# Organizations As Information Processing Systems

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An Exploratory Analysis of the Relationship Between Media Richness and Managerial Information Processing

Robert H. Lengel
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TR-ONR-DG-08

July 1984

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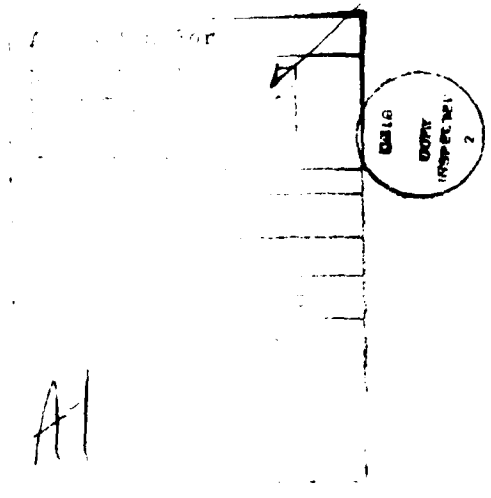

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# AN EXPLORATORY ANALYSIS OF THE RELATIONSHIP BETWEEN MEDIA RICHNESS AND MANAGERIAL INFORMATION PROCESSING

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## Abstract

A dilemma exists between technical information designers and students of managerial information behavior. A richness model is proposed that uses the concepts of media richness and communication learning requirements to integrate the two perspectives. The concepts and model were tested in a four-stage research program, and they were generally supported. Managers tended to prefer rich, oral media when learning requirements were high and less rich, written media when learning requirements were low.

# AN EXPLORATORY ANALYSIS OF THE RELATIONSHIP BETWEEN MEDIA RICHNESS AND MANAGERIAL INFORMATION PROCESSING

Information is the life-blood of organizations. Participants, especially managers, exchange information to interpret the external environment, coordinate activities, resolve disagreements, establish goals and targets, make technical and administrative decisions, and disseminate rules and instructions (Arrow, 1974; Porter and Roberts, 1976; Tushman and Nadler, 1978; Galbraith, 1973). Managers spend the majority of their time interacting with other people, and additional time is spent with mail, reports, and printouts (Mintzberg, 1972). The importance of information is reflected in the technology available to make information processing more efficient (Conrath and Bair, 1974; Parsons, 1983; Harris, 1980; Gerstein and Reisman, 1982). Micro-computers, word processors, teleconferencing, electronic mail, and database management techniques are adopted by organizations on the premise that more efficient information processing will mean a more efficient organization.

Feldman and March (1981) proposed that the study of information in organizations involves a dialectic between students of information behavior and information engineers. The engineering (or technical) approach to information emphasizes precision, clarity, logic, and cost-benefit ratios. Information engineers use technology to design optimal information systems that will provide clear, correct data to help managers solve current problems (Keen, 1977; Henderson and Nutt, 1978). Students of information behavior often focus on the social, intuitive, and seemingly non-logical aspects of information processing in organizations. Students of this social perspective observe actual information encounters and try to make sense of them.

The technical and social perspectives represent an unresolved dilemma

for the study of information processing. Each perspective explains a limited aspect of managerial behavior; neither perspective reconciles the view of the other. Consider, for example, the following observations.

1. Managers seem to prefer oral means of communication. Managers spend little time thinking, planning, writing, or using the formal means of information at their disposal (Mintzberg, 1973; Kurke and Aldrich, 1983). Decision making often involves gossip, unofficial data, informal communication, and intuition. Managers move toward live action, away from thoughtful reflection, toward personal contact, and away from formal reports and data.

2. The mode of presentation influences the impact of information on the receiver. Case illustrations and verbal stories seem to have greater impact than hard statistical data on people's judgement (Borgada and Nisbett, 1977; McArthur, 1972, 1976; Martin and Powers, 1980a, 1980b; Nisbett and Ross, 1980). O'Reilly (1980) concluded that humans are influenced more by vivid, concrete examples than by dry statistics, even though statistics present better systematic evidence from multiple observations.

3. The role of information and decision support systems in organizations seems limited (Mitroff and Mason, 1983). After great initial optimism, the credibility of operations research/management science data gathering and decision techniques has weakened, even while an increasing number of managers have received formal training in these techniques (Ackoff, 1976; Dearden, 1972; Larson, 1974; Grayson, 1973; and Levitt, 1975). Although information hardware and technologies have become more powerful and sophisticated, the outputs apparently are not used more for decision making at upper management levels.

4. Organizational learning and adaptation often seem threatened by

the very systems designed to scan the environment and provide information displays to managers. The formal systems, once in place, may hamper search and filter away change signals, even when the organization is in a changing environment (Hedberg and Jonsson, 1978; Mowshowitz, 1976; Hedberg, 1981; Hedberg, Nystrom, and Starbuck, 1976). Technology based probes and forecasting mechanisms become part of the programmed behavior and defined structure of the organization. They apparently foster stability and inertia rather than the learning and adaptation these probes and mechanisms are supposed to facilitate.

These observations about managerial information behavior illustrate the dilemma. Why do managers prefer face-to-face exchanges of information in lieu of expensive and extensive computer based management aids, or written media in general? Why does soft information often have more impact than hard data? Why do scanning systems promote inertia rather than learning? The literature does not provide good answers. Tushman and Nadler (1978) concluded that technology oriented information designers lack a theory of managerial information needs because designers are motivated to find ways to fit data to hardware. Students of social information behavior, on the other hand, find their observations difficult to formulate into an operational model because of the complexity of the social context. Both technological and social sources of information are present in organizations, and these sources are used at certain times for certain things (Huber, 1982; O'Reilly, 1982). A logical next step in the development of a theory of information behavior would be to reconcile the formal, written information modes with the informal and face-to-face.

The dialectic associated with managerial information behavior is the puzzlement that motivated the research reported in this paper. The purpose of this paper is to propose and test a model to partially integrate the

opposing viewpoints. We define "media richness" and "translation requirements" as concepts that can be used to explain managerial information behavior. Media richness reflects the capacity to convey information between managers, and we propose that media are selected based on manager information requirements. By exploring managerial communication preferences in terms of a new theoretical framework, we will try to find an initial answer to the dialectic on information processing within organizations.

## Theory Development

### Information and Learning

One underlying purpose of human communication is mutual learning. Learning in organizations is a process of gaining knowledge or comprehension of organization reality (Hedberg, 1981), especially knowledge of action-outcome relationships (Duncan and Weiss, 1979) and organizational errors (Argyris, 1976). It seems clear that organizations, or rather their human participants, must be capable of learning from their environments if they are to survive and be effective. Participants need to acquire and share some minimum understanding of their organizational world, of what to do, of how and when to do it. Learning involves the processing of information.

The definition of information typically includes the concepts of uncertainty, utility, and relevance (Shannon and Weaver, 1949; Garner, 1962; MacKay, 1969; Helvey, 1971). Human beings represent what they know by mental images, pictures, symbols, and verbal statements. When managers process cues that make some change in their mental representation, and thereby reduce uncertainty or increase utility for the problem at hand, then information processing has occurred. Data, by contrast, are the input

and output of any communication channel (MacKay, 1969). Managers work in a sea of data that is only potential information. If managers consume this data with some purpose or intent in mind, their mental pictures may be changed. Data thus becomes information when it is perceived, when it has relevance and utility for managers, and thereby facilitates learning.

The information-data distinction is one step toward the resolution of the technical and social information perspectives. Managerial information processing is an outcome not directly visible to observers or researchers (Gifford, Bobbitt and Slocum, 1979). Only managers know if data provides utility, changes their mental representation, and facilitates learning. Data flow, by contrast, is observable and amenable to technology. Data can be counted in the form of letters, words, number of reports, and telephone calls. Managers may use just a fraction of the data available to them to make sense of a complex, changing social system. Managers appear to process data continuously, but the actual learning event is related to the use of information inside the manager's mind.

Translation Requirements

Data becomes information if learning occurs. The amount of learning required in an organizational communication is reflected in the amount of change in mental representation required to achieve mutual understanding. We propose that the difficulty or ease of attaining mutual understanding is related to message content and the similarity in frame of reference of the sender and receiver.

A person's frame of reference is formed from a combination of cognitive elements, organizational role, previous experience, and other personal characteristics (Lawrence and Lorsch, 1967; Shrivastava and Mitroff, 1984). Communication becomes more difficult as the experience of individuals diverges and as the subjective or equivocal (Weick, 1979)

content of a message increases. A person trained as a scientist may have a difficult time understanding the point of view of a lawyer. Emotion-laden messages often are personal and subjective, and therefore open to misinterpretation. In these cases a common perspective does not exist and information processing is required before understanding can occur. Messages are complex, equivocal, and difficult to interpret. Learning requirements are high.

