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SOURCES OF INFORMATION
FOR NEW ZEALAND KNOWLEDGE WORKERS

A thesis presented in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Business Studies at Massey University.

FRANCIS XAVIER SLIGO

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Sources of Information for New Zealand Knowledge Workers

ABSTRACT

Little is currently known about the ways in which knowledge workers in New Zealand organisations presently use and prefer to use both interpersonal and print sources of information. This study examined the sources employed by 318 knowledge workers in 17 organisations, comprising a mixture of private sector, public sector and quasi-governmental enterprises. Environmental and organisational, individual and source characteristics were explored in a review of the literature relevant to information sources, and a wide variety of disparate points of view were found among previous writers on the subject.

To accommodate the relatively undeveloped nature of the topic, an exploratory and descriptive study was designed in order to establish some basic findings. Research methods included cluster analysis and communication network analysis (in the pilot studies); assessment of source rankings, crosstabulations of status and sources, breakdown of education and print sources, correlation coefficients of status, education and sources, and discrepancy analysis of sources presently used and preferred.

Seven objectives were developed, which may be collapsed into five main topic areas: present and preferred use of information sources, and discrepancies arising; use by participants of interpersonal and print-based sources of information; use of sources which were internal and external to the organisation; the relationships between participants' status and source use; and the relationships between participants' education and source use.

Initially from the clustering process in the two pilot studies, and later from the ranking procedure across all organisations, it became evident that participants' status was a crucial factor in the present use of sources. Although distinct differences by status levels were found for present source use, preferred source use was almost entirely unrelated to status level. Overall, it appeared that as these knowledge workers moved up the hierarchy they tended to receive more information and record fewer discrepancies between information received and sought.

From the investigation of interpersonal and print sources, it was found that certain very accessible and internal interpersonal sources (coworkers, superior, subordinates and the grapevine) were most used, though two (also accessible and internal) print sources (memos and newsletters) were also frequently cited. Use of the grapevine seemed to be associated with lesser access to formal or officially sanctioned sources of information, but it was also found that participants tended to prefer to receive grapevine information only sometimes; if frequency of contact exceeded this, a negative discrepancy was likely to occur.

Few overt indications of information overload were found, but there was some evidence to suggest that the phenomenon of overload was more closely related to what staff felt able to handle rather than to what they would like to have had. There was also some evidence that external sources were contacted more by staff at the top and bottom of the organisation, than by the two middle levels. A complex pattern of correlations seemed to apply in respect of education and source use; relationships appeared to be emerging between education and external sources and the grapevine.

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CHAPTER 1

INTRODUCTION

"We need more reliable information on where and how organisations secure information: how that information is communicated through the organisation... What alternative sources of data exist and are used? What determines which sources of information will be used by organisations?" (Cyert and March, 1963, p.20).

Despite the fact that more than 20 years have elapsed since Cyert and March called for more and better research into this topic, in fact relatively few well agreed upon and substantive findings have emerged. Information sources still constitutes a topic about which little can be said with assurance, notwithstanding that practitioners in a variety of different disciplines (as will be seen in the Literature Review) have taken an interest in the subject of where their information comes from.

In their quotation above Cyert and March of course specify organisations as securing information, and organisations as using sources of information. In a sense this is a kind of metaphorical use of language, as, literally speaking, people rather than organisations secure information and use sources of information.

KNOWLEDGE WORKERS

To provide a suitable focus for the study, it was decided to specify "knowledge workers" as the people within the organisation whose source contact preferences would be explored. Knowledge or information workers are considered to be the primary consumers of information (rather than agricultural, production or service workers, for example); so a study designed with a view to explicating the functioning of information sources in modern, complex organisations, would seem to specify knowledge workers as its natural target.

Nevertheless, as the Literature Review will reveal, the roles and behaviour of knowledge workers in this regard have been studied relatively little elsewhere, and not at all in this country. Thus the data base upon which design of information supply systems to organisations may be founded is very incomplete, and is constructed more of conjecture, assumption and opinions than systematically researched evidence.

With this in mind, it seemed that the most urgent tasks for research in this area (certainly in the context of New Zealand organisations) were to provide a broad overview of source contact practice and preferences, and to attempt to define what appear to be the more important of the variables associated with source use.

KNOWLEDGE INDUSTRY

The term "knowledge industry" seems to have been coined by Machlup in 1962, and describes the work done in educational institutes, news media, publishing, R and D laboratories, all of which are primarily oriented to the production of information based goods and services. Paisley (1980) suggests:

" A present-day disciple of Frederick Taylor cannot concentrate on anything as simple as the flow of materials on a production line. The much more complex flow of information now determines the productivity of industry and even the vigor of science" (p. 118).

In 1976, Porat described how more than half of the U.S. national income and nearly half of the gross national product originated in the "production, processing and distribution of information goods and services."

Porat is often cited in discussion of information or knowledge workers; he defines an information worker as a person whose income originates primarily in the manipulation of symbols and information. This may be at a high intellectual level (such as the production of new knowledge) or at a more routine level (such as entering data into a computer) (Conway, 1981).

The management theorist Peter Drucker is also frequently quoted in discussions of knowledge workers; in his book The

Age of Discontinuity, for example, he stated that:

"Thirty years ago ...semiskilled machine operators, the men on the assembly line, were the centre of the American workforce. Today the centre is the knowledge worker, the man or woman who applies to productive work ideas, concepts and information rather than manual skill or brawn" (1969, p. 322).

As well as "knowledge workers" proper (people in education, publishing, media etc.), workers in probably the great majority of other occupations are becoming increasingly more dependent on information to do their jobs. As technology becomes more sophisticated, and as social and economic demands on organisations become more complex, printed instructions, regulations, specifications, etc., become essential in organisational functioning. Various studies of workers in a variety of jobs suggest that they spend typically between half and two thirds of their time dealing with information (Chapanis, 1971, p. 952).

Once it was relatively easy to distinguish between agricultural, production, service and (more latterly) information workers, thereby to trace changes in the percentages of national workforces, and predict trends for the future.

A major implication of the findings of Chapanis and others is that the former distinctions among production, service and information workers are disappearing; it may be said that most workers are now "information" or "knowledge" workers to some extent.

Thus problems emerge when particular occupations are assessed in terms of whether they primarily concern information handling, or something else, such as service. Specifics of this are discussed further in Chapter 3, Research Methodology. In exploring the question of who is and who is not an information or knowledge worker, Porat proposed that:

"Stating precisely who is an information worker and who is not is a risky proposition. Obviously every human endeavour involves some measure of information processing and cognition... We are trying to get at (the) question: Which occupations are primarily engaged in the production, processing or distribution of information as the output, and which occupations perform information processing tasks as activities ancillary to the primary function?" (Conway, 1981, p.3).

The focus of the present study is on workers who have information handling, or "adding value" to information, as a dominant part of their work. The organisations represented in the survey include some instances of "traditional"

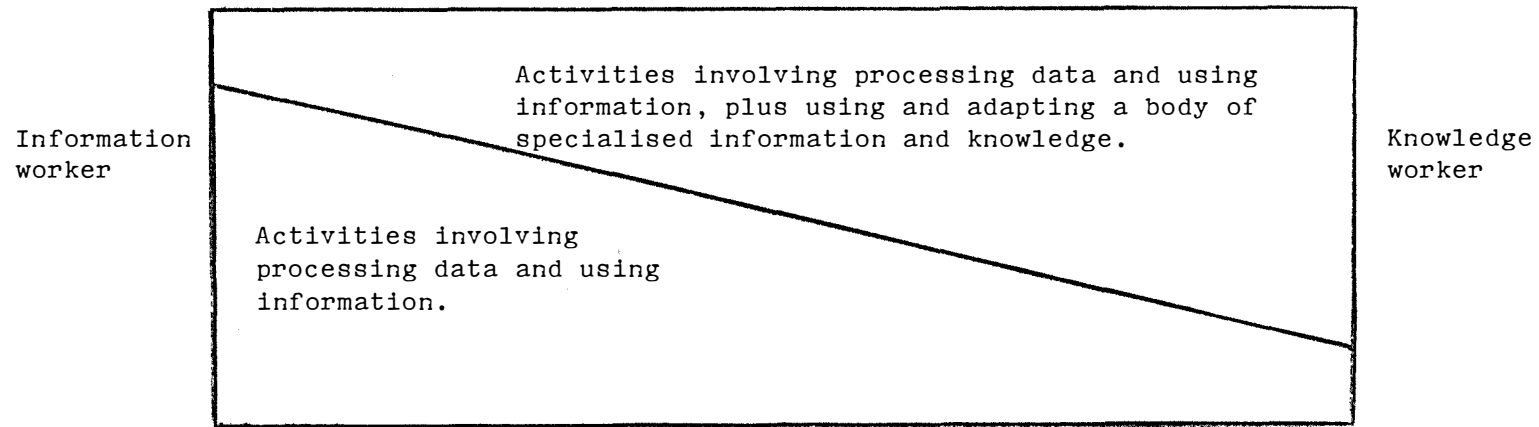
information work (education, news media), but it is estimated that in all cases participants spend at least half and typically much more of their time in information activities.

"Knowledge worker" needs to be defined both conceptually and operationally at this point.

Conceptual definition: The terms "knowledge worker" and "information worker" may for most purposes be regarded as synonymous. A strict examination of concepts might suggest that a knowledge worker will have qualifications or specialist ability not attained by the information worker. The primary tasks of the information worker may be relatively more oriented to the processing of data, whereas the knowledge worker may be more oriented to adding value to data for the benefits of clients etc.

While in practice it seems not possible to draw absolute distinctions between the knowledge and information worker, Fig.A may help to clarify the differences between the two. Nevertheless for the purposes of a study such as this one it seems desirable to link both together.

Fig.A INFORMATION AND KNOWLEDGE WORKERS



Examples

Programmer

Examples

Systems analyst

Straightforward legal conveyancing

Legal advisory work

Basic accounting or bookkeeping

Accounting or financial
advisory work

Clerk

Manager

Processing data

Adding value to information

Operational definition: For the purpose of the present study, knowledge workers will be regarded as people whose work activities are concerned at least 50% of the time, (and probably much more than this) with handling information. By handling information is meant inputting data (as in computer data entry), receiving, selecting and summarising information (as in interviewing a client), feeding back information to clients (offering advice on financial or other matters), and the range of other information activities. The occupations involved in the study include some traditional information occupations (eg. education and mass media) but are mainly from outside that ambit.

Attempting next to put source use in context, Whittmore and Yovits (1973) may be paraphrased along these lines:

The knowledge worker first

1. Acquires knowledge, by means of contact with a certain number of information sources, then
2. Processes that information: this calls for the person to mentally organise information received, then match it in its transformed state with the perceived information needs of the organisation, then
3. Disseminates that information, either by making himself

or herself available to others or actively approaching them.

