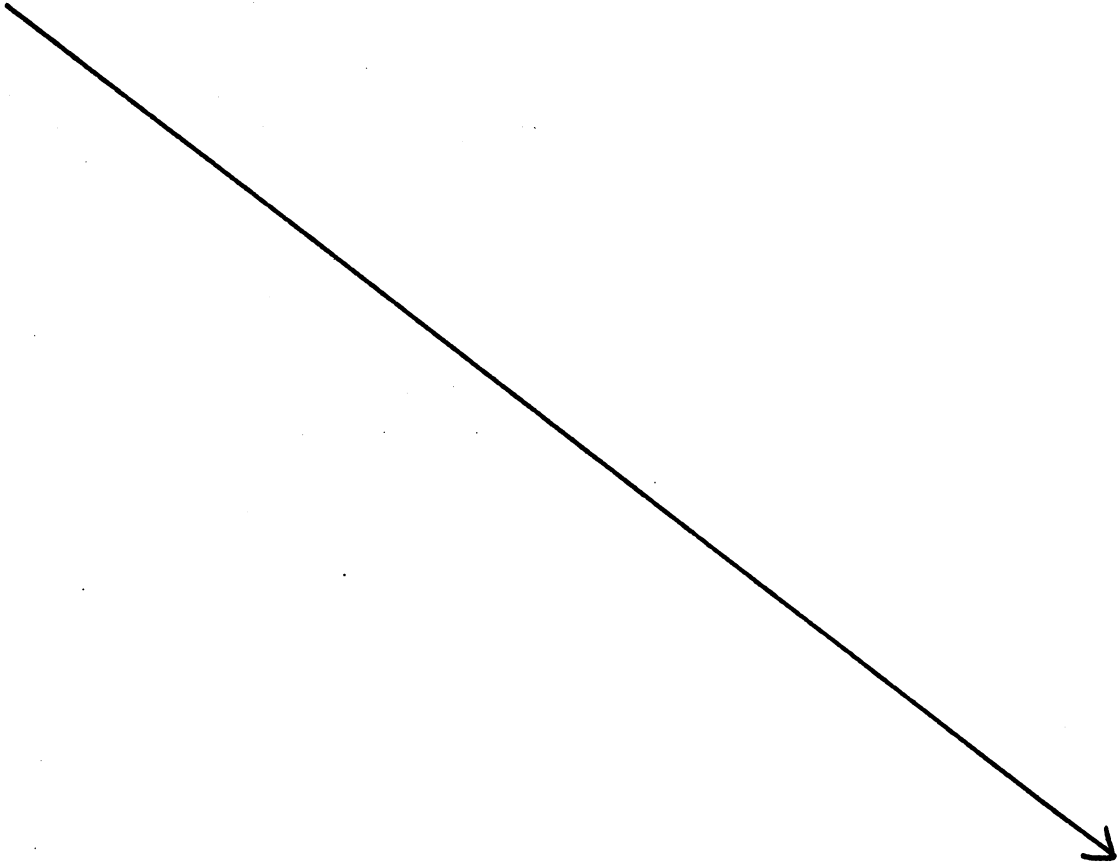
The precedent is now established for interest in attitudes and behaviors of participants in the F-14 program. We can easily provide a short thermometer for estimating the organizational "health" of various squadrons, though some further research activity is required to extract those measures which account for greatest variances in performance or any other outcome of interest. The kinds of comparisons begun under this contract can be usefully continued and modified to provide important theoretical and applicable information if squadrons are assessed on a regular basis. (See the last section of this chapter for the kinds of applications which can be made on the basis of any assessment within a series.)

Our primary interest, however, is in using the available data base to develop systems analytic theoretical models of organizational performance which simultaneously account for the effects of variables at different conceptual levels. Note that throughout this report efforts have been made to keep separate conceptually different variables. Only at one point have we attempted to understand relationships across levels (that point concerned with individual and group level communication). As stated previously organizational researchers tend to either focus on interrelated phenomena at one level, or relate outcroppings of macro variables with those at more micro levels, giving no attention to intervening processes. Thus, we see discussions of the influence of organizational structure on individual job satisfaction, with no attention given the group characteristics which possibly mediate such influences. In addition, only recently have we seen multivariate as opposed to bivariate or few variate studies in the literature.