On the other hand, if the perspectives of managers are similar, the task of reaching mutual understanding is easier. Similarity in the experience or background of the sender and receiver as well as objective, unequivocal content in the message reduces the need for changes in mental representation (Daft and Macintosh, 1981). In these cases a common view of the situation already exists and serves to facilitate the interpretation of the message. For example, if one scientist communicates with another scientist on a routine technical matter, there will be a high degree of confidence that the message will be understood without elaboration. Mutual understanding is relatively easy to achieve. Learning requirements are small.

The amount of learning required between sender and receiver is a critical element in information processing. The process of overcoming differences in perspectives to achieve a common understanding will be called "translation." Translation is defined as the extent of change or conversion required in perspective between sender and receiver to attain mutual understanding. The concept of translation is useful because it can serve as an operational surrogate for managerial learning requirements. We propose that the amount of translation required in a communication transaction is an underlying force that drives managerial communication behavior. Learning requirements determine the usefulness of information

sources and provide a potential explanation for why managers prefer various forms of communication.

Media Richness

The translation requirement in a communication episode reflects the amount of learning necessary to achieve mutual understanding. We propose that managers select media to accommodate translation needs. Communication media available to managers (e.g., telephone, computer printout, face-to-face conversation) differ in their ability to facilitate learning. Media influence the capacity to process information among managers.

The role of media becomes clearer if by looking at one information carrier that media utilize, which is language. Daft and Wiginton (1979) proposed that languages can be arrayed along a continuum of language variety. The continuum captures the intuitive idea that languages differ in their ability to convey meaning. Numbers, for example, convey greater precision of meaning than do poems or pieces of abstract art. Many human values and feelings are so complex and equivocal that they do not lend themselves to precise, quantitative descriptions. Conversely, the use of music or art to describe the physical relationship between force, mass and acceleration is not as effective as using simple, precise equations. According to Daft and Wiginton, effective description occurs when language variety matches the amount of uncertainty or equivocality in the concept to be transmitted.

The concept of language variety suggests that the mode of communication needs to be adjusted to fit the topic to be communicated. Language variety, however, is only one aspect of managerial communication. We propose the broader concept of media richness to explain the selection of media by managers to process information. Media richness is defined as a medium's capacity to process information. Richness is the relative

ability of information to influence or change mental representations and thereby to facilitate learning (Lengel, 1983; Daft and Lengel, 1984). Bodensteiner (1970) proposed the concept of a media hierarchy, ranking media channels in terms of their mechanical characteristics for processing different types of information. Bodensteiner's model incorporated four media classifications--face-to-face, telephone, addressed documents, and unaddressed documents. These media and the basis for proposed differences in richness are shown in Figure 1. The richness of each medium is based on four criteria: (1) the use of feedback so that errors can be corrected; (2) the tailoring of messages to personal circumstances; (3) the ability to convey multiple information cues simultaneously; and (4) language variety.

[Figure 1 about here]

Face-to-face is hypothesized to be the richest information medium. Face-to-face communications allow immediate feedback so that understanding can be checked and misinterpretations corrected if the message is complex or equivocal. This medium also allows the simultaneous communication of multiple cues, including body language, facial expression, and tone of voice, which convey information beyond the spoken message (Meherabian, 1971). Face-to-face information also is of a personal nature and utilizes high variety natural language.

The telephone medium is somewhat less rich than face-to-face. Feedback capability is fast, but visual cues are not available. Individuals have to rely on language content and audio cues to reach understanding, although the medium is personal and does utilize high variety language.

Written communications are still lower in media richness. Feedback is slow. Only data written down are conveyed, so visual cues are limited to those on paper. Although audio cues are absent, natural language can be

utilized. Addressed documents can be tailored to the individual recipient, and thus are of a personal nature and are somewhat richer than standard documents or bulletins.

Formal, unaddressed documents are lowest in media richness. One example would be quantitative reports from a computer. These communications often utilize numbers, which are useful in communicating simple, quantifiable aspects of organizations, but do not have the information carrying capacity of natural language (Daft and Wiginton, 1979). Another example would be a standard flier or bulletin issued to all managers in the organization. This medium is low in richness because these documents provide no opportunity for visual cues, feedback, or personalization.

The media richness hierarchy shown in Figure 1 is simple, but it helps organize ideas from the information literature. For example, the difference between oral and written communication is illustrated in the hierarchy. Face-to-face and telephone communications are richer than written communications, which may explain why top managers prefer oral media (Mintzberg, 1972). Oral communications provide immediate feedback, high variety language, a variety of cues and personal tailoring that make them a powerful means of conveying information. Another example is management information systems. Most information system reports go in the category of unaddressed documents, and thus are low in richness. Other research has been concerned with information sources such as human versus documentary (Keegan, 1974), personal versus impersonal (Aguilar, 1967), and such things as files, formal reports, or group discussions (O'Reilly, 1982; Kafalas, 1975). The media richness continuum helps explain these differences. Each medium is not just a source, but a complex act of information processing. Each medium is unique in terms of feedback, cues,

and language variety--all of which influence learning between sender and receiver.

Richness Model

The proposed model of managerial information processing is presented in Figure 2. The Figure 2 model hypothesizes a positive relationship between media richness and the translation requirements in communication transactions. Our reasoning is that managers will select a rich medium when the message is difficult and learning requirements are high. A rich medium provides a mechanism for managers to learn and achieve mutual understanding when perspectives diverge and message content is subjective and difficult. Information processing must resolve inherent equivocality sufficient to capture different perspectives. Learning is facilitated by rich media. Less rich media are appropriate when perspectives are similar and the learning requirement is low. Media low in richness provide an efficient way to communicate an objective, unequivocal message to others.

[Figure 2 about here]

The richness match in Figure 2 provides a way to explain managerial information processing. It departs from the engineering metaphor of precision and clarity as the desired information state for managers. Precision and clarity are important, but when the communication task is objective and the mutual learning requirement is small. A richness mismatch may explain failures to transfer understanding. Written media and standard MIS reports may oversimplify complex problems, because these media do not transmit the subtleties associated with the unpredictable, personal, subjective aspects of organizations. On the other hand, the model in Figure 2 suggests that face-to-face media should not be matched to objective, well-understood communication transactions. For simple messages, face-to-face discussion may contain surplus meaning. Multiple

cues may not always agree--facial expression may distract from spoken words. Multiple cues can overcomplicate the communication and distract the receiver's attention from the routine message.

The organizational literature lends support to the Figure 2 model, although the support is indirect because managerial information activities have not been conceptualized along a richness hierarchy. For example, Mintzberg (1973) observed that chief executive officers display a strong preference for oral media. Top management issues are difficult, personal, intangible, and require the integration of diverse views and perspectives (Daft and Lengel, 1983). Top managers thus relied on rich media to process information to facilitate learning about high translation issues.

Research examining the relationship between task uncertainty and information processing also support the model. Van de Ven, Delbecq, and Koenig (1976) studied task uncertainty and coordination modes. Under conditions of high task uncertainty (high learning requirements), managers preferred face-to-face modes of coordination. When task uncertainty was low, rules and procedures were used, which are lower in richness. Meissner (1969) and Randolph (1978) found that when communications were objective and certain, less personal sources of information such as objects, signs, signals, and written documents were used. Personal (face-to-face) means of communication were used more frequently as tasks increased in uncertainty.

Holland, Stead, and Leibrock (1976) gathered questionnaire data from R&D units, and found that personal channels of communication were important when perceived uncertainty was high. They concluded that face-to-face communications enabled participants to learn about complex topics in a shorter time. Written information sources, such as the professional literature and technical manuals, were preferred when task assignments were well understood.

The research into management information systems shows a similar pattern. Higgins and Finn (1977) examined top management attitudes toward management information systems, and found that intuitive judgment was used more often than computer analysis in strategic decisions. Brown (1966) argued that decision support systems have greater value for technical problems. Management information systems are more relevant to managers who work with well-defined operational decisions (Blandin and Brown, 1977). Management information systems represent media that are low in richness, and are suited to information tasks that have a small translation component.

The basic proposition to be tested in this research is that organizational information processing is characterized by a match between the information media selected by managers and the extent of mutual learning required to reach understanding. This relationship is summarized in the following hypothesis.

> Hypothesis 1: Managerial information processing patterns will be characterized by a positive relationship between the richness of media selected and the translation requirements of communication episodes.

As an auxiliary hypothesis, we also propose that learning requirements explain the selection of oral versus written media as described by Mintzberg (1973). The predicted relationship is summarized in the following hypothesis.