The manner in which knowledge workers acquire information by means of contact with information sources will be the principal subject of this research. The dissemination of information will also be explored to some extent, as the research assesses the nature of interpersonal contact within organisations in its exploration of the information sources in use.

Sources of Information

In this section the sources of information on which the research will focus are defined. In chapter 5 (Discussion of Results: Introduction) these definitions will be reassessed in the light of what was found in the course of the research.

1. Subordinates

By subordinates is meant those people who report to the respondent either directly or through an intermediate supervisor. It is anticipated, however, that most subordinates will report directly to the respondent, and also that the reporting relationship will be direct, in a line rather than staff relationship.

2. Coworkers

This term means the group of people with whom one interacts most on the job. It implies that they are mainly, but not exclusively, on the same or a very similar organisational level as oneself, and primarily in the same department or unit. In some instances, however, the category coworkers might also include individuals on higher or lower organisational rankings, and in departments other than one's own. Also, some overlap is possible between coworkers and the categories of immediate superior and subordinates. The means of communication will be spoken, not written or print.

3. People in Other Units

These may be individuals on any organisational level, but it is assumed that they do not comprise top management, who rather than being in "other units", are normally in a line relationship "above" the respondent in the organisational hierarchy.

4. Immediate Superior

It is expected that this term should not be a source of difficulty to most participants in the research. Possibly there may be some ambiguity about the term for individuals whose organisations feature a "matrix" or partial matrix form of structure. The proportion of "knowledge industry" organisations in New Zealand employing such structures is not known, but in any event it seems unlikely that the great majority of knowledge workers will have any difficulty with this term.

5. Department or Unit Meetings

The main focus of this term is regular meetings including (usually) all staff. To a lesser extent the term includes occasional or ad hoc gatherings perhaps involving a subsection of department staff. This is especially the case where a department has no regular meeting schedule, and ad hoc gatherings comprise the only form of meetings. In instances where organisations do have regular meetings of the entire department group, these are the primary concern of this source.

6. Top Management

This term is intended to include the people who define themselves as at or very near the top of their organisation. There may be some overlap with middle management, the next level down, but such overlap is unlikely to be very great.

7. The Grapevine

This term is defined as "informal word of mouth communication inside the organisation." Given that such communication is carried by people such as coworkers, subordinates, superior, and so on, and given that these people already comprise separate sources, the source grapevine overlaps with all of them. Nevertheless, it is felt that the grapevine as a source of information is sufficiently distinctive, is of considerable interest to researchers in this area, and generally is so much a part of organisational communication research as to require separate

inclusion.

8. Contacts Outside The Organisation

By this term is meant people outside the organisation who are reasonably well known to participants, and who comprise probably, moderately regular sources of information.

9. Seminars, Courses or Workshops

Within this source is included a fairly wide range of educational and training events. What they have in common is that they tend to be quite structured means of transferring information, and this formal character is one of the features which distinguish them from meetings, the only other "group" interpersonal information source.

10. Memos From Within The Organisation

This source focusses on personalised, written messages coming from inside the organisation. Memos carry messages in-house, while letters are sourced mainly from outside the organisation. At times there may be overlaps: large organisations with branches in different locations sometimes communicate internally by both letter and memo, depending on the means used to transport the message.

It appears very desirable to have separate categories for messages of this nature from within and outside the organisation, based on the assumption that there may well be important differences in the use of internal as opposed to external sources.

11. Letters From Outside The Organisation

This is the second external source included so far, and there are two purposes in including it. Firstly, the intention is to discover how respondents rate it in comparison with the other principal external source (personal contacts outside the organisation). Secondly, comparisons will be drawn between participants' use of this source and their use of the comparable internal source, memos from within the organisation.

12. In-House Newsletters

While this source is similar to memos insofar as it is an internal source, it is much less personal, being intended as information for the entire staff. In-house newsletters are normally intended as means of acquainting staff with new company developments, staff arrivals and transfers, and (it is often hoped) as a way of helping staff develop a sense of corporate pride and team loyalty.

13. Organisational Records

A variety of filing systems etc. are included in this category: correspondence files of various kinds, card files, specifications for production design, order sheet files, client files and others.

14. Books etc. Not In An Organised Library

15. Journals etc. Not In An Organised Library

16. Organised Library Facilities

By means of this group of sources (Nos.14-16) it is intended to discover how participants regard books, journals, magazines, etc. held in unorganised and organised collections respectively. Unorganised and organised collections tend to have different strengths and weaknesses. The former will normally be close at hand, very specialised in respect of the work people do and familiar to their users. They may also be out of date and too limited in their scope. Examples are bench manuals, books of instructions, technical data compilations, perhaps in loose-leaf folders, trade or technical journals.

Strengths of organised collections are that they are systematically organised, broad in their scope and relatively up to date. However, they are likely to be less accessible, possibly so large as to be daunting and difficult to use. Although organised library facilities implies mainly in-house libraries, some respondents will be users of other collections such as public or professional association libraries.

A differentiation was made between books and journals in order to find out if there were differences in people's attitudes towards these different ways of presenting information. The major differences between books and journals are that books are more complete, thorough, and sum up the state of knowledge at a point in time; journals are

more up to date, more specialised and generally are a source of the latest information available.

17. Government Documents.

These are considered a sufficiently important source for knowledge workers to justify a separate inclusion in the survey. Traditionally government documents (statutes, statutory regulations, bills, white papers, gazettes etc.) are heavily used by lawyers, accountants and many categories of civil servants.

18. Computer-Based Information Retrieval Systems (CBIRS)

The trend towards computerisation of information sources over the past two decades has been sufficiently large to warrant inclusion of such i.r. systems as a separate source.

19. News Media

Newspapers, radio and television are the principal media within this source.

Internal and External Sources

The above sources can be classified as "internal" (to the organisation concerned), "external", or both. During the course of this research reference is made to internal and external sources: some sources fall clearly into one or another category; others share elements of both.

Internal Sources

Subordinates

Coworkers

People From Other Units

Immediate Superior

Department Meetings

Top Management

The Grapevine

Memos From Inside The Organisation

In-House Newsletters

Organisational Records

External Sources

Personal Contacts Outside The Organisation

Letters From Outside The Organisation

News Media

Sources Which May Be Internal or External

Seminars, Courses, Workshops

Books Not In An Organised Library

Journals Not In An Organised Library

Organised Library Facilities

Government Documents

Computer-Based Information Retrieval Systems

Descriptive Model of Information Sources

Once the sources of information had been defined to this extent, it was decided to conduct a preliminary review of the literature of information source use. Initial findings from this review seemed useful enough as an overview of the topic to warrant publication and two articles subsequently

appeared (Sligo, 1982a, Sligo 1982b) which explored aspects of source use, with specific reference to the implications for library services.

The Literature Review deals in some depth with all the major issues raised in these two articles, but in summary, the key points were that:

Customers and vendors were highly used; print sources were little used (Allen, 1965)

Interpersonal contacts are crucial (Mintzberg, 1978)

Greatly increased availability of data does not necessarily imply better access to information (Rogers and Agarwala-Rogers, 1976)

Now, more than ever, information is power (Bennis, 1976)

Print sources are seen as a cause of information overload (Goldhaber, 1979)

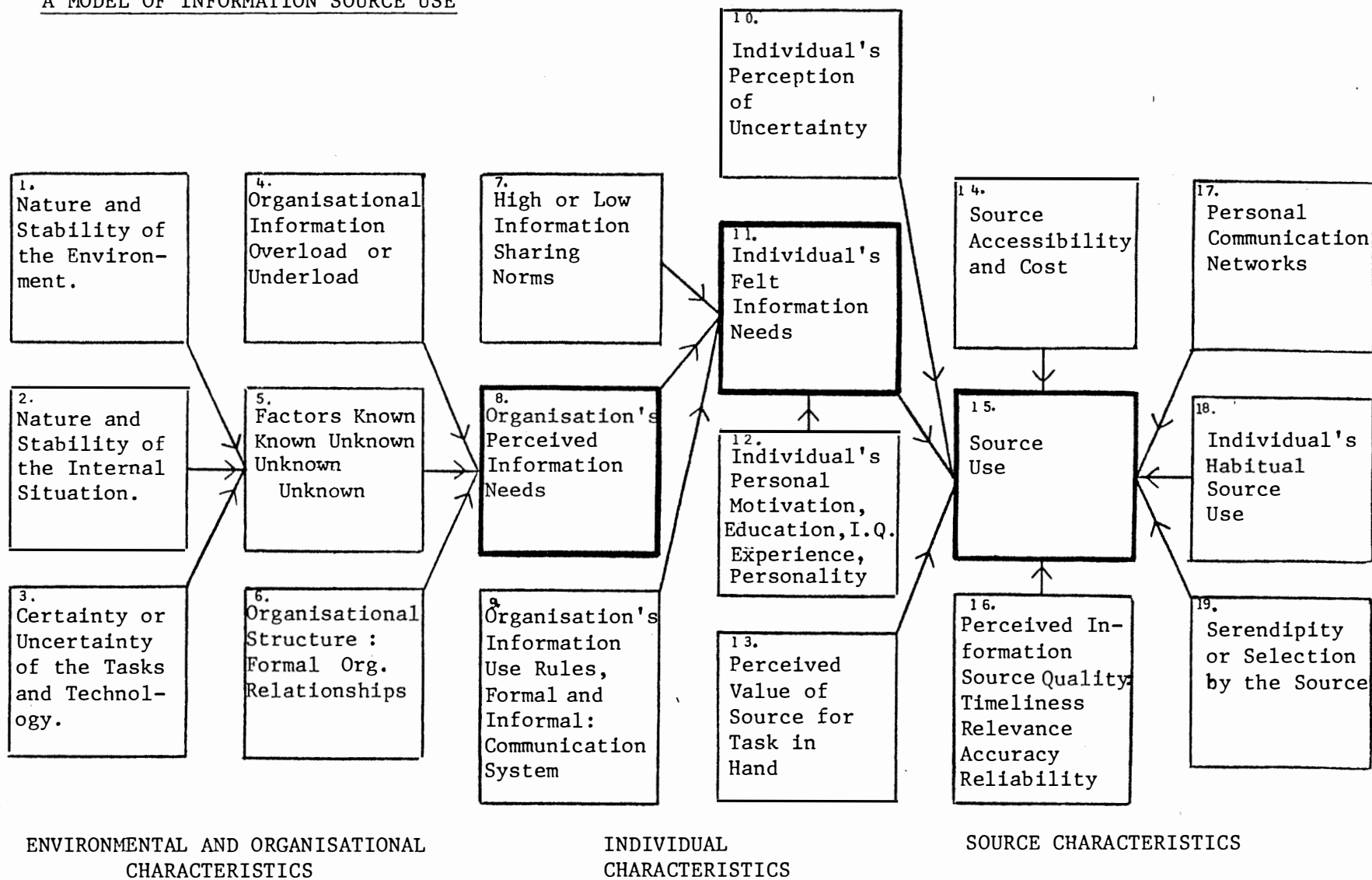
Managers attempt to develop their network of interpersonal contacts in the "organisational intelligence" process (Wilensky, 1967)

Information-gathering does not seem to be systematically done (Keegan, 1974).