The research we propose follows Cattell's (1966) dictum concerning the need for multivariate-multilevel analyses, and develops and tests a model which links psychological and objective variables (including

In the Future....

This project marks a beginning in the development of a behavioral data bank in the F-14 community. While in the past we have compared data obtained in Navy organizations with data from other organizations (and this has some considerable practical utility), it seems to us that, if nothing else, a useful future activity would be to regularly monitor changes in the F-14 community and to compare assessments across time. As the F-14 community changes from a novel venture to a stable "old line" aspect of the Navy, squadrons, work groups, and individuals will respond differently and in turn will influence the F-14 community. Understanding



performance) within and across the three levels of analysis discussed here. As is now obvious the primary variable will be communication, or the "glue" which appears to tie organizations together. One step in the research, then, is to continue efforts to find unique outcroppings of communication at each of the three conceptual levels, understand their relationships to one another, and use these outcroppings as nodes in a conceptually three-tiered nomological network. For example, what is the relationship between within group linkage (for various kinds of groups) and individual accuracy in information transmission? In addition, the research will continue to appropriately classify variables and then to link communication, performance, and other psychological processes across levels.

A model has been developed as an initial guide. It will be refined and tested in the sense of eliminating irrelevant variables and assessing inclusion of relevant variables which influence any outcome of interest (performance, retention rates, etc.). An obvious second stage of the proposed research is validation of the model using a new data base.

Statistical techniques do exist (and some will have to be developed) for pursuing such research. Inferences of causal sequencing based on non-experimental data were mentioned in Chapter 3. Two types of multivariate analyses can be used to begin; canonical correlation or an extension of multiple regression to include multiple criterion variables (including partial canonical extensions); and causal modeling with reliance on path analysis (Blalock, 1969; 1971; Herman, Dunham, & Hulin, in press; Herman & Hulin, 1972; Lyons, 1973; O'Reilly & Roberts, submitted for publication, a).

Application of Current Findings in the Navy

The most obvious use of this research for policy formation is based on continued collection (in a much reduced form) of the kind of information about the F-14 community which is now in the data bank, collection for the purpose of diagnosis. This activity was mentioned in the last section of this chapter. Note that there now exists an easily used thermometer for diagnosing organizational, group, and individual "psycho-social health." The precise form of the thermometer which might be used in a given situation

depends on the interests of those using it. Organizational change of any sort should follow diagnosis, be concerned with organizational goals, and be systemically evaluated. Based on our current data (and continual analyses of the data bank) specific change strategies and evaluation projects could easily be implemented by groups such as NPRDC.

One obvious side benefit to continual monitoring is that information will be forthcoming on the way people respond to technological innovation in the Navy. For example, attitudes and values will change as the management information system now operational in the F-14 squadron, is extended in function. As more personnel data are added, and are more easily accessible; as even low ranking personnel must learn to access the system for various reasons; groups and individuals in them will change.

A primary purpose of our research has been to elucidate aspects of information flow which can, and often should be improved. The problem of "improved in the interest of what..." is one that we have frequently discussed with Navy officers and technical representatives. Since our criterion measures (which are at least possible outcomes of changing information flow) are not what they might be, it seems appropriate to relate some of the internal organizational processes we have uncovered to more differentially assessed outcomes. Recall, we have no performance data for officers, and only ratings rather than multi-method data for enlisted personnel. At the group level we are assessing the adequacy of one perceptual measure of performance (Mott, 1972) and as yet have no idea how to systematically compare performance for various high technology organizations with the same or different goals. The outcome of a project which compares the kind of data we have to better developed criteria (again, see Campbell, 1973) would undoubtedly be useful. Perhaps such a project could be completed by teams composed of "basic" and "applied" researchers (though we find this distinction artificial).