> Hypothesis 1a: Managers will select oral media for high translation communication episodes and written media for low translation communication episodes.

Moderating Influences. The above discussion argues for a positive relationship between media richness and message translation requirements. However, other factors may moderate manager media selection patterns. Communication activities may be influenced by the experience and personality of the manager, and by the sender versus receiver role in the communication

transaction. Even if the model is supported in terms of the relationship in hypothesis one, the personality and role of respondents may moderate this relationship.

Previous research has shown variation in information processing behavior associated with the personality traits of communication propensity (Dance, 1967) and extroversion versus introversion (Daft, 1978). Other personality characteristics--tolerance for ambiguity (Budner, 1962; Dermer, 1973) cognitive complexity (Downey and Slocum, 1975; Stabell, 1978), and incongruity adaptation level (Hunsaker, 1973)--have been indirectly associated with communication through the respondent's interpretation of perceived information complexity. Propensity to communicate and introvert-extrovert traits, however, are related to one another and to information behavior (Carskadon, 1979; Dance, 1967; Daft, 1978). Extroverts tend to initiate communications and to enjoy personal interactions. If an individual is an extrovert, he or she could bias media selection in the direction of increased richness, that is, extroverts may have a greater preference for personal media such as face-to-face and telephone. Introverts may prefer to avoid face-to-face contact in favor of impersonal media such as notes, memos, or bulletins. Introverts differ from extroverts by their preference to be alone and to have fewer personal contacts. We thus hypothesize that personality of the respondent may influence media selection as follows:

> Hypothesis 2: Managers classified as extroverts will, on the average, select richer media to accomplish communication transactions than will managers classified as introverts.

The other moderating factor pertains to a possible difference between senders versus receivers. This difference may be important because senders and receivers play different roles in a communication transaction. The sender may want to accomplish mutual understanding, but the receiver may not want to

be bothered. The sender may have a higher stake in achieving mutual learning than does the receiver. Previous research has not addressed this issue. But it seems reasonable to assume that senders want to make sure the message gets through, and will try to influence the receiver to have the same perspective as held by the sender. The receiver, however, may want to resist being influenced, and may simply want to receive the communication in the most efficient fashion. Senders may prefer richer media because they want the message to have more impact. Receivers may prefer less rich media so they receive only the essential message, are less likely to be influenced, and have more time to provide feedback. We hypothesize that sender-receiver status will influence media selection.

> Hypothesis 3: Managers in the position of information sender will, on the average, select richer media for communication transactions than will managers in the position of information receiver.

Summary

This paper began with the dialectic between information engineers and students of information behavior. Hypotheses about the relationship between media selection and the translation requirements of communication episodes were then developed. The trail of logic began with the premise that managerial learning is a driving force underlying information behavior. Communication episodes differ in the amount of learning required to achieve mutual understanding, because of differences in perspective between sender and receiver and the extent to which messages are equivocal and difficult to interpret. The concept of translation was defined to reflect the amount of mutual learning required in a communication transaction. The concept of media richness was then introduced. We argued, based on an extension of Bodensteiner's work, that media vary in the capacity to process information and facilitate learning between managers. We concluded with a model that

proposed a positive relationship between media richness and translation requirements as a way to test the validity of these ideas. Diverse findings from the literature support the model, but manager personality and sender/receiver position may moderate observed media selection behavior.

## Research Method

The model described above is an extrapolation from the literatures on organizational communications and managerial behavior. But the research literature did not provide a basis for operationalizing and testing the model. Very little has been reported about the message content of managerial communications or the role of specific media. This information had to be generated as part of the overall study. The research to test the model entailed a program of four projects. The first three projects developed necessary instruments and an operational base for the fourth project, which was the test of the Figure 2 richness model. The four projects were:

1. Open-ended pilot study to ground the theory in the real world of managerial communications.

2. Translation requirement study to identify a set of organizational communication incidents representing a range of learning requirements.

3. Media hierarchy study to assess whether the ordering of media along a richness continuum is a logical assumption.

4. Final study to test the research model and to assess the moderating influence of extrovert-introvert personality characteristics and sender-receiver position in the communication transaction.

The remainder of this section describes the procedures used in these studies, and reveals the learning process we went through while surmounting the unknowns associated with operationalizing the concepts to test the model.

Pilot Study

The pilot study included open-ended, in-depth interviews with a convenience sample of four practicing managers in three organizations. Three of the subjects had general management responsibilities: one was president of a bank; two were plant managers for manufacturing companies. The fourth subject was the director of personnel for one of the manufacturers.

Each interview lasted three hours over two sessions. The interviews were structured around the Critical Success Factor (CSF) technique (Rockhart, 1979, 1982). Managers were asked to identify key areas of responsibility and performance, called CSF's. The CSF provided a concrete referent in the manager's experience about which we could then identify information needs and the communication activities associated with meeting those needs. The interviews were tape-recorded and studied in detail. The goal was to learn as much as possible about communication incidents and media used by managers and to uncover problems or contingencies that would violate or strengthen the richness model.

One outcome from this stage of research was identification of an expanded list of communication media. Managers occasionally used media such as two-way radios, telexes, and public address systems, although these media tend to be peripheral to the manager's job. We also learned that managers did not think in terms of addressed and unaddressed documents. Memos, notes, and letters are the organizational analogs of addressed documents. Fliers/bulletins, and standard documents/reports are the analogs for unaddressed documents.

At the end of each interview, the model was presented to the managers to solicit their comments or suggestions. Each manager understood and supported the basic concept of the richness model. The managers did note, however, that organizational circumstances might dictate the medium in specific situations. They also agreed that personality may influence media preferences, and

commented that while they would choose one medium to send a certain message, they might prefer to receive the same message via a different medium.

Translation Requirements

Media identified in the pilot study were used to generate a sample of communication incidents. The source of these data were interviews with eleven practicing managers in eight organizations. These managers were also a convenience sample, chosen to provide variation in hierarchical level, functional responsibility and type of organization. The interview procedure asked managers to discuss critical incidents in which they used each medium. This method is the critical incident technique developed by Rosenbloom and Wolik (1970) and subsequently employed by Dewhirst (1971). This technique minimizes recall distortion by focusing on a concrete incident. Each manager was first asked to recall the most "recent" use of a specific medium, and to describe the content and purpose of the communication. Each manager was then asked to recall a second, "important" use of the medium. Managers were also asked open-ended questions about the reasons they choose that specific medium for each communication. The overall objective of this interview process was to refine our understanding of the purpose and content of specific managerial communications.

These interviews generated 220 concrete examples of managerial communications. Since these examples contained repetition and overlap, it was possible to reduce the list to 60 incidents that were representative of managerial communications. The incidents were selected based on the specificity of the description and the probable generalizability to other managers. However, there is no claim that the 60 incidents are a complete representation of managerial communications. Rather these incidents represent a broad cross section of communications that are grounded in actual managerial work. The 60 incidents are listed in Appendix I.

Once the 60 communication incidents were developed, the amount of translation required to achieve mutual understanding between sender and receiver had to be identified. Translation scores for the incidents were obtained from a panel who were asked to rate each of the 60 incidents. The panel was composed of 17 management faculty members and 13 practicing managers for a total panel of 30 judges. The translation concept was explained to each judge and a written definition of the translation concept was provided. The 60 incidents were then rated on a five-point Likert scale. The average translation rating for the 30 judges for each communication incident is reported in Appendix I. A score above 4 represents a communication in which the content or frames of reference would require extensive translation to achieve mutual understanding. Translation scores below 2 are communications for which mutual understanding is easy to achieve and little learning is involved.

Media Richness

The next research project was to obtain an external validation for the notion of a richness hierarchy. Once again, the judgments of an outside panel were used. This panel consisted of 12 faculty members and 10 practicing managers for a total panel of 22 judges. Each panel member was given a written description of media richness and was asked to rate each medium on a 100 point scale (0 = lowest in richness, 100 = highest in richness).

The purpose of these data was to test whether an objective panel would confirm our ordering of media along a richness hierarchy in descending order from face-to-face, telephone, addressed documents, and unaddressed documents. The media contained in each category of our original hierarchy are listed in Table 1 along with the richness ratings and standard deviations. To test whether the judgments of the panel supported the perception of a richness hierarchy, t-tests for differences between ratings were calculated. The data

in Table 1 indicate that the judges' ratings are consistent with the hierarchy of media richness. All judges perceived face-to-face as being highest in richness, which is reflected in the score of 100. The telephone medium is second, with a score of 85.9. Next in order are the letter (67.1), note (64.4), and formal memo (54.1). The lowest richness ratings were given to standard reports (32.3) and flier/bulletins (16.6), which are unaddressed documents.