On the basis of these and other issues the writer decided it was desirable to construct a descriptive model of information source use which would serve to draw together what appeared, from this preliminary exploration of the literature, to be the major variables of importance. This appears below as Figure B, A Model of Information Source Use.

Fig.B

A MODEL OF INFORMATION SOURCE USE



This figure depicts what the writer at that stage understood to be the most important of the elements affecting source use, and as can be seen, some 19 elements are postulated, 18 of which lead directly or indirectly to the factor of source use.

The purposes in developing this model were firstly, to try to bring the scope of the topic of information sources down to a manageable size, and thereby reduce the complexity of it. Secondly, it was seen as necessary to do justice to the breadth of the topic - numerous variables were seen as potentially important and hence the model had to be reasonably comprehensive in recognition of this.

There are three parts to the model:

1. Environmental and organisational characteristics
2. Individual characteristics
3. Source characteristics

reflecting the span of influences that affect source use.

Environmental and organisational characteristics are shown as at several removes from cell 15, source use, attempting to demonstrate how such influences are usually mediated through individuals. (Or put another way, even though commentators such as Cyert and March in their quotation above say that organisations use information, in fact it is the individuals operating within the organisations who use

information.) These characteristics include the factors in cells 1-9.

Cells 1-3 concern the environment external to the firm, the situation internal to it, and the nature of the tasks performed by knowledge workers and the information and other technology they employ. The elements in these three cells were seen as combining to influence what people in the organisation see as "factors known, known unknown, and unknown unknown". The dimensions of this expression are explained in the Literature Review, but briefly, it refers to what people do know about their work circumstances, what they are aware they do not know, and what they are unaware of not knowing.

This then leads directly to the major element, in cell 8, of the organisation's perceived information needs. As mentioned at the start of the chapter, essentially this is metaphorical language, and more specifically, cell 8 points to cell 11, which is the individual's felt information needs, which in turn links to the central concept in the model, cell 15, source use.

It will be observed that cells 8, 11 and 15 are highlighted by heavy boundary lines to signal that they are seen as the basis of the model's structure, with most of the other factors feeding into them.

Other elements leading to cell 8, organisation's perceived

information needs, include load (in cell 4) and particularly under and overload. Aspects of load are discussed in Chapter 2. Organisational structure is seen as important (cell 6), and it also has a formative influence on the organisation's perceived information needs.

The elements discussed so far are not considered necessarily to include all organisational variables of importance to the topic, but should comprise all such variables of greatest significance.

Individuals' Source Use

Nearer the centre of the model the factors are starting to be more specific, and are beginning to reflect the matters of importance in individuals' source use. Cells 7 and 9 contain factors which may be said to be "midway" between the organisation and the individual, or rather, are of relevance to both. Information sharing norms, in cell 7, exist inasmuch as they are perceived by individuals and by groups, and such norms then have an effect on the extent to which people wish to receive information.

A set of complex elements is included in cell 9, and they centre around both the specified and the unspoken "rules" that organisations have to govern who has rights of access to what information. Such rules may be in part determined by formal, written, organisational policies, but more typically are created by an unspoken but common understanding as to who should normally receive which pieces

of information. In turn these also help to shape the individual's felt information needs.

From cell 10 onwards the true individual characteristics are shown, and uncertainty (which will be discussed extensively in Chapter 5) is proposed as having a direct influence on source use. In cell 12 there is a cluster of personal attributes including motivation, education, experience and others; status level could also be worked in here. It will be noted that these attributes are shown as affecting cell 11, individual's felt information needs (and thereby indirectly source use), rather than in a direct relationship with source use.

The influence of the task in hand makes its second appearance in the model in cell 13; it had earlier appeared in a more generalised form in cell 3. Here in cell 13 task is considered in terms of its most immediate influence on source use, and aspects of task are discussed further in Chapter 2.

Characteristics of Sources

Having noted some primary aspects of environmental, organisational and individual characteristics, now characteristics of the source are examined. In cells 14-19 an attempt is made to specify the aspects of information sources which appear to have greatest effect on their use. In cell 14 accessibility and "cost" are specified; both of these are discussed in the following chapter, but suffice to

say here that cost includes not only cost in an economic sense, but more particularly in a psychological sense, whereby people may feel reluctance to use a given source (often another person) because doing so may result in a perceived lowering of status for the enquirer.

Quality of the source appears in cell 16; quality, as will be discussed in Chapter 2, may be seen in various different ways, but here the sub-elements of timeliness, relevance, accuracy and reliability are specified as the essential preconditions to quality. Often when distortion of information is discussed, what is meant is that the quality of the information is perceived to be suffering; perhaps accuracy is lacking or the reliability of the person giving the information is in question.

Cells 17 and 18 contain elements which are characteristics of both sources and of individuals who use them. (Also, the discussion is complicated to some degree by the fact that "sources" and "individuals" are to an extent interchangeable: in any two-person interaction, for example, both individuals may be simultaneously seekers of information and sources of information.)

Personal communication networks are placed in cell 17; these refer to the patterns of communication links among organisational members. Networks are considered to have an influence on their members' use of sources, and this is discussed further from both theoretical and applied

perspectives in Chapters 2 and 5.

The individual's habitual source use rates mention in cell 18. People usually display patterns of preferences for source use, feeling more comfortable with some as opposed to other sources. Possibly interpersonal sources will be favoured over print ones by some individuals, or print over interpersonal, or internal over external by others.

Lastly, the role of fortuitous chance or "selection by the source" was listed in cell 19. It was decided to put this in as a counterweight to the assumption apparently endemic to discussions of source use, that the enquirer always takes an active role in the process, and that source use should normally therefore be regarded as resulting from the enquirer's decision to use or not.

It seemed to this writer that undoubtedly source use often does occur from the conscious preference of the user, but it also seems to be necessary to take into account the possibility of chance acquisition of information from unplanned circumstances.

In these ways the model attempts to recognise the existence of multiple factors grouped into the three broad categories of environmental and organisational, individual and source characteristics. The heart of the model comprises the three factors of the organisation's information needs, the individual's information needs and source use (cells 8, 11

and 15).

Although at this stage it was still too soon to determine the precise direction of the study, it was soon enough to specify that the nature of sources presently used would have to be investigated (cell 15), that people's preferred sources of information should be explored (cell 11), and by this means a picture would be developed of the organisation's perceived information needs (cell 8). Further, from a comparison of cells 11 and 15 it seemed very desirable to include an examination of possible discrepancies between sources used presently and sources preferred.

Methodological Approaches

So if an exploration of sources used presently, sources preferred and discrepancies arising was to be the main interest of the study, the next consideration was how to measure such use. The writer was interested in what people perceived to be their current source use, and preferred use, so what essentially would be an attitudinal approach seemed to be acceptable; that is, the research would ask participants what they perceived to be their present and preferred use of sources rather than attempts being made to observe directly what sources they did in fact use. Also, in respect of sources preferred, there was thought to be no option than to take an attitudinal approach, since there seemed no "objective" means of discovering this. And further, numerous methodological difficulties would have

surrounded attempts to directly observe the sources knowledge workers used in "reality".

It was also considered possible that in this instance measures of perceived use might actually be more accurate than more objective measures of "actual" use (such as participant observation, for example). That is because in many instances, it would be difficult if not impossible for an observer viewing an interaction between a participant and his or her coworker, superior, subordinate, etc, to say whether the participant was contacting an information source at that point, or whether some other kind of interaction was taking place.

Thus for these reasons it was thought to obtain the most reliable results probably an approach along the lines of "what happens now?" (actual use) and "what would you like to happen?" (preferred use) would be employed.

The next decision was what measure of information would be employed. "Information" is of course a very nebulous and complex concept, subject to a variety of different definitions (the definition employed in this study is specified below). Eventually the choice came down to two main possibilities: quantity of information (" how much information do you get from your supervisor?") or frequency of information contact (" how often do you obtain information from your supervisor?").

Ultimately it was decided to employ a measure of frequency (how often) in preference to a measure of quantity (how much). Basically it was felt that frequency could be more reliably and more accurately assessed than quantity, that respondents would find it easier to specify how often they came into contact with a source than they would to specify how "much" information they obtained from a source. There are, after all, no generally agreed-upon measures of information quantity; whereas data may be measured in terms of bits and bytes, information resists such quantification.

At this point in the discussion it seems appropriate to define some key terms more precisely, and the definitions to be followed in this study are as follows:

Data: Separate units of potential information, not yet assigned meaning by a human recipient.

Information: A patterned flow of data, to which meaning has to a greater or lesser extent been assigned by a human recipient.

Communication: Communication occurs when two or more people assign the same or similar meaning to a message.

Communication is a difficult concept to define; Dance (1970) for example, cited 15 different definitions of communication after reviewing the literature of communication, but the above should be sufficient for the purposes of this study.

Methodological Approach For Complex Organisations

In terms of an appropriate approach to the issues involved, Daft and Wiginton (1979) argue (see Chapter 2) that in every study it is very desirable to suit the research approach to the particular topic of investigation. A simple problem may be accommodated by simple methods, whereas a complex problem will probably require complex methods of investigation. The authors propose the following as research appropriate to complex organisational processes:

- "(1) It would focus on general patterns rather than on specific details.
- (2) It would rely on some type of human observation of the system, and human thought processes would be used to form the observations into a model of the system.
- (3) Many potential explanatory variables would be left unmeasured.
- (4) Imprecision would characterise measured variables and relationships among measured variables.
- (5) The research process would rely heavily on language of high variety rather than on mathematics or statistics" (p.186).

At this stage it is considered desirable that the approach

of the present research should be generally in accordance with this model. General patterns of source contact are being sought (1); human observation (self report and interview) is used (2); it is accepted that not every potentially explanatory variable can be included (3); at the present state of knowledge within the field some of the definitions of sources lack exact precision (4); and although the analysis will rely on statistical processes the interpretation will need to employ "high variety" language (5).

Aims of the Study

The major aim of the research is to engage in an exploratory, descriptive analysis of the sources of information in use among New Zealand knowledge workers. Within this overall objective are included assessments of interpersonal and print source use, external and internal source use, and an exploration of the relationships among status, education and source use. These aims are discussed in more detail in Chapter 3.

The other significant intention is to assess or devise suitable means of analysing the data obtained. Given that the field presently is not well defined, it was considered that one of the tasks of this study should be to experiment with different ways of making best use of the data obtained.