Before discussing applications of specific findings we warn the reader of the extremely tentative nature of our current conclusions. Recall that when discussing individuals in organizations the implications of the research are considerably clearer than when discussing groups, etc.

Applications of Findings to Individuals in Navy Work Groups

When considering dysfunctionalities in the way individuals communicate (or perceive they communicate) interpersonal trust is a clear forerunner of information blockage (withholding, changing, gatekeeping information etc.), perceptions about the accuracy of information received, desire to interact with others and satisfaction with communication. In upward transmission information favorable to the sender, and important to the problem at hand seems to get through even under conditions of low interpersonal trust. However, under such conditions important information which reflects poorly on the sender is often blocked. This can have enormous negative consequences for decisions made in high technology, rapidly changing organizations. In looking at trust further, we note that of its components, psychological safety has primary impact on information transmission. Further, participants as opposed to isolates (at least in task groups) seem to be more trusting, perceive communication as accurate and open, etc. This is probably reflected in their communication behavior.

Perceived low influence of the superior, while not having the deleterious effects that low interpersonal trust does on information blockage, has other negative impacts on people's communication responses. Low perceived influence is associated with low desire for interaction with work group members, low estimates of the accuracy of information received, and low satisfaction with communication.

Two reasonable outcomes of communication responses are individual job satisfaction and performance. Organizations might be interested in maintaining adequate job satisfaction simply because we know it is related to employee absenteeism, retention, and sabotage. The costs of poor job satisfaction can be enormous, depending on the situation. Our evidence suggests that relevant facets of job satisfaction are related to communication. In situations in which communication is accurate, open, and frequent, satisfaction with work and promotion, and with technical and human relations supervision is high. Isolates (as opposed to task group participants) have low satisfaction with supervision, and co-workers are less committed to their squadrons (an important factor in an AVF military).

The performance relationships to communication are a little more complex. Within the enlisted personnel ratings alone senior people who are high performers feel they receive good information, they send information in writing (possibly as redundant behavior), and they interact considerably with their superiors. Junior level high performing enlisted personnel are more responsive to the accuracy and openness of the communication situation. And if personnel communicate freely across all levels they at least feel their work groups are successful.

The implications of these findings for organizational change are rather clear. They suggest emphasis on different aspects of communication at lower and higher job levels and the importance of engendering interpersonal trust at all levels. Designing ways in which each supervisor can have maximum influence over his subordinates (and can go to bat for them) is important.

It is possible to take the various findings in Chapter 3 and to design training packages which include modules concerned with elements discussed here. For example, focus on the meaning and outcomes associated with trust, particularly noting the safety aspect to be more important than dynamism or expertise, can be one module. Developing the notion of how it is possible (within the constraints imposed by the Navy) for Chiefs and other supervisors to influence their subordinates while at the same time increasing their own influence with those above, is yet another possible module. A third might be development of means for opening communication among people who must work together. An entire series of training modules can be developed and appropriate modules applied where diagnosis indicates they might improve the situation.

We suggest cultivating (and evaluating) the following strategy within Navy units:

- (1) Assessment of interpersonal trust, perceived influence of superiors and communication facets within units.
- (2) Units in which attitudes about these factors are high are not in need of immediate attention.
- (3) Where diagnosis shows poor attitudes the logic of this research suggests there is also low job satisfaction and poor performance.

- (4) The application of different training modules simultaneously for high level and low level personnel within the same units, noting again that high performing junior and senior grade enlisted personnel respond favorably to different aspects of communication.

Yet another recommendation is that supervisors pay particular attention to improving (through opening communication, being redundant, accurate, etc.) communication with low paid people at all levels. In the Navy sample, at least, poorly paid people at all job levels perceive that important information is blocked and generally feel communication is deleterious in their work groups. Opening communication for low paid people at all levels might change their perceptions of their work groups as being highly centralized with high task structure. Since pay is related to performance (but in some situations supervisors may be better able to keep a subordinate's pay grade in mind than his last performance rating) these changes may lead to increased performance. Hopefully, better performance will be rewarded and the circle completed.