[Table 1 About Here]

The t-tests also support the original four richness classifications of media as face-to-face, telephone, addressed documents and unaddressed documents. The statistical significance between categories is greater than the statistical significance among media within the same category. The ratings of the external judges thus provide initial, external support for our attempt to order media into a richness hierarchy.

The Model

Media selection. The primary hypothesis from the Figure 2 model is that media richness will be associated with the translation requirements of communication transactions. The method used for the final study was to combine incidents and media into a single instrument, and to survey a new sample of practicing managers about their communication preferences.

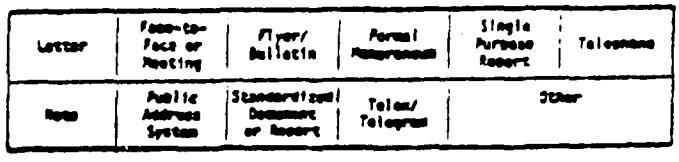
The new instrument contained all 60 incidents in Appendix I. Respondents were given instructions for completing the instrument. A sample of 10 media were provided for each incident, and each respondent was asked to select the medium through which he/she would prefer to send the message. The instructions to respondents and the first incident on the questionnaire is presented on the following page.

*II. The exercise which follows involves a series of communication incidents. Assume you are sending a message in each case. From the ten media classes defined on the previous page, select the medium that you would use to accomplish each communication. You will need to refer to the media definitions periodically during the exercise. When you have selected a medium, indicate your choice by marking an "X" in the appropriate box. If you choose a medium that does not clearly fit one of the given categories, write your selection in the box labeled "other."*

*You are faced with the following communication tasks. Select the medium you would use in each case by marking an "X" in the appropriate box.*

*The purpose of the Communication Task is:*

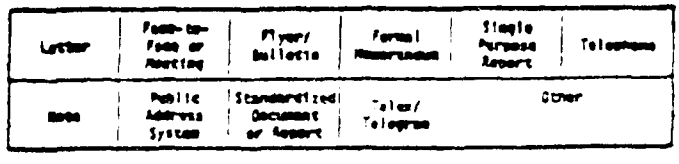
*1. To give your immediate subordinate a set of five cost figures that he requested last week.*




Ten media were used for response categories to provide a broad selection of alternatives and to camouflage the underlying model. The final data analysis included only the media that were included in the original model. The other media--telex, special reports, public address--were seldom selected because they are not part of typical managerial information processing.

Senders vs. Receivers. One moderating influence on media selection was hypothesized to be sender vs. receiver orientation. The 60 incidents were rewritten in a mirror image to reflect the receiver's perspective. For example, the first incident was rewritten as follows.

*1. To receive a message from your immediate superior giving you a set of five cost figures that you requested last week.*



One complete instrument was thus developed for the sender's perspective which contained 60 incidents. Another complete instrument was developed containing 60 incidents for the receiver's perspective. Each instrument contained instructions to the respondent describing their role as sender or receiver and asking them to check the media they would prefer for each communication transaction.

Extrovert-Introvert. The final hypothesis pertained to personality as a moderating variable in media selection. The instrument chosen to measure introversion-extroversion had to be short and relevant to mature, practicing managers. The media selection exercise alone required a significant amount of the respondents' time. The extrovert-introvert subscale of the Myers-Briggs type indicator (Myers, 1962) was chosen. The subscale was extracted from the full instrument, and provided 15 items that could be completed in about 5 minutes and had relevance to a mature audience. The extrovert-introvert subscale of the Myers-Briggs type indicator has been extensively validated for its association with predicted behavioral differences (Carskadon, 1979; Carlson and Levy, 1973). The questions came near the end of the questionnaire just before the biographical information. Appendix II contains the Myers-Briggs subscale and the instructions to respondents. Coefficient alpha for our respondents was .80, indicating acceptable internal reliability for the 15 items.

Sample. The principle criterion for selecting respondents to complete the final instrument was that they be practicing managers with experience consistent with the communication incidents. The sample of managers was obtained from a large (35,000 employee) petro-chemical corporation in Houston, Texas. The initial sample was 109 managers from three divisions of the corporation. The sample was not random. The personnel department would not give us access to the personnel files. The personnel manager drew the sample

based on a number of criteria, including the managers' availability during the time of the study, at least one year on the job, and our request to obtain representative responses from diverse functions and levels within the company. The response rate was 87 percent, which yielded a final sample of 95 managers. The sender version of the 60 communication incidents was completed by 46 managers, and 49 other managers completed the receiver version. All 95 managers completed the Myers-Briggs subscale. Since each manager responded to 60 communication episodes, the total possible sample for analysis was 5,700 incidents for which a medium was selected for a communication incident. This was reduced by 204 for omitted or illegible responses, or for media checked that were not part of the model.

Data Analysis. The question for data analysis was whether to test the hypotheses with correlation and regression techniques based on absolute numerical values from the judges' ratings, or to use simpler techniques that utilized general categories. For example, a communication incident rated 4.1 on the translation scale was probably higher than an incident rated 2.3, but it was not certain that the numbers represented the true translation values or that the ratings constituted an interval scale. Since this was an exploratory study, we decided against premature rationalization of the data. Initial analyses indicated that straightforward techniques of cross-tabulations, means, percentages, and graphs fully revealed the underlying relationships. With these methods we could test hypotheses while staying close to the operational base of the research. Media thus were grouped into the four categories of face-to-face, telephone, addressed documents, and unaddressed documents for analysis. Communication incidents were grouped into four categories representing low to high translation requirements.

## Research Findings

The central hypothesis in the richness model is that communication translation requirements will be positively related to the richness of media selected. The data pertaining to this hypothesis are shown in Table 2. Table 2 reports a cross-tabulation of the four media categories by four levels of translation requirements. Visual inspection of Table 2 reveals a well defined relationship between media richness and translation requirements. As the translation requirement in a communication transaction increases, the preference for richer media increases as predicted. For communication transactions falling in the low translation category, only 13.5 percent of the respondents preferred the face-to-face medium. This percentage increases to 84.1 percent when message translation requirements are high. By contrast, 62.4 percent of the respondents preferred a written, addressed medium for low translation messages, but only 10.8 percent selected this medium for high translation messages. A Chi-Square test of independence between translation requirements and media richness was rejected at the .00001 level, which indicates support for hypothesis 1. The Gamma coefficient for Table 2 is .56. Gamma represents strength of association for ordinal variables in a contingency table, and is similar in interpretation to a Spearman rank-order correlation coefficient (Blalock, 1972; Nie, Hull, Jenkins, Steinbrenner and Bent, 1975).

[Table 2 about here]

The media categories are combined into written and oral media to test hypothesis 1a. These data are reported in Figure 3, which shows strong visual support for the relationship between media and translation requirements. For low translation transactions, 32.1 percent of respondents preferred oral media. The preference for oral media increased to 88.7 percent for communications that have a high translation requirement. It appears that the

preference for rich media are stronger for high translation communications. These data provide empirical support for the hypothesis that oral media are preferred when translation requirements are high. For low translation tasks, managers report a preference for written media.

[Figure 3 about here]

Unexpected Finding. Visual inspection of Table 2 suggests an additional finding that was not hypothesized. The data in the right hand (high translation) column are skewed toward the face-to-face medium (84.1 percent). Moving to the left across Table 1, however, the distribution among media in each column becomes broader. For translation requirements in column 2, for example, 40.5 percent of the managers selected face-to-face, and 40.5 percent selected an addressed document. The variation among media appears greater for the simpler, low translation communications. This difference was tested by calculating separate Chi-square and Gammas for the right half and left half of Table 1. The Chi-square for the right half (third and fourth columns) is 105.8 ($p < .00001$), and the Gamma is .56, which indicate lack of independence. The Chi-square for the left half of Table 1 is 71.8 ($p < .0005$) and the Gamma is .44. This relationship is also statistically significant, but less so. The significance test for the difference between Gammas is .02, which supports the interpretation of a stronger relationship at higher levels of media richness.

While this finding is tentative, it suggests a "convergence effect" by managers toward rich media when translation requirements are high. Although this convergence was not hypothesized, it does make sense in terms of the underlying theory. The premise was that rich media are required to accomplish high translation communications. Low rich media cannot process complex messages or resolve different frames of reference, and therefore cannot substitute for rich media when the learning requirement is high. On the other

hand, high rich media have more than sufficient capacity to process low translation messages. The rich medium may not be efficient, but can nevertheless serve as a substitute for low rich media in simple communications. Thus managers have greater freedom to select across media categories when routine information is conveyed.