CHAPTER 2

LITERATURE REVIEW

"(The field of) acquiring and generating new knowledge... is one of the great uncharted areas of management and human behavior" (Zand, 1981, p.11.)

Introduction

In Chapter 1 the topics of knowledge workers and information sources were introduced and defined, and a preliminary statement of the intent of this research was made. The purpose of this chapter is to focus most particularly on information sources, and in so doing to explore all the major ways in which the topic of information sources has been addressed in the various literatures of management and organisational studies.

In reviewing the literature it became evident that the subject of information sources has not been seen in a unitary fashion by other writers but rather has been touched upon from many different perspectives in a wide variety of sub-areas of management research. Therefore to do the topic justice it was decided that as many as possible of the relevant references to information sources would be reviewed here.

This chapter falls into several major sections. In the first section a collection of topics indirectly relevant to information sources is briefly assessed (they include channels of communication, information environment and information overload). Next several topics of major relevance to information sources are explored in more depth, and these topics are internal and external sources of information, communication networks, oral and written sources, information searching processes, source research proper and communication audits.

THORNGATE'S MODEL

One of the problems encountered by the researcher when surveying the literature relevant to the field of information sources was summed up by Thorngate (1976), who suggested that a theory of social behaviour cannot be simultaneously accurate, simple and general. Often any two of these may be present in a model of organisational or social functioning, but never all three.

The studies reviewed in this section usually were found to be in accordance with this model. Studies of more scholarly intent tended to feature accuracy and one of the other factors; others of a practical orientation tended to prefer simplicity as their primary factor.

A similar principle was earlier enunciated by Zadeh (1973) who proposed that as the complexity of a system increases,

our ability to make precise yet significant statements about its behaviour diminishes. At a certain point precision and relevance are virtually, mutually exclusive. Thus it is argued that significant statements about complex organisational systems must necessarily contain imprecise and ambiguous aspects.

Information sources as a topic of research are currently poorly defined; it is not yet agreed upon what elements should be regarded as central to an exhaustive theory of information sources, nor is it clear how or where the boundaries in the field should be set.

This is at least partially due to the fact that numerous different disciplines take an interest in the question of where their practitioners obtain their information from; thus there is an enormous variety of methodological approaches to the tracing of information sources and (more importantly), a similar variety of epistemological underpinnings for this research.

This state of affairs however is not unusual in social science or management research areas, investigating as they do topics of considerable complexity. Three decades ago Boulding (1956) proposed a nine step model of system complexity, locating organisations at step eight, concluding that organisations are among the most complex systems imaginable, in fact approaching unknowable complexity. Some of the implications of this are discussed in Chapter 3,

Research Methodology.

In a very creative discussion piece, Daft and Wiginton (1979) argued that since organisational functioning is at such a complex level, the language and research methods which describe and investigate it must also operate at commensurate levels of complexity and abstraction in order to do the topic justice. More particularly, they argue that:

"If organizational models are too simple, or the language appears to be too precise, then meaningful statements about organizational functioning appear unlikely" (p.185).

Along similar lines, Argyris (1972) suggested that statistical studies tend to skim over the complex internal processes of organisations. Researchers employ easily quantified "surface" variables, and hence fail to test the underlying causal explanations for organisational relationships.

The intention of this reviewer is to explore writings relevant to information sources from a number of different literatures, both of a scholarly and of a more practical orientation, in the hope that the breadth of the review will at least to some extent do justice to the manifold nature of the use of information sources.

Although information sources are of interest to a variety of disciplines, typically research into them tends not to be very extensive or of long duration, often being more of an off-shoot of other research than a primary focus in its own right (eg. Porcano, 1981, Donohew, Tipton and Haney, 1978, Taylor, 1975). Probably information sources have been most thoroughly investigated in the context of research and development laboratories (eg. Gerstberger and Allen, 1968, Ackhoff and Halbert, 1958, Fischer, 1980) but given the specialised nature of the work of R and D scientists it is problematic to what extent findings from this field can be extrapolated to the situation of New Zealand knowledge workers.

Nevertheless, given the relative dearth of information source studies in conventional organisational contexts, the most prominent of the R and D literature will be assessed in this review, and the implications for non R and D environments will be evaluated.

CHANNELS AND SOURCES

Although there is relatively little research into sources of information in organisational settings considerably more attention has been paid to channels of communication - though perhaps to less effect.

One complicating factor is that the terms source and channel have often in the past been used interchangeably, since the field is lacking in well agreed definitions of

terms. However more exact usage would probably require that source be seen as the ultimate place from which information comes, and channel be seen as the method or means whereby such information is transmitted. Thus in interpersonal communication the person is the source, but the voice and body language are the channels. Such a demarcation may break down; the grapevine, for example, could be regarded as either a channel or a source, or both. Wofford et al suggest that:

"In essence the communication channel is any medium which couples the source to receiver" (p.31).

This appears straightforward, but unfortunately in the literature of organisational communication there are at least two distinct ways in which "channel" can be used. Examples are given below.

Huseman et al (1976) commented on the existence of information-sharing norms in terms of channels:

"Research shows that the use of interpersonal channels of communication will be directly related to the perceived strength of such information-sharing norms" (p.125).

(In this instance source could be (and perhaps should be) substituted for channel.)

Harriman (1974) pointed out that since different people and groups have different communication needs, and since these shift as circumstances change, only a multipurpose communications system can provide channels covering the entire company. Earlier, Asseal (1969) reported on the means by which companies within the automobile distribution system developed internal mechanisms for conflict resolution by improving channels of communication; this enabled managers to obtain access to important sources of information as needed.

It seems to this reviewer that Asseal's and Harriman's use of the term channel is correct, and relatively unambiguous, while that of Huseman et al. effectively blurs the terminology. Asseal and Harriman's use is synonymous with means of communication whereas that of Huseman et al. may mean either channels or sources.

The voluminous literature of organisational and business communication gives numerous examples of each kind of usage - every communication textbook discusses channels of communication - and frequently the meaning is blurred, as in the latter example.

In this review, literature on communication channels has not been included when the intention of the writer was clearly to discuss means of communication, but attempts have been made to refer to discussions on channels where it seemed that sources were the primary focus.

ACCESSIBILITY

T J Allen (1966a,1968,1977) has published extensively on the importance of accessibility as a predictor of which information sources will be selected. Allen suggests that scientists tend to use channels which are more accessible or easier to use rather than ones which are highly regarded in terms of their technical quality.

There is some opposing evidence, such as that of Walsh and Baker (1972) or Pruthi and Nagpaul (1978), which proposes that the task structure is likely to override the factor of accessibility. Nevertheless Allen's findings have become firmly established in the literature of scientific information-getting, and in recent times investigations have been mounted into the applicability of his findings to organisational, non-scientific knowledge worker settings (eg. O'Reilly 1982).

Maltha (1977) supported Allen's findings in a review of agricultural information getting. He considered that accessibility is a key factor in determining the use made of an information source and that a user's ability to employ and even be aware of an information source is often imperfect.

Collins and Guetzkow (1964) found that messages tend to be directed towards (a) persons in close proximity (b) persons in the same work group and (c) persons of the same

socioeconomic status. In line with this, Miller (1972) suggested that:

"In general the farther components of a system are from one another and the longer the channels between them are, the less is the rate of information flow among them".

In a related argument, March and Simon (1958) proposed that:

"Channel usage tends to be self-reinforcing... informal communication, much of it social in character, develops side by side with task oriented formal communication, and the use of the channel for either kind of communication tends to reinforce its use for the other" (pp.167,168).

Further evidence on the influence of accessibility is available from studies of library use. Mooers (1960) argued that an information system will not be used when a customer perceives that it will be more troublesome to get the information than to go without it. In his recent study of use of an industrial library, Mason (1978) confirmed Mooers's perception, and noted that a similar law of least effort seemed to apply: there was a sharp drop off in usage of the facility by people situated more than 75 yards distant.

Accessibility also has to do with whether one's superior is

seen to be "accessible", either in physical or psychological terms:

"If the subordinates perceive the communication from the superior as generally positive, they would be encouraged to exchange a great deal of information about task related matters" (Jain, 1973).

A very useful and relevant consideration was aired by Gerstberger and Allen (1968) in their study of research and development engineers' information sources. It was found that engineers, in selecting from among their information sources, act in a way which is intended not to maximise gain, but rather to minimise loss. The loss to be minimised is the cost in terms of effort, either physical or psychological, which must be expended in order to gain access to an information source.

Gerstberger and Allen derived certain specific conclusions from their research:

1. Accessibility appears to be the single most important determinant of the extent to which a source is used.
2. Both accessibility and perceived quality affect the choice of first source.
3. Perceptions of accessibility are influenced by experience. The more experience an engineer has with a

source, the more accessible he perceives it to be.

A topic closely related to accessibility is frequency of use. Ference (1970) proposed that:

"Information defined as required by the nature of the problem is more likely to be sought from frequently used sources than from infrequently used sources" and further, "Information available from frequently used sources is more likely to be defined as required than that from infrequently used sources" (p.75).

In the context of information sharing, Pfeffer and Salancik (1977) examined the effects on administrators of having to use ambiguous information, and argued that because of this ambiguity, and because of various work pressures, accessibility of information may be more important than quality in determining source choice.

In a classic study of how doctors obtain information about new drugs, Menzel and Katz (1955) found that they often learned about innovations not from "high quality" sources such as medical journals, but from more accessible sources such as pharmaceutical representatives.

In his study of social welfare officers, O'Reilly examined the relationships among perceived quality and accessibility in terms of use of the sources of files, updates, internal group sources and external sources of information. He found

that quality was important in the use of files and internal group sources, but accessibility appears to have the stronger influence in use of files, updates, and external sources.

<u>Correlations:</u>	<u>Frequency of Use of Information</u>			
	<u>Files</u>	<u>Updates</u>	<u>Internal Group</u>	<u>External</u>
Quality	0.26***	0.9	0.49***	0.23**
Accessibility	0.32***	0.21**	0.36***	0.25***

** p<0.01

*** p<0.001

(Adapted from O'Reilly, 1982, p.764).

Reasons why accessibility may be more important than quality have been suggested by Blau (1964), O'Reilly and Anderson (1979) Katz and Tushman (1979), McCleary (1977) and Pfeffer (1981). Blau proposed that someone who is frequently asked for information increases in social stature: even though a given person may possess high quality information, the "cost" of approaching him or her may be too high (a relative reduction in standing for the person making the request) so requests may instead be directed to other individuals who are nearby but who may not have equally high quality information.

O'Reilly and Anderson suggest that the structure of the organisation may reduce access to quality sources, or as McCleary reported, knowledge workers may be forbidden to use particular sources. Katz and Tushman found that R and D workers were sometimes aware of where high-quality information could be found, but were unable to obtain it.