Note that one area which appears to have more lip service given it than it deserves might now be minimized in thinking about personnel activities to improve work group functioning. Information overload is not a problem frequently complained about in the organizations we have studied. In fact, underload is, we think, the more serious problem and should be emphasized in training programs.

Applications of Findings in Considering Changing Navy Work Groups

Obviously application of any finding depends on exactly which outcome characteristics are desired in groups in which intervention agents are interested. Recall, again, that our findings concerned with group communication are extremely tentative.

First, it appears that task and social groups at work serve different purposes. Optimal task groups and optimal social groups also appear to have different characteristics. If one could influence their structural properties he should encourage development of small social groups and large task groups, both of which are characterized by more communication openness and satisfaction than are their opposites. Officers and enlisted supervisors

should keep in mind that older personnel tend to emphasize task group interaction and younger personnel social group interaction.

Depending on the task group requirements for a group, and the necessity for internal versus external connectedness, the following should be kept in mind. If internal sensitivity to information is required by the task steps can be taken to increase internal group connectedness. If to do an adequate job a group must be highly coordinated with other groups, steps should be taken to encourage external group contacts. The assets and liabilities of either of these change strategies must be recognized. One way to decrease intra-group connectedness is to make groups larger, which also tends in task groups to increase within group specialization. Note, finally, that in task groups with low internal and high external connectedness squadron commitment and perceptions of high work group reputation increase. Thus, here, some steps can be taken within groups which might influence member retention.

For "applied" researchers wishing to implement group or individual changes in the interest of some specific outcome, the following should be kept in mind. It still appears that communication may appropriately manifest itself in different terms at the individual and at the group level. If this is true then one cannot expect changes in say, group structure, to directly operate on individual job satisfaction, etc. In fact, we find very few relationships among communication and job satisfaction facets in task groups. To alter job satisfaction (and maybe individual performance, etc.) change efforts which focus on individual ^{communication} rather than group/perceptions seem to be more efficient. Interpersonal trust is the only one of the individually assessed variables which currently shows promise of being related to some important group phenomena.

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WORKING PAPERS

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**APPENDIX
ONE**

Description of the Communication Indices Assessed with the
Current Form of the Individual Communication Instrument

Directionality-Upward. General indicator of the amount of contact respondent has with his superior.

Directionality-Downward. General indicator of the amount of contact respondent has with his subordinates.

Directionality-Lateral. General indicator of the amount of contact respondent has with others at his job level.

Accuracy. Respondent's estimate of how accurate he perceives the information he receives to be.

Desire for Interaction. General indicator of the degree to which the respondent desires to interact with others in the organization.

Summarization. Estimate of how often information is summarized by emphasizing the important and minimizing the unimportant before being passed.

Propensity to Pass Information. Estimate of how much information a respondent receives he actually passes on.

Gatekeeping. Estimate of how often the respondent deliberately withholds from others information thought to be useful.

Change. Indicator of the extent to which a respondent changes the nature of information.

Underload. Estimate of the amount of time the respondent would like more information than he has.

Expansion. Estimate of how often information is expanded and discussed in greater detail.

Modality-Written. Percentage of the time respondent uses this modality for passing information at work.

Modality-Face-to-Face. Percentage of the time respondent uses this modality for passing information at work.

Modality-Telephone. Percentage of the time respondent uses this modality for passing information at work.

Redundancy. Estimate of how often the respondent receives the same information more than once.

Overload. Estimate of how often the respondent receives more information than he can efficiently use.

Communication Satisfaction. Indicator of how satisfied the respondent is with communication in general at work.

This is a series of questions about how people communicate at work. Imagine a typical week at work on your current job, and answer the questions accordingly. Please attempt to answer all the questions.