Moderating Effects. Hypotheses 2 and 3 concern the extent to which extrovert-introvert personality characteristics and sender-receiver roles influence media selection. Table 3 shows the average media richness preference for extroverts (82.2), introverts (81.5), senders (83.6), and receivers (81.1). These scores represent the average media richness selected for all 60 communication incidents. The differences in absolute scores are quite small, but they are statistically significant. The difference between introverts and extroverts is significant at the 0.06 level, indicating that extroverts do prefer somewhat richer media on average than introverts. Likewise, senders prefer somewhat richer media than receivers, which is statistically significant at the 0.006 level. The findings in Table 3 suggest modest support for hypotheses 2 and 3.

[Table 3 about here]

The important question about extrovert-introvert characteristics or sender-receiver roles is whether these factors influence the underlying relationship between translation requirements and media selection. Table 4 shows a contingency table breakdown of introverts vs. extroverts. Visual inspection of the table shows that the percentages within respective categories are similar to the percentages in the Table 1 categories. While extroverts prefer slightly richer media on the average, this preference does not effect the overall relationship between translation requirements and media selection. The relationship between translation and media is illustrated by the Chi-squares of 680 and 427 for Table 4, which are both statistically

significant at the .00001 level. Moreover, the zero-order Gamma between translation and media is .536, and the first order partial Gamma controlling for extrovert-introvert is .538, which indicates that the difference between contingency tables is not significant.

[Table 4 about here]

Table 5 shows the breakdown of relationships by senders vs. receivers. The percentages in respective cells are similar to Table 1 and to each other. The preference of senders for slightly richer media does not influence the underlying relationship between translation requirements and media selection. The Chi-square tests for senders and receivers are both statistically significant (.00001). The zero-order (.536) and first order partial Gammas (.537) for Table 5 indicate no significant effect of sender-receiver role on the relationship between media richness and message translation requirements.

[Table 5 about here]

Finally, the impact of sender, receiver, extrovert, and introvert (S-R-E-I) status on the selection of oral vs. written media are summarized in Figure 4. The strength of the relationship between translation requirements and media selection is revealed in the visual comparison of the S-R-E-I groups in Figure 4. For all but the lowest translation category, senders show a slightly higher preference for oral media than receivers, and extroverts show a preference for oral media slightly greater than introverts. But these relationships are secondary to the obvious increase in preference for oral media with increasing translation requirements from the left to right side of Figure 4.

[Figure 4 about here]

The data presented in this section thus support the hypothesis that communications with high translation requirements are associated with rich

media and low translation requirements are associated with media low in richness. The hypothesis that oral vs. written media would follow the same pattern was supported. The hypotheses that senders prefer richer media than receivers and that extroverts prefer richer media than introverts received modest support. However, these moderate relationships did not offset the tendency across managers to select media based upon translation requirements.

## Interpretation and Conclusions

The purpose of this research was to propose and test a theory to better understand managerial information processing behavior. We proposed that learning was an underlying force in information behavior, and that media are chosen by managers based on the media's capacity to facilitate learning.

Four projects were undertaken to operationalize the richness model. The results from the studies are summarized as follows: (1) The organization of media into a richness hierarchy received external support from a panel of 22 judges. (2) A list of incidents representing a cross section of managerial communications was developed, and the learning requirement of each incident was identified by 30 judges. (3) The final sample of 95 managers provided evidence to support a positive relationship between translation requirements and media richness. (4) No matter how the responses were grouped--extrovert, introvert, sender, receiver--the data demonstrated similarities in media preferences based upon the nature of the translation requirements. Rich media were consistently preferred when translation requirements were high. Media low in richness tended to be preferred when translation requirements were low. (5) An unexpected finding was that high translation communications seemed to necessitate a rich medium, but managers could use a variety of media for the low translation communications. (6) Differences in the media preferences for senders, receivers, extroverts and introverts superimposed a small secondary

effect on the primary patterns.

Overall, the data provided support for the richness model, but the findings must be interpreted within the limitations of the research. This was an exploratory research program wherein concepts were operationalized for the first time. Moreover a number of other variables could affect media selection, such as physical accessibility (Huber, 1982), time and workload constraints (Huber, 1982), perceived quality and reliability of sources (O'Reilly, 1982), location in a communication network (Tushman, 1979), the symbolic value of media (Feldman and March, 1981), and opportunity for distortion (O'Reilly and Roberts, 1974). Further research is needed to assess the validity of the media and translation concepts and to determine the relationship of media selection to additional factors. The appropriate conclusion at this point is to say only that the data have not disconfirmed the richness model or the underlying theoretical explanation.

Organizational Information Processing

What do these findings mean for information processing in organizations? We believe that the richness model provides a theoretical rationale for interpreting some of the puzzlements in the research literature. For example, why do managers prefer oral media and live action over written communications and formal reports (Mintzberg, 1972)? Our findings suggest that the managers observed in previous research probably were dealing with high translation communications. Oral communications are richer than written communications. Oral media are a better source of understanding for equivocal, ill-defined issues. For example, Mintzberg observed top managers, who had to resolve different perspectives and process subjective issues, hence they relied heavily on rich media, including tours, the telephone, and face-to-face meetings.

The managers in our study selected media both low and high in richness.

Indeed, they displayed a preference for notes, memos, and standard documents for simple communication transactions that involved little learning. These media are more efficient, and probably more suitable to the task. Managers thus preferred both written and oral media, depending on the nature of the communication transaction. The emphasis given to oral media in the literature may be somewhat one-sided, based upon observations of managers who were occupied with high translation communication tasks.

Next, why do managers presumably discount or even ignore management information and decision support systems (Mitroff and Mason, 1983)? Our data suggest two answers: (1) managers may use these unaddressed documents more than we realize, and (2) formal information systems are not well suited to high learning transactions. Information and decision support systems are in all likelihood used for transmitting routine, objective, and impersonal information that can be used throughout the organization. Managers can use these sources for routine scanning, monitoring and control data about issues that are well-defined and agreed upon, such as production volume. However, standard documents do not substitute for a high rich medium. These documents do not have the capacity for communications that require learning through feedback. multiple cues, personal circumstances, and high variety language. The failure of formal information and decision support systems (Ackoff, 1976; Leavitt, 1975) is probably associated with their inappropriate application to subjective and uncertain problems about which disagreement exists. Thus formal information systems should not be viewed as failures. Rather their success is contingent upon application to low translation communications, of which there are many in organizations. Low rich media probably are more efficient than face-to-face for relaying information about routine matters. On the other hand, low rich media do not have the capacity or characteristics to help managers resolve high translation issues.

Finally, why do formal scanning systems tend to filter out change signals and promote programmed behavior within organizations (Hedberg and Jonsson, 1978)? The implication from this research is that a rich medium, especially face-to-face, facilitates learning about issues characterized by diversity and subjectivity. If this interpretation is generalized to organizational learning, it says something about how organizations can diagnose their environments. The formal structure of organization is represented in its rules, formal scanning and information systems, budgets, performance evaluation systems, and control systems. These characteristics often represent low rich media that convey objective information through the organization. Following this logic, formal management systems provide an organization with low learning capabilities that are appropriate in a stable environment (Huber, 1982).

When environments are complex and unstable, however, a role for rich media emerges. Management can superimpose a less formal information structure over the formal systems (Argyris, 1976). Managers themselves are responsible for organization learning (Hedberg, 1981). Human beings are the key communication medium. Technology based scanning systems do not substitute for personal contacts, feedback, and high variety language. Managers can be in personal touch with individuals and events in the external environment (Aguilar, 1967; Keegan, 1974), and personally convey these ideas and observations to others within the organization. The interpretation of equivocal events requires rapid communication cycles among managers to define rules and parameters (Weick, 1979). Rich media have the capacity for rapid feedback so that convergence among managers is reached. Through face-to-face discussions, environmental change can be interpreted and equivocality reduced to the point where organizations can take appropriate action. Thus, managers need to utilize rich media for organizational scanning when external events

are unstable and poorly defined.

To an objective observer, managerial work may appear to be disorganized and fragmented. Managers seek live action and do not seem to be in control of their time. These surface observations can be explained at a deeper level by characterizing managers as information processors. Managers are attracted to rich information through which they can interpret subjective issues and learn about changing, complex environments. Managerial behavior and organic organization structures enable the use of rich media for learning, adaptation, and change. The richness model provides an information-based explanation for managerial behavior and the role of organic processes in organizational learning.