COMMUNICATION OR INFORMATION GAPS

Up to this point little attention has been paid to the substantial body of research in the literature of mass communication. Many of the ideas and assumptions in this body of work are difficult to transpose to the very specialised world of organisational communication, but this is not the case with the concept of information gaps. Also known as "knowledge gaps" (eg. Donohue, Tichenor and Olien, 1975, Ettema and Kline, 1977, or "communication gaps", Galloway, 1977), by this term is meant the phenomenon whereby an increased flow of information will often be observed to increase knowledge within certain subgroups much more than in others; the effect therefore of information gaps is to increase the distance between subgroups in terms of people's understanding or awareness of a given topic.

The term stands in close relationship to other concepts discussed in this review: for example information poor and information rich people respectively would and would not suffer the effects of an information gap, and one's information potential will be reduced by the presence of such a gap.

One of the key ideas in the literature on information gaps is that availability of information does not necessarily lead to its use: even exposure to information does not of itself bring about enhanced understanding or gain of information (Spitzer and Denzin, 1965, Allen and Colfax, 1968).

Very evident in this research are attempts to identify just which subgroups within the larger entity are and are not receiving information. Variables scrutinised included exposure to sources, contacts with experts and social participation. In short, connections were found between socioeconomic and information-contextual variables. As Dervin suggests,

"Certain groups of people are identified as information poor. They are also identified as being those with less education and income and less able and willing to intake information both because of lower ability as well as less opportunity to gain and use information" (p.77).

Childers and Post (1975) found that variables associated with information gaps included lack of education, failure to use expert information sources, lack of informed interpersonal contacts, lack of exposure to high information content print media, lack of awareness of information sources, an absence of organisational ties and a lack of

information processing skills.

Extrapolating from this, then, to the organisational context, it would appear especially fruitful to investigate lack of information, or lack of access to or use of sources, in terms of participants' education, status within the organisation, contact with liaisons or other centrally-placed persons, and connectedness with other organisational members.

It should however be pointed out that there is presently some controversy among communication scholars as to the most appropriate means of investigating this topic area. Here, as in other areas of management thought, there is considerable disagreement as to how research should be conducted, but more fundamentally, disagreement over the ontological and epistemological foundations upon which such investigations should be built.

Paralleling ideological splits elsewhere in the discipline of management, the field seems to have divided along empiricist versus relativistic lines (c.f. the debate on "emic" versus "etic" research in Morey and Luthans, 1984 or nomothetic versus ideographic research in Allport, 1937 and Evered and Louis, 1981).

In brief, the empiricist position seems to follow traditional principles of positivistic science with a preference for "objective", quantitatively-based research

design, whereas the relativistic approach proposes that "objectivity" as such cannot exist, that research should be oriented to exploring the nature of individual connotations and the personal meanings which participants attach to what they perceive (Brown, 1979, Weimer, 1978).

If not to resolve such tensions, then at least to partially accommodate the different perspectives, writers on management research (eg. Dubin, 1982, Van Maanen et al, 1982) have proposed that research design should ideally feature a combination of methods which jointly may produce data acceptable to both approaches. Such methods might include nominal and ordinal data from questionnaires, textual material from interviews and possibly network data from communication network analysis.

COMPETITIVE INTELLIGENCE SYSTEMS

The literature of competitive or strategic information systems also contains material useful to the present research. This body of work is not very extensive, and it seems to rely quite heavily on work done in military intelligence. Although some writers on strategic information in organisations (eg. Wilensky, 1967) make extensive use of military examples in their discussion, this review will confine itself mainly to the non-military organisational context.

In their discussion of information required for competitive purposes Cleland and King (1975) suggested there are three

main areas in which information is needed: marketing information, production and product information and organisational and financial information. Sources external to the enterprise will probably be of primary importance for the first area and also of importance (though somewhat less so) for the third. The second area will require mainly though not exclusively internal sources.

The balance between internal and external sources was discussed by Gringer and Norburn (1974), and they also assessed personal and impersonal (i.e. interpersonal vs print) sources. The sources were as follows:

	<u>External</u>	<u>Internal</u>
<u>Personal</u>	Customer and competitor contacts Bankers' contacts Conferences etc.	Unscheduled meetings with colleagues Formal, scheduled meetings
<u>Impersonal</u>	Scanning publications Market research Special surveys	Written communications Special reports

In brief, they found that personal sources were used more than impersonal (print) ones, and this finding is in harmony also with writers such as Keegan (1974), Mintzberg (1978) and Pondy and Mitroff (1979). It also seemed clear that internal contacts (through meetings and "chance") were more

important than external ones, and of least importance were market research and similar investigations. The relatively low importance of structured, planned, print sources often takes even experienced researchers by surprise: a case in point are the remarks made by Klauss and Bass in their recent book Interpersonal Communication In Organizations (1982):

"This (book) began as a fairly straightforward study in management information systems. Interviews and survey data were collected from 400 project engineering personnel and supervisors in a light technology plant on the media, documents and channels of communication that influenced their decision-making. Almost 85% of the influence was attributed to face-to-face interpersonal interaction with co-workers. As a consequence, our focus shifted to interpersonal information transfer... as a consequence, we have emerged with a book addressing the issue of interpersonal communication in organizational settings" (p. ix).

Leavitt (1975) further argues that "the promise of the computer-assisted management analyst, the operations researcher, the long-range planner, has not, in the eyes of many managers, come forth to fruition" (p.5).

Gessford (1980) also discusses the nature of the sources required for strategic information systems, and divides them

into six categories: personal conversations and observations, news services and internal reports, intelligence system data, long-range planning systems, special reports based on retrieval of data from the database and computing systems designed to study strategic questions.

It will be noted that Gessford's list runs counter to the trend of personal sources, consisting as it does mainly of print rather than oral sources, and he describes each as follows.

1. Personal conversations and observations: "Managers... (can compare) what they find in the business with what they know of other businesses" (p.466).
2. Periodicals, news services and routine internal reports. The first two are especially helpful in keeping up with external changes, while the last may reveal internal deficiencies.
3. Intelligence systems. Data from such systems may come from sales representatives, lobbyists or an "intelligence group".
4. Long-range planning systems. Each operating unit is asked to prepare a long-range plan, each of which is then studied at higher levels in the hierarchy; the best ideas are incorporated into the strategic plan.

5. Special reports generated by data management techniques. This involves the extracting and organizing of data from internal operations, including special sales analyses, labour cost studies, inventory reports and purchasing analyses.
6. Computing systems devised to study strategic problems. Included in this are computer-based decision models or simulations of aspects of industry functions.

From the perspective of the present study the principal weakness of Gessford's approach is that it appears to be mainly normative rather than descriptive. An unfortunate habit the author has is to couch his discussion of what may perhaps exist in the future as if it already existed. An example is in regard to videophones, of which Gessford says:

"Videophones are helpful in dealing with strangers and in discussing strategic problems with fellow executives... Thus this kind of teleprocessing system is extending the ability of executives to gather strategic information through personal contact" (p. 467).

Videophones of course exist in prototype, but have not found wide acceptance in organisations. The author's habit of confusing recommended with actual behaviour blurs his intention and diminishes the usefulness of his writing.

CONSULTATION WITH WORKERS

In the New Zealand context, the necessity of both upwards and downwards communication has been discussed by Duncan (1984):

"Reports to employees giving information about the organisation is (sic) a helpful way of consulting workers but this tends to be a "top down" approach and is no substitute for effective dialogue... If it is only to inform and instruct, communication often only causes a counter-reaction, but if... there is a two-way dialogue, then it encourages participation and anticipatory planning in the organisation" (pp.116,117).

The New Zealand Employers' Federation (1977) recommends that every company should formulate policy on information and communication:

"The foundation of all involvement is information... when information is acquired, explanations and questions follow, then the exchange of ideas which produce advice useful to the enterprise. One-way traffic becomes two-way" (p.10).

In terms of appropriate sources of information, the NZEF reinforces the crucial place of supervisors, in terms of both upwards and downwards communication:

"The supervisory level is the critical point along the line of communication ... an inadequate channel may block passage of views to top management level ... blocks in the flow can (also) occur if higher management does not make available the information needed or sought by those further along the line" (pp.11,12).

In their survey of 65 manufacturing firms which had implemented a worker participation scheme (1976), the New Zealand Department of Labour found evidence to suggest that both upward and downward communication normally improved as a result:

"(There) were improvements in employee knowledge and understanding of company policy and problems (and) increased employee contribution to the management of the firm.... Management/employee relations and communication had also improved after the introduction of three out of four schemes" (p.26).

The New Zealand material cited so far focusses on interpersonal sources; to complement this, the importance of print sources has also been referred to:

"If they are to have real purpose in an employee communications programme, house journals, staff magazines and the like must be seen as being primary sources of information - not the place in which one

copies stories given to the news media last month"
(Sutcliffe p.8).

Sutcliffe also touches on the need to ensure that information coming to workers from their supervisors agrees with that from the annual report to employees:

"Being very mindful of the difficult position in which supervisors and foremen find themselves as "middle man", and their embarrassment if they find that they are unable to answer reasonable questions from employees, we have tried to assist them by arranging that they be given advance briefing, usually one to two days before the report is received at the homes of employees" (p.17).

The literature of participation and power-sharing also has some relevance for this discussion; for example Vroom and Yetton (1973) found that managers use decision processes providing less opportunity for participation by their staff when the managers possess all essential information than when they lacked some needed information. And it also appeared that if managers' subordinates had extra, needed information a more participative decision process would be employed (p.108). Thus, in information source terms it might be expected that people of higher status are more likely to use others further down the organisation as information sources if those higher up lack needed data or if those further down clearly possess this needed data.

Related to this is the work done by Bacharach and Aiken (1977) who proposed that (perhaps unwittingly) managers keep their subordinates "information-poor". Briefly, they found that communication contact initiated by administrators was both lateral and downward, whereas subordinates' contacts were mainly lateral. They speculated that the net effect of this is that upward feedback will be inhibited and subordinates will be information poor. An assessment of information source use might discover, following this, that superiors are relatively more likely to use subordinates as information sources than subordinates are to use superiors.

EXPERIENCE AS A "SOURCE"

Several writers on the subject have voiced the opinion that one's own experience itself constitutes a "source" of information required at work. For example Johnston and Gibbons (1975) suggest that:

"We have clear evidence that ... a problem solver uses the knowledge he possesses whenever he can, but when this is insufficient he usually approaches a particular general source to obtain a particular type of information" (p.31).

A similar theme appears in Greller and Herold (1975), who argue that as tasks require more complex skills and autonomy, it is likely that workers will make more use of their own experience and personal assessments, and in a

sense this constitutes an "information source". (Related to this is the work done in decision making (eg. Braybrooke and Lindblom, 1963) which illustrates how this process of personal assessment results in the acceptance of only a restricted number of alternatives, so that new information from various sources will be ignored.)