Some questions ask you to fill in an answer. Others have seven point scales on which to answer. On these questions, please check the point that represents most closely how you feel. For instance, to the question, "How rich do you want to be?" you might answer:



Do you have subordinates working for you? No
1
2
3
4
5
6
7
 Yes
1
2
3
4
5
6
7
 How many
1
2
3
4
5
6
7
 (48) (49-50)

How free do you feel to discuss with your immediate superior (the person who most frequently gives you orders and directions) the problems and difficulties you have in your job without jeopardizing your position or having it "held against" you later?

(1) Completely free
1
2
3
4
5
6
7
 Very cautious (51)

Immediate superiors at times must make decisions which seem to be against the interests of their subordinates. When this happens to you as a subordinate, how much trust do you have that your immediate superior's decision was justified by other considerations?

(2) Trust completely
1
2
3
4
5
6
7
 Feel very distrustful (52)

In general, how much do you feel that your immediate superior can do to further your career in the Navy?

(3) Much
1
2
3
4
5
6
7
 Little (53)

How much weight would your immediate superior's recommendation have in any decision which would affect your standing in the Navy, such as promotions, transfers, etc.?

(4) Important
1
2
3
4
5
6
7
 Unimportant (54)

As part of your present job plans, do you want a promotion to a higher position at some point in the future?

(5) Content as I am
1
2
3
4
5
6
7
 Very much want a promotion (55)

How important is it for you to progress upward in the Navy?

(6) Not important
1
2
3
4
5
6
7
 Very important (56)

To what extent do you have confidence and trust in your immediate superior regarding his general fairness?

(7) Have little confidence or trust 1 2 3 4 5 6 7 Have complete confidence and trust (57)

while working, what percentage of the time do you spend interacting with: (total=100%)

(8) Immediate superiors (58) % (9) Subordinates (59) % (10) Peers-others at your job level (60)

Of the total time you engage in communication while on the job, about what percentage of the time do you use the following methods to communicate: (total =100%)

(11) Written (61) % (12) Face-to-face (62) % (13) Telephone (63)

When receiving information from the sources listed below, how accurate would you estimate it usually is:

(14) Completely accurate 1 2 3 4 5 6 7 Completely inaccurate (64)
Immediate superiors

(15) Completely accurate 1 2 3 4 5 6 7 Completely inaccurate (65)
Subordinates

(16) Completely agree 1 2 3 4 5 6 7 Completely disagree (66)
Peers-others at your job level

Do you ever feel that you receive more information than you can efficiently use?

(17) Never 1 2 3 4 5 6 7 Always (67)

Of the total times you spend receiving information at work, what percentage goes to: (total=100%)

(18) Immediate superiors (68) % (19) Subordinates (69) % (20) Peers-others at your job level (70)

Of the total time you spend sending information, what percentage goes to: (total =100%)

(21) Immediate superiors (71) % (22) Subordinates (72) % (23) Peers-others at your job level (5)
Card 2 (1-4)

To what extent do you have confidence and trust in your immediate superior regarding his general fairness?

(7) Have little confidence or trust 1 2 3 4 5 6 7 Have complete confidence and trust (57)

while working, what percentage of the time do you spend interesting with: (total=100%)

(8) Immediate superiors (68) % (9) Subordinates (59) % (10) Peers-others at your job level (60) %
Of the total time you engage in communication while on the job, about what percentage of the time do you use the following methods to communicate: (total =100%)

(11) Written (61) % (12) Face-to-face (62) % (13) Telephone (63) %

When receiving information from the sources listed below, how accurate would you estimate it usually is:

(14) Completely accurate 1 2 3 4 5 6 7 Completely inaccurate (64)
Immediate superiors

(15) Completely accurate 1 2 3 4 5 6 7 Completely inaccurate (65)
Subordinates

(16) Completely agree 1 2 3 4 5 6 7 Completely inaccurate (66)
Peers-others at your job level

Do you ever feel that you receive more information than you can efficiently use?