One path of new research to test these ideas would be to compare managerial effectiveness with the selection of information media. Information processing makes up a large part of the manager's job, so selecting the right medium for each communication may determine information quality, shared understanding, and managerial effectiveness. Indeed, the richness model suggests several streams of new research, including the laboratory testing of media capacity, the classification of additional media, and the systematic analysis of how characteristics (feedback, multiple cues, etc.) of each medium influence information processing. Media selection may also be important to research on larger organization processes, such as environmental scanning, structure, and interdepartmental coordination.

In closing, we want to address once again the dialectic between information engineers and students of information behavior that motivated this research (Feldman and March, 1981). The findings about learning requirements and media selection do not resolve the dialectic, but they do suggest a simple idea for integrating these two perspectives. Communications within organizations contain different learning requirements that influence the

richness of the medium selected. Information engineers have been concerned with media low in richness that are appropriate for the efficient communication of objective, impersonal data through the organization. Students of information processing have focused on the use of rich media for the resolution of personal, complex, subjective issues among managers. The important point is that both kinds of issues exist within organizations, and that both types of media are important. One view cannot be supported to the exclusion of the other. The richness hierarchy provides a tentative way to incorporate both viewpoints within the domain of organizational information processing.

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| Increasing Media Richness | Media Classification | | Media Characteristics | | | |
|---|---|---|---|---|---|---|
| | | | Feedback | Channels & Cues | Source | Language |
| ↑ | Face-to-face | Oral | Immediate | Audio & Visual | Personal | Natural |
| | Telephone | Oral | Fast | Audio | Personal | Natural |
| | Addressed Documents (e.g., letters, Memos) | Written | Slow | Limited Visual | Less Personal | Natural |
| | Unaddressed Documents (e.g. MIS Reports, Newsletters) | Written | Slowest | Limited Visual | Impersonal | Numeric or Natural |

Figure 1. Heirarchy of Media Richness

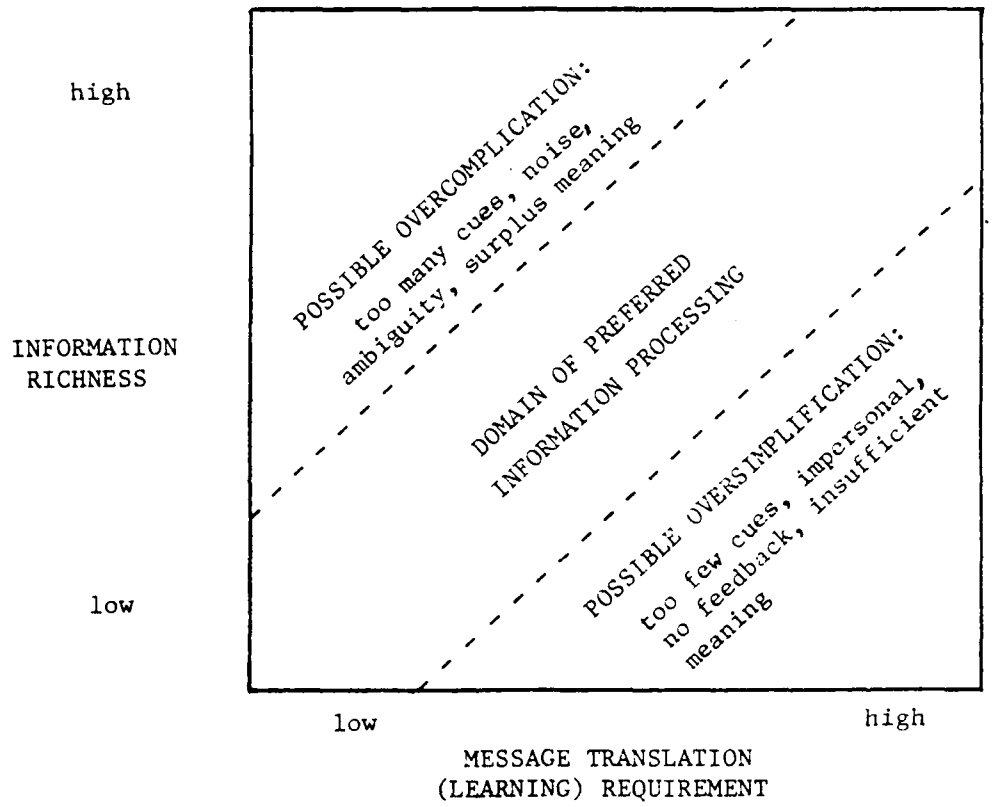


Figure 2. Proposed Model of Managerial Information Processing

Table 1: Media Richness Ratings

| Media | Media Richness Rating Mean (s.d.) | t-test for differences between media richness ratings t-value | Probability |
|---|---|---|---|
| Face-to-Face | 100.00 (0.00) | | |
| | | 9.5 | .0001 |
| Telephone | 85.86 (7.0) | | |
| | | 6.6 | .0001 |
| Addressed Documents | | | |
| Letter | 67.14 (15.3) | | |
| | | 0.8 | .448 |
| Note | 64.36 (18.5) | | |
| | | 1.7 | .105 |
| Formal Memo | 54.05 (19.9) | | |
| | | 4.25 | .0001 |
| Unaddressed Documents | | | |
| Standard Report | 32.3 (23.4) | | |
| | | 2.3 | .03 |
| Flier/Bulletin | 16.6 (18.3) | | |

(N - 22 Judges)

Table 2: Relationship Between Message Translation Requirement and Preferred Media Richness

| | Low ← Translation Requirement → High | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Information Medium | 1 ≮, ≦2 percent | (N) | 2 ∠, ≦3 percent | (N) | 3 ∠, ≦4 percent | (N) | 4 ≧, ≮5 percent | (N) |
| Face-to-Face | 13.5 | (148) | 40.5 | (598) | 60.6 | (1342) | 84.1 | (546) |
| Telephone | 18.6 | (203) | 18.3 | (271) | 9.4 | (208) | 4.6 | (30) |
| Addressed Documents | 62.4 | (683) | 40.5 | (598) | 28.4 | (628) | 10.8 | (70) |
| Unaddressed Documents | 5.5 | (60) | 0.7 | (11) | 1.7 | (37) | 0.5 | (3) |
| | 100 | (1098) | 100 | (1478) | 100 | (2215) | 100 | (649) |

($x^2$ = 1099.13; significance = .00001)

(Gamma = .54)

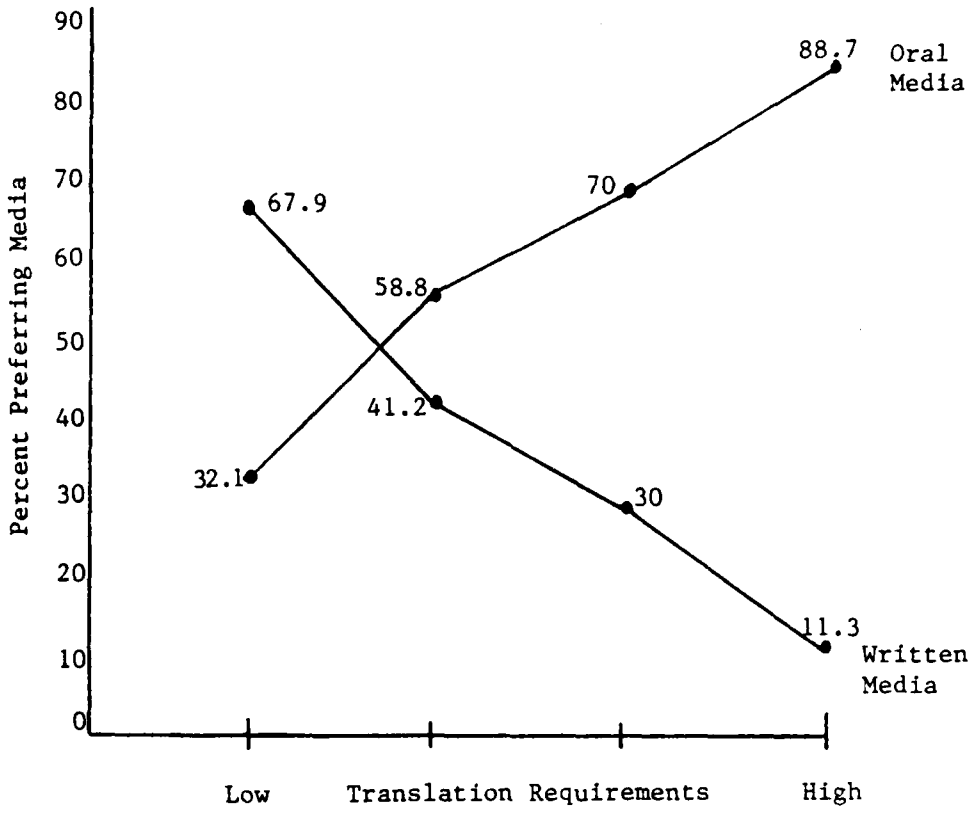


Figure 3. Summary of Translation Requirements and Oral versus Written Media Preferences