Along similar lines, Hauser and Muchinsky (1978) state that:

"Formal organisational structures, supervisors, coworkers, the task itself and people's own interpretations are all information sources that determine the criteria used for making evaluations".

These viewpoints widen the definition of "information source" rather more broadly than is considered desirable in the context of the present study. While it may well be true to say that in a sense "formal organisational structures" do act as an "information source", one might foresee considerable problems in defining this in either a conceptual or more particularly an operational sense, to enable participants in a study to understand what is meant by it.

Likewise with "people's own interpretations"; difficulties are also foreseen here in establishing a dividing line between, for example, the information received from a coworker, and information "received from" oneself. Often a chance comment from a coworker will constitute as it were

the missing piece in a jigsaw already mainly assembled in one's mind; data becomes information and new knowledge is gained, partly from the coworker and partly from one's own experience. Means of operationalising the dividing line between oneself and others in terms of information "received" are presently unclear.

The position taken in this research is that "one's own interpretation" is an inevitable component of all information received. In fact it may more properly be said that data received does not become information until it has passed through the personal filter of values, attitudes, prejudices, etc.. which has been developed as a result of early up-bringing, education, training and experience (Hanneman, 1975, Lewis, 1980, Littlejohn, 1978, Sieburg, 1976, Pace and Boren, 1973).

If "one's own interpretation" is employed in screening data from every source used, then it becomes difficult to justify having it as a separate source in its own right. To sidestep these conundrums the present research focusses only on sources defined as external to the participants in the study.

FINANCIAL INFORMATION SOURCES

A small but growing literature exists in the topic of where share market investors obtain their information from (eg Cumpstone et al., 1980, Lee and Tweedie, 1975, Porcano, 1981, Reckers and Stagliano, 1980, Wilton and Tabb, 1978,

Bell and Howieson, 1984) and although it is not entirely relevant to this topic some findings will be mentioned.

Probably most attention has focussed on investors' use of the annual report. Reckers and Stagliano report that:

"While 91% of the investors indicated a somewhat thorough reading of the annual report, conclusions about the use of these reports must be made cautiously. It must be noted that half the respondents apparently disregard financial statement footnotes. Potentially, the reports may actually be misused" (p.32).

Kerkin (1983) speculates that:

"It is possible that the type of source (used) and extent of information search will differ significantly between investors. Other characteristics relate to the degree of financial sophistication, or specialised education, of shareholders. These are likely to influence information search strategies; users will only search for information if they are aware that it exists, that it is possible to obtain it, and that they can then use it effectively" (p.47).

Porcano's study asked user groups of different levels of financial sophistication to give their opinions on various information sources, and different viewpoints were found. The most sophisticated group, chartered financial analysts, perceived:

"... many of the sources to be of greater importance than the other groups... (and they) also use more sources with greater frequency. This may reflect their... cognitive complexity regarding financial information utilisation. They may be more able to integrate data from various sources" (p.45).

This echoes other findings in respect of greater source use and higher education (Westbrook and Fornell, 1979, Swinehart and McLeod, 1960).

A much larger literature exists in the assessment of management information systems (MIS), and it appears to consist of a mixture of normative and descriptive approaches.

"Normative approaches have been concerned with prescribing courses of action that conform most closely to the decision makers' values and beliefs (whereas)... descriptive approaches deal with how individuals process information to arrive at decisions" (Ungson, Braunstein and Hall, 1981, p.118).

Much of the literature seems to have been written from a normative standpoint by MIS practitioners who are keen to demonstrate the value of their systems (Keen, 1976, Neumann and Seger, 1979, Robey, 1979, Schewe, 1976, Swanson, 1975, Bentley, 1974) but caveats were sounded as early as 1967 by

writers who considered that MIS had often been oversold: (Ackoff, 1967, "Management misinformation systems" and Mintzberg, 1972, "The myths of MIS").

Swanson (1982) reviewed some of the MIS user research and summed up the key elements as follows:

"Given the information need, the organizational context, and his or her channel disposition, the individual engages in a process of channel selection. A decision to use one or more channels, in some order, or to use no channels at all, results. In making this choice, the individual may redispense him- or herself towards the alternative channels, on the basis of the information need and organizational context" (p.163).

By channel Swanson means what is here called source, and his summation is of some use, but basically seems too simplistic to be very helpful. Swanson states that "an information need, arising within an organisational context, is presumed to motivate the individual to seek information" (p.162). In the context of MIS research this is perhaps not an entirely valid presumption, given that much if not most MIS information in organisations arrives at the user's desk without being sought, thus Swanson's focus on selection may be misplaced. By "channel disposition" Swanson means "that portion of the individual's attitude that reflects tendency toward use (of a channel)" (p.162). This seems to be an awkward concept - a "portion of an attitude" is unusual -

which has little explanatory value.

Further, channel (source) selection does not seem to happen in this way, and the use of the term decision is also probably unwarranted, implying a rationality that is ascribed post hoc.

INFORMATION DECAY RATE

The concept of "information decay rate" introduced by Smith (1983) may be of assistance in accounting for use of sources. Following recent bibliometric studies (research into how long and which particular books, journal articles etc. are cited by other writers), Smith postulated a continuum of information decay on which different disciplines may be located (see Figure C).

Scientific literature is shown to have a relatively fast decay rate, humanities literature a very slow one, and social science literature straddles both. By way of contrast, the decay rate for literature (or information) required for business ranges from extremely fast to quite slow, depending on the kind of information required.

Extrapolating from this model to the question of source use, it may follow that the needs of researchers in the humanities could be satisfied from print sources (since the most up to date sources - other people - will not be needed so much); research needs in social sciences may be satisfied by a combination of print and oral sources; while

in science researchers will need both oral information and the most up to date print information, being journal articles, conference papers, pre-publication drafts of articles and the like. Certainly there will be many other variables affecting source use, such as the exact nature of the work performed, accessibility of and preference for sources etc., but as an overview of likely source use the model appears to be of assistance.

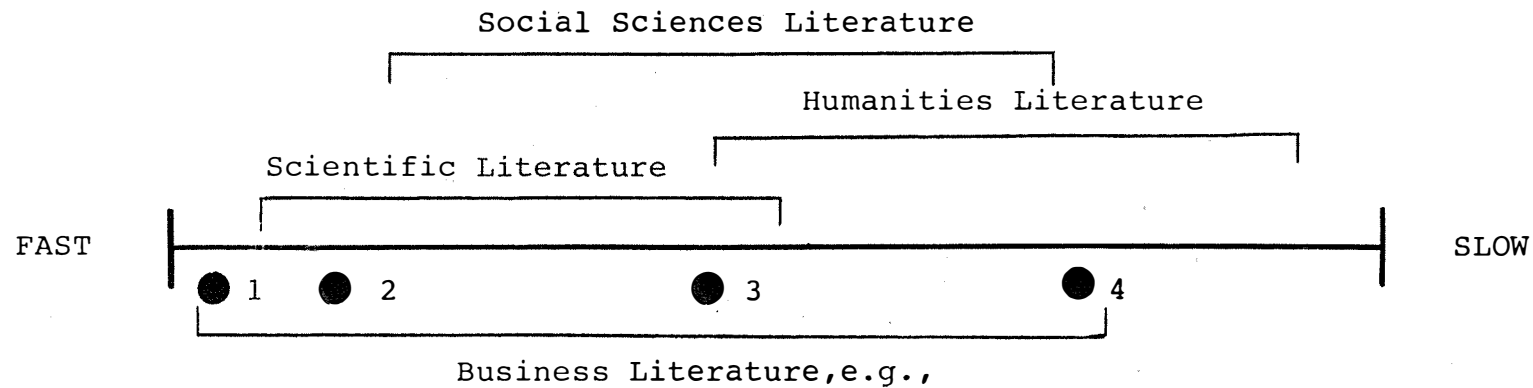
In business or other organisations, it follows that knowledge workers will require the kind of "hot", immediate information discussed by Mintzberg (1978) for example, in some aspects of their work (eg. keeping up to date with very rapid changes such as currency fluctuations) but in other respects (possibly aspects of organisational structure or principles of engineering design for example) the information required may have been available for many years, and the most "static" sources, published books, may well suffice.

Mintzberg's findings on the oral nature of managers' worlds have proven extremely persuasive since the first edition of his book The Nature of Managerial Work appeared in 1973, but observations such as Smith's should alert us to the possibility that business source use is rather more complex than originally thought.

Fig C

INFORMATION DECAY RATE

(As shown by bibliometric studies: Smith, 1983)



- 1 ● Exchange rate movements
- 2 ● Economic indicators
- 3 ● Many functional techniques
- 4 ● Some aspects of organisational structure and management.

Adapted from:

Gerry Smith,
Business Information
Sourcebook,
Hartlepool: Headland,
1983.

INFORMATION ENVIRONMENT

The term "information environment" is occasionally to be found in the literature; for example, Paisley (1980) comments that:

"Individual initiative, professional "connectedness" and organisational policies with respect to information services create rich or poor information environments for workers... Workers who are favored with rich information environments receive information via many modes and channels. Studies of the acquisition of scientific information (notably Menzel 1959, 1966b) have shown that workers in rich information environments are desultory information searchers. Knowing that the information they need will reach them "spontaneously" not once but many times, they exhibit what can be called information nonchalance" (p.123).

Paisley goes on to say that:

"Workers who are out of the information mainstream account for more than their share of subscriptions to information services, computerised searches, reprint requests, etc." (p.124).

At this stage it is not known how well these studies of scientific environments translate to non-scientific settings, but clearly Paisley has made what is potentially a useful observation, that people who receive relatively less information want relatively more of it.

McClure (1980) also uses the term information environment (p.67); his meaning is rather better operationally defined than that of Paisley, though conceptually less advanced. McClure specifies that one's information environment is the totality of information sources normally available to a person.

INFORMATION OVERLOAD

Another source of relevant information on our topic is the literature on information overload. Overload has been defined as the amount or complexity of the messages coming to a person or unit which exceed handling capacity (eg. Churchill, 1965). Slovic, Fischhoff and Lichtenstein (1977) suggest that many decisional errors may be explained in terms of individual limitations. The nature of those limitations was explored by Simon (1957) who observed that decision makers reduced the complexity of decisions by constraining the process of developing alternatives and processing information. In other words Simon suggested that people do not want too many alternatives open to them, they fear "analysis paralysis" and would rather their choices were relatively narrow rather than exhaustive. Although Simon was addressing himself to the matter of decision making in organisations rather than source selection as such, it appears reasonable to draw on his conclusions and infer that in all likelihood it is probable that people will prefer a restricted rather than an infinite range of information sources.