(17) Never 1 2 3 4 5 6 7 Always (67)

Of the total times you spend receiving information at work, what percentage goes to: (total=100%)

(18) Immediate superiors (68) % (19) Subordinates (59) % (20) Peers-others at your job level (70) %

Of the total time you spend sending information, what percentage goes to: (total =100%)

(21) Immediate superiors (71) % (22) Subordinates (72) % (23) Peers-others at your job level (5) %
Card 2 (1-4)

(32) Never 1 2 3 4 5 6 7 Always (14)

To peers-others at your job level

Of the total amount of information you receive at work, how much do you pass on to:

(33) All 1 2 3 4 5 6 7 None (15)

Immediate superiors

(34) All 1 2 3 4 5 6 7 None (16)

Subordinates

(35) All 1 2 3 4 5 6 7 None (17)

Peers-others at your job level

How desirable do you feel it is in your squadron to interact frequently with:

(36) Very Desirable 1 2 3 4 5 6 7 Completely undesirable (18)

Immediate superiors

(37) Very Desirable 1 2 3 4 5 6 7 Completely undesirable (19)

Subordinates

(38) Very Desirable 1 2 3 4 5 6 7 Completely undesirable (20)

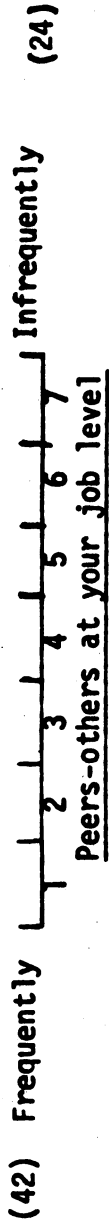
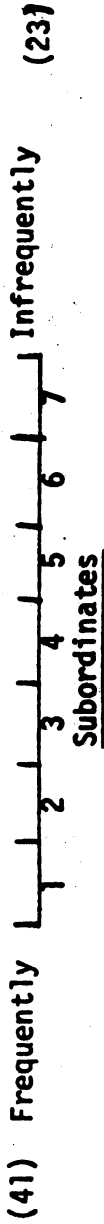
Peers- others at your job level

While at work, we often receive the same information (such as directives, statements of policy, changes in regulations, requests for reports, etc.) more than once. How often do you estimate the information you receive on the job is received more than once?

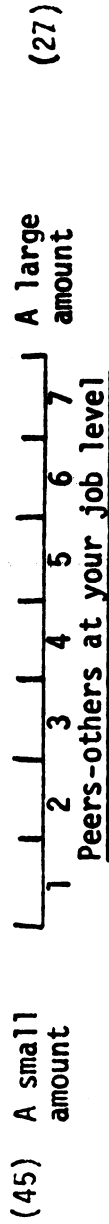
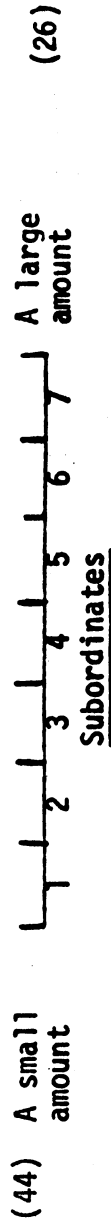
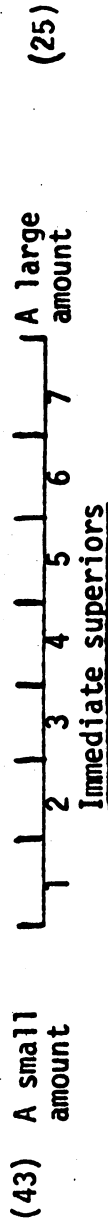
(39) Never 1 2 3 4 5 6 7 Often (21)

It is often necessary in our jobs not to pass to others some of the information which comes to us. About how often during a typical week do you withhold from the following people information which might be useful to them?

(40) Frequently 1 2 3 4 5 6 7 Infrequently (22)



We often find it necessary to change the nature of information (e.g. use different words, shift emphasis, simplify, etc.) we pass to others in our organizations. Of the total amount of information you receive, how much of it must you actively change in some way before you pass it on to the following people:



Put a check under the face that expresses how you feel about communications in general, including the amount of information you receive, contacts with your immediate superior and others, the accuracy of information available, etc. (28)