Table 3: Average Media Selection for Extroverts, Introverts, Senders and Receivers.

| Classification | average media richness | t-value for difference | significance |
|---|---|---|---|
| Extroverts | 82.2 | 1.91 | .06 |
| Introverts | 81.4 | | |
| Senders | 83.6 | 2.87 | .006 |
| Receivers | 81.1 | | |

Table 4: Relationship Between Translation Requirement and Media Richness, by Extrovert/Introvert.

| | EXTROVERT | | | | | | | | INTROVERT | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Low ← Translation Requirement → High | | | | | | | | Low ← Translation Requirement → High | | | | | | | |
| Information Medium | 1 ≤, ≤ 2 percent | (N) | 2 <, ≤ 3 percent | (N) | 3 <, ≤ 4 percent | (N) | 4 <, ≤ 5 percent | (N) | 1 ≤, ≤ 2 percent | (N) | 2 <, ≤ 3 percent | (N) | 3 <, ≤ 4 percent | (N) | 4 <, ≤ 5 percent | (N) |
| Face-to-Face | 14.0 | (90) | 40.3 | (349) | 61.0 | (779) | 85.5 | (325) | 12.8 | (58) | 40.6 | (249) | 59.5 | (543) | 82.2 | (221) |
| Telephone | 17.9 | (115) | 19.2 | (166) | 9.0 | (118) | 4.7 | (18) | 19.4 | (88) | 17.1 | (105) | 9.9 | (90) | 4.5 | (12) |
| Addressed Documents | 61.9 | (397) | 40.1 | (347) | 28.4 | (372) | 9.2 | (35) | 63.1 | (286) | 40.9 | (251) | 28.3 | (256) | 13.0 | (35) |
| Unaddressed Documents | 6.1 | (39) | 0.3 | (3) | 1.5 | (20) | 0.5 | (2) | 4.6 | (21) | 1.3 | (8) | 1.9 | (17) | 0.4 | (1) |
| | 100 | (641) | 100 | (865) | 100 | (1309) | 100 | (380) | 100 | (453) | 100 | (613) | 40.4 | (906) | 12.0 | (209) |

$X^2$ = 680.07 = 680.07; significance = .00001)

$X^2$ = 427.28; significance = .00001)

Zero-order Gamma for Media Richness by Translation = .536.
First-order partial Gamma controlling for Extrovert-Introvert = .538.

Table 5: Relationship Between Translation Requirement and Media Richness, by Sender/Receiver

| | SENDERS | | | | RECEIVERS | | | |
|---|---|---|---|---|---|---|---|---|
| | Low ← Translation Requirement → High | | | | Low ← Translation Requirement → High | | | |
| Information Medium | $1 \leq, \leq 2$ percent (N) | $2 <, \leq 3$ percent (N) | $3 <, \leq 4$ percent (N) | $4 <, \leq 5$ percent (N) | $1 \leq, \leq 2$ percent (N) | $2 <, \leq 3$ percent (N) | $3 <, \leq 4$ percent (N) | $4 <, \leq 5$ percent (N) |
| Face-to-Face | 17.4 (94) | 45.5 (330) | 65.7 (722) | 86.1 (272) | 9.7 (54) | 35.6 (268) | 55.6 (620) | 82.3 (274) |
| Telephone | 14.5 (78) | 19.8 (144) | 8.8 (97) | 5.7 (18) | 22.5 (125) | 16.9 (127) | 9.9 (111) | 3.6 (12) |
| Addressed Documents | 60.7 (327) | 33.5 (243) | 23.7 (261) | 7.6 (24) | 64.1 (356) | 47.2 (355) | 32.9 (367) | 13.8 (46) |
| Unaddressed Documents | 7.4 (40) | 1.2 (9) | 1.7 (19) | 0.6 (2) | 3.6 (20) | 0.3 (2) | 1.6 (18) | 0.3 (1) |
| | 100 (539) | 100 (726) | 100 (1099) | 100 (316) | 100 (555) | 100 (752) | 100 (1116) | 100 (333) |

($\chi^2$ = 574.35; significance = .00001) ($\chi^2$ = 563.73; significance = .00001)

Zero-order Gamma for Media Richness by Translation = .536.
Zero-order partial Gamma controlling for Sender-Receiver = .537.

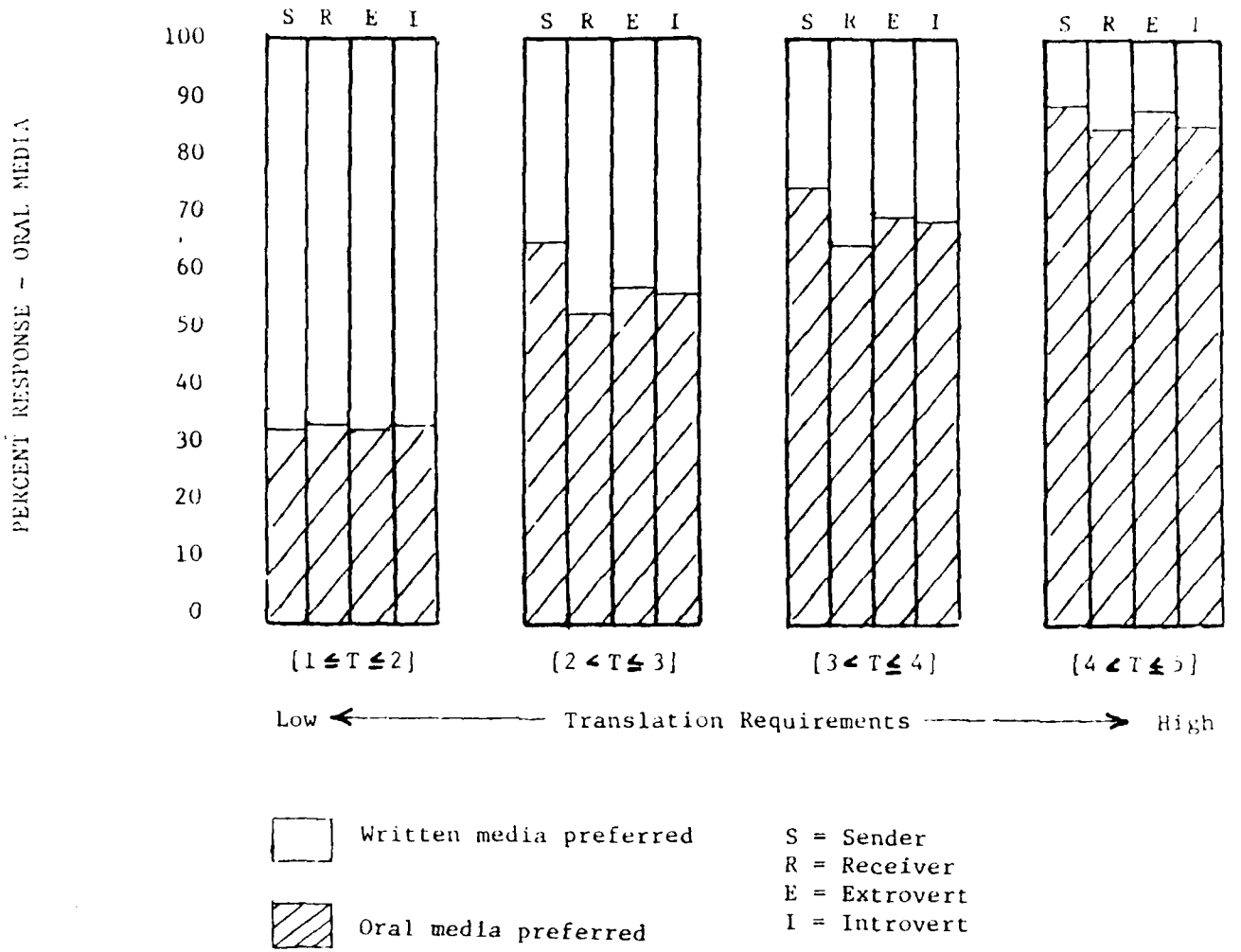


Figure 4. Summary of Translation Requirements and Oral versus Written Media Preference by Senders, Receivers, Extroverts and Introverts.