One of the best known writers in this field is Toffler (1971); he suggests that "Laboratory tests on man and animals alike prove that the more the choices, the slower the reaction time" (p.326). Toffler appears to have coined the phrase "informational overstimulation" and associates it with the increasing

"pressures of acceleration and those of novelty. One forces us to make faster decisions while the other compels us to make the hardest, most time-consuming type of decisions". (p.325).

Newell and Simon (1972) suggested that individuals may use heuristic devices to keep information processing demands within their capability, while earlier Marschak (1964) had identified much the same phenomenon when he observed that:

"individuals tend to focus on a few variables and categorise or aggregate large amounts of data to reduce the information load" (cited in Stumpf and London, 1981).

That overload is a subjective not an "objective" phenomenon was stressed by Porat and Haas (1969) who pointed out that it is relative among people depending on their own capabilities. They also suggest that more information will result in more accurate levels of goal setting and decision making. Along similar lines, Rokeach (1960) proposed that

as people acquire more information they develop a better ability to widen their personal agendas.

In his much cited book The Nature of Managerial Work, Mintzberg (1978) discussed his findings in respect of top managers' use of print and oral sources. Overload seemed especially associated with print rather than oral contacts; managers displayed avoidance of, almost aversion to print-based data, yet keenly sought out information from interpersonal contacts.

The limitations on people's information processing abilities were described by Miller (1956): he cited evidence to suggest that around seven items of information are all most people are able to comfortably deal with; more than this number create overload, confusion and errors.

Information seems to be regarded as particularly of value for immediate rather than future needs; Inkeles (1975) found that stockpiling of information was of little value at times of organisational crisis. At such times managers will ensure that their information is as immediate as possible and previously acquired data will be of little relevance. This finding is highly congruent with Mintzberg's discovery that managers much prefer "hot", interpersonal sources of information as a means of maintaining contact with current events rather than using print sources.

A concept related to issues of communication load is the

idea of optimal ignorance first publicised by Uphoff (1972). What is meant is that not knowing certain things may in fact be beneficial for the individual. Uphoff proposes that people concerned with information are likely to overestimate the benefits to be obtained from additional information and underestimate the costs to be incurred in acquiring it. Attempting to obtain more information than necessary is likely to lead to overload.

Nevertheless it may be speculated that many knowledge workers do not strive to increase their knowledge much past an optimal point. Anecdotal evidence such as that recounted by Perrot (1983) suggests that staff are well aware of the exhausting aspects of overload and actively seek to avoid too much print information:

"... one of the (staff) warned 'I don't want too much information'. The fear that the new librarian could so easily 'overdo it' was obviously evident in a busy marketing team where great value was already placed on a vast flow of internal correspondence" (p.161).

Comparable examples are offered by King (1971) and St Clair (1976).

Along similar lines, Broadbent (1971) has argued that in the process of making decisions, people normally receive far more information than they can handle. They cope by firstly, filtering out some sources of information which

they believe have been less useful in the past, then "pigeonholing" information received, by which Broadbent means fitting that information into categories previously constructed and found to be useful.

Meier (1963) found that overloaded knowledge workers use a variety of strategies when confronted with excessive demands on them; one particular response is to "destroy lowest priorities".

A further dimension was added by Wilensky (1967) who proposed what he called the

"dilemma of centralisation: if intelligence (eg. strategic information) is lodged at the top, too few officials and experts with too little accurate and relevant information are too far out of touch and too overloaded to function effectively; on the other hand, if intelligence is scattered throughout too many subordinate units, too many officials and experts with too much specialised information may engage in dysfunctional competition, may delay decisions while they warily consult each other, and may distort information as they pass it up" (p.58).

Wilensky also assesses people's failure to use suitable sources of information in his analysis of the effects of hierarchy:

"The shape of the organisational hierarchy - not merely the number of ranks but also the number of personnel at each level - conditions the upward flow of information... For the purposes of intelligence, the optimal shape of the hierarchy would be relatively flat (few ranks permit a speedier diffusion of more accurate information)... if an organisation... emphasises rank, the greatest distortion and blockage will attend the upward flow of information. Status symbols serve to motivate performance, legitimise positions and facilitate some kinds of communication. Without stable, comfortable, certified ways of talking and writing to one another... people of different rank or different function do not easily maintain harmony. But the harmony is achieved at the cost of lowering the quality of intelligence channelled to the top" (p.44).

Farace, Monge and Russell (1977) attempt to define information load in this way:

"Load is based on the rate and complexity of communication inputs to an individual. Rate is usually expressed as the number of communication demands (e.g. bits of information or requests, messages etc.) that are received, operated on or resolved... in a given period of time. Complexity refers to the number of judgements or factors that must be taken into account while dealing with (processing) communication" (p.100).

INFORMATION POTENTIAL

McClure (1980a) and Holland (1972) use the concept of "information potential" in the context of choosing information sources. Every manager, suggests McClure, has an "information potential" which essentially seems to consist of two elements, firstly, being in a position to contact information sources, and secondly, having the ability to select information sources to resolve a specific decision (p.67). McClure's study does not deal with network analysis as such, but in fact his first element can be seen as a function of participants' network positions, and his second relates closely to aspects of participants' status, education and experience.

A closely related concept has been employed by a Swedish research group, which has published on the subject of people's "communication potential" (Nowak, Rosengren and Sigurd 1976). By this they mean the personal and social characteristics and resources which facilitate the giving and taking of information by individuals. Communication potential is here viewed as a means of attaining certain values and life goals. Some of the important characteristics which act to determine communication potential are income, education, age and sex.

INFORMATION QUALITY

There is evidence to suggest that good quality information leads to good quality decisions, both on intuitive grounds (O'Reilly, 1982) and from laboratory studies (eg. Porat and

Hass, 1969, Streufert, 1973).

Often it is difficult to draw a distinction between information quality and information source quality, and much of the literature which touches on the area seems to treat the two concepts interchangeably.

Although no definition of source quality has been found in the literature so far, a working definition may be constructed along these lines:

"Source quality is defined in terms of the perceived quality of the information which issues from that source over a period of time. Thus source quality is an average of the information quality as perceived by users over a period of time.

Paisley (1980) defines information quality as:

"A composite attribute based on the information's relevance, timeliness, comprehensiveness and authoritativeness. Quality does not reside in the information itself but rather in the judgement of users qualified by need" (p.121).

This is along similar lines to Zmud (1978) who suggests that information quality is reflected in messages that are relevant or specific to the problem being addressed, accurate, reliable and timely. Probably Wilensky (1967) offers the fullest definition:

"High quality intelligence designates information that is clear because it is understandable to those who must use it; timely because it gets to them when they need it; reliable because diverse observers using the same procedures see it in the same way; valid because it is cast in the form of concepts and measures that capture reality; adequate because the account is full, ie. the data are not out of context; and wide-ranging because the major policy alternatives promising a high probability of attaining organizational goals are posed or new goals suggested" (p.118).

However as Pfeffer and Salancik (1977) and Paisley point out, quality is not an objective entity; it is not possessed by the information but is rather an assessment of it given by users of the information. Such assessments may well differ according to users' experience, status, education or preferences. Nevertheless O'Reilly (1982) argues that:

"A source that has been shown to provide such (quality) information clearly is likely to be used more frequently than sources providing information of lower quality. Quality information allows a decision maker to justify the basis of the decision to others, arguing that if the information used is timely, accurate and reliable, than any decision made is likely to be a good one" (p.758).

Similar arguments have been mounted by Wilensky (1967), Goldstein, Marcus and Rausch (1978) and Staw (1980).

Also associated with perceived quality are aspects of interpersonal trust and source credibility. When Clausen (1973) studied the voting practice of U.S. congressmen, he found that voting decisions by individuals often owed less to a personal assessment of the issues involved than to the lead of a trusted colleague. Other writers (e.g. Giffen, 1967, McCroskey, 1978, Sligo, 1985a) have explored the effects of source credibility, and the evidence suggests that listeners are more likely to accept information if the speaker is perceived as ranking highly on dimensions such as expertness and trustworthiness.

O'Reilly (1982) proposes that often there will be a trade-off between quality and accessibility:

"When questioned, the decision maker may be able to identify the highest quality sources of information with respect to a given issue. In practice, however, the less qualified, more accessible information sources may be used more frequently. Thus, accessible information sources that are used frequently may be of lower perceived quality than other sources that are less accessible" (p.758).

However Smeltzer and Golen (1984) argue that:

"The relationship between preference (for sources) and source quality has not been substantially verified" (p. 82)

and they call for more research into this area.

INFORMATION RESOURCES

There is a growing literature on managing organisational information resources that are available to managers: the field is an offshoot of both librarianship (especially "special librarianship" within that discipline) and computer science. Recent examples of books on the subject of managing organisational information resources are R.I. Tricker, Effective Information Management (1982) from the U.K. and M.F. Meltzer, Information: The Ultimate Management Resource (1981) from the U.S.A.

Although this literature specialises in the matter of helping knowledge workers gain access to information, typically there is very little attention paid to the question of exactly where people get their information from. When these authors discuss "information sources" they normally mean specific print or on-line data bases which may be consulted on particular technical or other questions.

The role of interpersonal information sources tends to receive scant recognition; for example in his chapter "Information Sources" Meltzer refers to the importance of

consulting both internal and external sources, but under internal sources makes virtually no mention of other people ("your information may be stored in... a coworker's head" p.44). The bulk of the chapter is devoted to the examination of particular print sources or other non-human data bases.

Tricker's book, though a well argued analysis of information systems developments from an organisational perspective, and like Meltzer's book, assessing specific print or on-line sources, makes no mention of interpersonal sources. This is an unfortunate omission, suggesting a lack of awareness of the major work that has been done by writers such as Mintzberg (1978) in North America, or Stewart (1981) in the U.K.

INFORMATION RICHNESS

McClure's (1980a) concepts of information potential lead next into the idea of "information richness". In this latter term he is referring to a person "who comes into contact with more sources of factual information related to his/her position... than other employees..." (p.9). In operational terms McClure defined the information rich people in his study as the top 50% of employees in terms of contact with information sources. The bottom 50% he defined as information poor (p.92).

McClure went on to argue that it is the information rich person who provides the link between information

acquisition, dissemination and decision making (p.119). The nature of the link is both between the organisation and its outside environment and among the members of the organisation as an opinion leader.

Both these functions are crucial ones in the process of obtaining the information which the organisation requires from its environment, then in transmitting this information to those people in the organisation who particularly need it. However the relationships between these roles are not well known, so it is considered that work on elucidating such relationships would be well justified.

The concept of information richness is also used by Power-Ross (1982), this time in discussing information environments. Power-Ross borrows concepts of information rich environments from their more usual contexts of scientific or technical communication (see for example T J Allen (1969), Menzel (1966b) or Paisley (1980)) and translates them into a commercial setting. In Power-Ross's definition an information rich situation is one:

"where massive amounts of information are readily available, where much of the information validity cannot be objectively determined, and where both the information itself and its validity are constantly changing".