APPENDIX I

Sample of Communication Incidents
Derived from Critical Incidents

| The Purpose of the Communication was: | Translation Score Mean | S.D. |
|---|---|---|
| 1. To give your immediate subordinate a set of five cost figures that he requested last week. | 1.74 | 1.05 |
| 2. To present some confusing changes in the employee benefit package to 20 subordinates. | 4.00 | 1.02 |
| 3. To get an explanation or clarification of the conclusions in a statistical study done by an in-house consulting group. | 3.72 | 1.00 |
| 4. To convince your immediate superior that you need to increase your manpower to complete an important project on schedule. | 3.51 | 1.08 |
| 5. To find out if an immediate subordinate has been accurately reporting progress on a very important project. | 3.2 | 1.20 |
| 6. To give an easy-to-understand, routine assignment to an immediate subordinate who has an abrasive personality. | 2.25 | .96 |
| 7. To get basic information from your immediate superior that is needed to set up an itinerary for a two-day management meeting to be chaired by this superior. | 2.46 | 1.12 |
| 8. To direct a subordinate (two levels below you) to handle a routine problem with a cross-town client. | 2.25 | 1.02 |
| 9. To remind a subordinate (two levels below you) that she is scheduled to attend a meeting on Friday at 3:00 p.m. | 1.34 | .65 |
| 10. To notify an immediate subordinate that his request for a leave of absence has been approved. | 1.37 | .90 |
| 11. To notify five subordinates that you have to cancel a meeting with them tomorrow, but that you can make it at the same time the following day if they can. | 1.83 | .81 |
| 12. To delegate a routine paperwork chore to an immediate subordinate. | 1.48 | .50 |
| 13. To express your dissatisfaction with the way your office is being cleaned to the janitorial staff. | 2.60 | .80 |
| 14. To notify your 20 subordinates about a new staggered-hour working schedule going into effect at the end of the month. | 3.80 | .94 |

| | | Translation Score | |
|---|---|---|---|
| | | Mean | S.D. |
| 15. | To work out a personality problem occurring between your immediate subordinate and one of his subordinates. | 4.11 | .82 |
| 16. | To reprimand an immediate subordinate for missing a deadline on a minor project. | 2.80 | 1.12 |
| 17. | To give an easy-to-understand, routine assignment to an immediate subordinate who is a personal friend. | 1.50 | .70 |
| 18. | To remind a superior that she is scheduled to attend a meeting with your work group on Friday at 3:00 p.m. | 1.50 | .63 |
| 19. | To tell your subordinates that your firm has lost a major contract and that this could affect their employment status. | 4.20 | .82 |
| 20. | To get the opinion of a trusted peer about how to deal with an unusual problem you are facing. | 3.25 | 1.00 |
| 21. | To explain to a new, rather sensitive, employee that she mishandled a personnel conflict in her work group. | 4.20 | .90 |
| 22. | To work out a personality problem that has affected the working relationship between you and your boss. | 4.40 | .90 |
| 23. | To notify a subordinate (two levels below you) that he did not fill out an expense report properly. | 2.30 | .93<br>.93 |
| 24. | To persuade one of your peers to stay with your firm and to turn down an attractive job offer with another firm. | 3.44 | 1.14 |
| 25. | To reprimand an immediate subordinate for missing a deadline on a major project, thereby embarrassing you in front of your boss. | 3.23 | 1.10 |
| 26. | To ask a peer to give a talk in your place at a Rotary Club luncheon next week. | 2.90 | 1.02 |
| 27. | To reassure your subordinates that their job security is not threatened by the loss of a major contract. | 3.44 | 1.14 |
| 28. | To inform a trusted superior about the way you have chosen to handle an unusual situation. | 2.93 | .88 |
| 29. | To get an explanation from a subordinate, who is a personal friend, about what appears to be a "padded" expense report. | 3.70 | 1.08 |
| 30. | To work out the requirements for a new project with your boss. | 3.60 | 1.23 |

| | | Translation Score | |
|---|---|---|---|
| | | Mean | S.D. |
| 31. | To express your "official" appreciation to one of your immediate subordinates, who is leaving the company after ten years of loyal service. | 1.86 | 1.12 |
| 32. | To get clarification of an ambiguous directive from your boss. | 3.41 | 0.95 |
| 33. | To inform your 20 subordinates of the time and place of your work unit's annual Christmas party. | 1.30 | .50 |
| 34. | To let a new worker know that he is doing an excellent job and that you are pleased. | 2.16 | 1.09 |
| 35. | To get your boss's reaction to your request for a one-month leave of absence for "personal business." | 3.80 | 0.83 |
| 36. | To warn a "problem" subordinate that he better start showing up for work on time. | 3.21 | 1.24 |
| 37. | To explain to subordinates how important the project they are working on will be to their careers. | 3.41 | 0.98 |
| 38. | To request the presence of your boss at your work unit's Christmas party. | 1.60 | 0.80 |
| 39. | To get an idea of your boss's expectations for your group for the next six months. | 3.83 | 1.17 |
| 40. | To ask your subordinates for suggestions about the reorganization of work and responsibilities in your group. | 3.65 | 1.19 |
| 41. | To get an explanation from a subordinate, who is difficult to get along with, about what appears to be a "padded" expense report. | 3.95 | 0.92 |
| 42. | To work out confusing terminology used by a new subordinate reporting progress on a routine work assignment. | 3.67 | 0.77 |
| 43. | To get your boss's impression of an idea you had for handling customers' complaints in the future. | 3.11 | 0.90 |
| 44. | To explain a new, rather complicated policy change to a subordinate who will be singularly affected by it. | 3.95 | 0.95 |
| 45. | To remind an immediate subordinate about a task that should have been completed yesterday. | 2.02 | 0.93 |
| 46. | To get an explanation from a peer in another department of a complicated technical matter in which you have little formal training or experience. | 4.25 | 0.75 |

| | | Transaction Score | |
|---|---|---|---|
| | | Mean | S.D. |
| 47. | To warn a subordinate who is a former superior that he has taken action beyond the bounds of his authority and that he is no longer the boss. | 3.90 | 1.00 |
| 48. | To suggest to a new employee that she is not doing an adequate job and would be better off accepting a demotion to a less demanding position. The alternative is dismissal. | 4.41 | 0.73 |
| 49. | To get an explanation from a peer in another department of a complicated technical matter in which you have formal training and experience. | 2.90 | 0.83 |
| 50. | To warn a superior diplomatically that her arrogant and authoritative behavior is affecting the morale of your group. | 4.23 | 0.78 |
| 51. | To solicit suggestions from your subordinates for new ways to market or package an old product. | 2.86 | 1.03 |
| 52. | To work out confusing terminology used by an experienced subordinate reporting progress on a major, non-routine project. | 3.55 | 0.93 |
| 53. | To offer a recommendation to a peer for one of your friends, who is applying for a job in his group. | 2.71 | 1.00 |
| 54. | To direct your secretary to order twice as many note pads this month as she usually does. | 1.41 | 0.93 |
| 55. | To explain to your new secretary how you want your phone calls handled. | 2.41 | 1.00 |
| 56. | To express displeasure to your superior about the careless, error-filled reports you have been getting from a peer in another work group. | 3.58 | 0.80 |
| 57. | To let a peer know that, in your opinion, a woman he would like to hire will not be able to handle the job. | 3.35 | 0.90 |
| 58. | To notify an applicant for a position in your group that she will not be offered the job. | 2.65 | 1.20 |
| 59. | To notify your five subordinates that the plan they worked out for coordinating project assignments has been approved and will go into effect next month. | 1.83 | 1.02 |
| 60. | To let a new employee know that you are monitoring his performance and are pleased with his progress. | 2.16 | 1.17 |

APPENDIX II

MYERS-BRIGGS SHORT FORM

This exercise addresses various dimensions of your personality that might be related to your communication media preferences. There are no "right" or "wrong" answers to these questions. Circle the response which most accurately describes you. Do not think too long about any question.

Part A. Which answer comes closer to telling how you usually feel or act?

1. Are you usually
   a. a "good mixer", or
   b. rather quiet and reserved?

2. When you are with a group of people, would you usually rather
   a. join in the talk of the group, or
   b. talk with one person at a time?

3. In a large group, do you more often
   a. introduce others, or
   b. get introduced?

4. Do you tend to have
   a. deep friendships with a very few people, or
   b. broad friendships with many different people?

5. Among your friends, are you
   a. one of the last to hear what is going on, or
   b. full of news about everybody?

6. Do you
   a. talk easily to almost anyone for as long as you have to, or
   b. find a lot to say only to certain people or under certain conditions?

7. Can the new people you meet tell what you are interested in
   a. right away, or
   b. only after they really get to know you?

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