This concept is related to the term "knowledge industry"

mentioned in the discussion of knowledge workers, but essentially it is a specialised refinement of the kind of description produced of society in recent years by writers such as Bell (1973), Feigenbaum and McCorduck (1985), Goldhaber et al. (1979) and Zand (1981). Zand, for example, suggests that "we are becoming a knowledge society, and business enterprises are becoming knowledge-processing organisations" (p.3). In the future, "although it may be difficult to predict the exact shape and form organizations will take, it is clear that managers will be concerned with what can best be described as a knowledge organisation" (p.5). In their discussion of the emergence of knowledge processing, Feigenbaum and McCorduck talk about the knowledge industry "in which knowledge itself will be a saleable commodity like food and oil. Knowledge itself is to become the new wealth of nations".

More specifically, Zand suggests (pp.6 and 7) that when the organisation is viewed as a system, there are four processes that should concern managers:

1. "Finding and disseminating knowledge that already exists in the organization
2. Acquiring and creating new knowledge
3. Converting knowledge to profitable products and services
4. Managing people who work with knowledge."

The focus of the present study is on items one and two. The

first process includes both the internal sources of information (both interpersonal and print) which are available to knowledge workers and the networks of communication which exist to transmit information interpersonally. The second has to do with the external sources of information accessed by knowledge workers, and also again with networks, as the process of passing on information often means "adding value" to it.

INTERNAL AND EXTERNAL SOURCES AND INNOVATION

There is a considerable literature on innovation, particularly the diffusion of innovation through social systems (including organisations) which deserves recognition. Much of this literature has to do with agricultural innovation, exploring relationships among agricultural scientists, farm advisers and farmers, and thus is outside the scope of this research.

One of the seminal works in the field was The Management of Innovation by Burns and Stalker (1961); others often cited include Czepiel (1975), Deutschmann and Danielson (1960), Daft (1978) and Davis (1953a).

Czepiel (1975) reported on the diffusion of information about a major technological innovation in the steel industry. He found that networks within organisations tended to develop around the "early adopters" of particular innovations. The networks functioned so as to convey information rapidly from an early adopter to a late adopter,

and a major factor in this transmission process was friendship among staff.

Earlier, Likert (1961) popularised the idea of managers as "linking pins", that is, they hold simultaneous membership in groups at different levels of the hierarchy. On this issue, Wofford, Gerloff and Cummins suggest that:

"An environment of rich communication and close interaction can be achieved via groups which are so linked. An organisation so structured and operated is (a).... beneficial blend of formal and informal processes" (p.458).

In his discussion of the "technological gatekeeper", Fischer (1980) stressed the importance of both internal and external information sources in the process of formulating ideas. People who act as gatekeepers of technological ideas show a tendency to have a relatively higher number of external information contacts than do other people. They engage in a large amount of informal communication with their colleagues within the laboratory context, and they also do a large amount of reading of technical and scientific literature. Thus unlike the picture of the manager sketched by Mintzberg (1978), as a person highly tuned to oral sources but making relatively little use of print, Fischer's technological gatekeeper makes extensive use of both oral and print sources (as well as internal and external sources). Smith's (1983) concept of "information decay" further reinforces

Fischer's comments (see the earlier discussion on Information Decay Rate).

A number of writers have commented on the means by which new ideas enter the organisation, and people involved in importing innovations, as well as "technological gatekeepers" are also sometimes known as "boundary spanners" (Aldrich and Herker, 1978, Duncan, 1972, Fahey and King, 1977, Leifer and Delbecq, 1978). Such people, while fully organisational members, also maintain close ties with individuals outside. The research into boundary spanning activities focusses mainly on the interpersonal sources used outside by such individuals with less attention to the print sources employed.

While there is an extensive collection of writings on the diffusion of innovation through social systems such as a city or country district (eg. Deutschmann and Danielson, 1960, Lazarsfeld, Berelson and Gaudet, 1948), most of these works are difficult to apply to the organisational setting and hence are not properly within the ambit of this study. Perhaps the first researcher to apply the techniques of the diffusion studies to organisational contexts was Davis (1953 a and b). He pioneered the use of Ecco analysis (episodic channels of communication in organisations), tracing the diffusion of an internally generated message throughout an organisation. Davis's concern was less to plot the communication networks within the organisation (though this would have been feasible) as it was to explore what happened

to messages sent, in terms of distortion, omission, speed of flow and so on.

Fischer (1979) explored the question of how task newness or routineness was related to information source use. As a generalisation it appeared that the newer the task, the greater was the reliance on external sources; however, the more routine the task, the greater was the reliance upon internal sources of information.

Isenson (1968) cites results from a U.S. Defense Department project which found that informal, person to person contact was the "dominant propagating mode for ideas in the innovative process" (p.49). In similar vein, Bernal (1967) pointed out the importance of informal, face to face discussions in fostering scientific advance.

Innovation is considered to consist of stages, such as idea-formulation then problem-solving (Fischer 1980, Rothwell and Robertson 1973, Baker, Seigman and Rubenstein 1967) or work programme development, idea-formulation, problem solving (Hes, 1980). In reviewing previous findings, Fischer suggested that:

"Scientific and technical information sources external to the firm play a predominant role in supplying information in the idea-formulation phase, while internal sources play the more important role in the problem-solving phase...

In the idea-formulation phase for example, there is almost complete agreement among studies of innovation that the recognition of the need for an innovation is the primary motivation for innovation. Such innovations are called 'need-pull' innovations and they typically have a higher probability of commercial success than do innovations which are generated from technological advances ('technology push')... The implication for R and D managers, therefore, is to ensure a sufficient amount and variety of external contacts so as to establish the capability to recognise market needs" (p.68).

Fischer later goes on to say that:

"As might be expected from groups of highly talented people, assembled explicitly to solve problems, and engaged in activities of a proprietary nature, the information sources of most value to R and D teams in the problem-solving phase of innovation are sources internal to the laboratory" (p.72).

In line with this observation were the comments of Allen (1966b):

"Across (a) wide range of problem types, teams which relied more heavily upon outside information sources (in problem solving) were found to produce poorer quality solutions" (p.95).

The place of "gatekeepers" in R and D organisations has been extensively researched by Allen (1966,1968,1977) who reports that they typically have a high number of external information contacts, are frequently cited as choices for technical discussions and are consistently the sources of the best technical ideas within R and D groups.

The role of the technological gatekeeper is to link the external, formal channels (which appear important in the process of idea formulation and the initial stages of problem solving) with the internal, informal channels (which are important in supporting and maintaining problem-solving activity).

Allen (1966b) discussed the concept of "communicational impence" at organisational boundaries, created by the "unique coding schemes" (ie. basically jargon or specialised language) acquired by people in formal workgroups. This specialised language while facilitating the efficiency of communication internal to a group often impedes communication with information sources external to the group.

Allen appears to be primarily interested in communication within formal groups, and across their boundaries; not considered by him, but perhaps of equal importance, are the effects of informal groups, and communication across their boundaries. This is considered further in the discussion of organisational communication networks.

NETWORKS AND THE "INVISIBLE COLLEGE"

"Invisible colleges" have been extensively discussed by authors such as Crane (1972), Gaston (1973) and Griffith and Miller (1970). Basically the term refers to an informal communication network of research personnel, scientists or academics, often built around one or several outstanding performers. Members of the college typically send one another pre-publication drafts of their and others' writing, seek one another out at conferences to discuss the latest findings in their area, and write to one another to describe and ask about new developments and other matters of mutual interest. Griffith and Miller suggest that the extent of such informal contact via the invisible college is such that:

"Alternative efforts to facilitate the availability of this yet-unpublished research would apparently be only of value to persons not well established in the research field" (p.135).

The literature on transfers of knowledge workers is also relevant to this topic. Writing about movement of managers within multinational companies Edstrom and Galbraith (1977) suggest that the frequent transfers of managers create "verbal information systems". These systems, it is thought, help to facilitate the delegation of decision making from central offices to local subsidiaries. In effect this creates a network of oral sources to which managers will

turn when in need of an up to date information source.

Kaufman (1960) described a system which had a similar effect. The U.S. Forest Service maintained an intensive inspection system of their forest ranger districts, enabling rangers to develop and maintain contacts across districts and with their central authority. The emphasis on decentralising information activities within the service fostered the delegation of decision-making to the rangers and facilitated use of an oral information network.

Downs (1967) observed that formal and informal communication within an organisation are complementary:

"When formal channels are restricted, informal channels will flourish. The more stringently restricted the formal channels, the richer will be the flowering of subformal (informal ones)."

The study of interpersonal (informal) influence through networks thus has been touched on in several disciplinary areas, but the most comprehensive analyses have been carried out by researchers in the area of organisational communication. Rogers and Kincaid (1981) define communication network analysis as:

"A method of research for identifying the communication structure in a system, in which relational data about communication flows are analysed by using some type of

interpersonal relationships as the units of analysis. This analytical approach is particularly valuable to social researchers because it allows them to trace specific message flows in a system, and then to compare this communication structure with the social structure of the system in order to determine how this social structure is interrelated with the communication network" (p.82).

Network analysis is founded on the assumption that organisations can usefully be viewed as social groupings (Katz and Kahn, 1978) with relatively stable patterns of interaction (Weick, 1979). Both a framework for understanding organisations in this way, and a set of analytical methods for studying them are provided by network analysis. It is further characterised by the capability either to analyse the detailed minutiae of interpersonal relationships or to block out the broader picture of organisational functioning (Crozier, 1972).

White, Boorman and Breiger (1976) argue that communication network research has divided into two paths. The first traces the way in which chains of contact wind their way through large and complex social systems (eg. Davis's use of Ecco analysis, 1953 b) and the second explores the "knittedness" of interconnections within a network, and the overlaps among different networks for a given (typically small) population. The works reviewed in this section are mainly in the second category.

In organisational contexts the usual practice is to explore the relationships among different networks: Greenbaum (1974) proposes these may be regulative, innovative, integrative (maintenance) and informative-instructive networks (p.140); MacDonald (1970) investigated relationships among production, maintenance and innovation networks in a government bureaucracy; Farace and Pacanowsky (1974) also looked at work (production), maintenance and innovation networks. Katz and Tushman (1979) identified exchange of affect (liking), exchange of influence or power, exchange of information and exchange of goods or services as the transactional content of networks.

Once the desired networks have been established, the next step is often to compare them with the formal organisational chart, in order to find out how closely these informal networks follow the formal, prescribed network. The comparison can show instances where failures to communicate are apparently occurring in the formal hierarchy, and it also helps to identify the particular strengths in the informal communication of the organisation. As Perrow (1972) suggests, pointing out the discrepancies between the communication structure and the formal organisational structure, is "one of the true delights of the organisational experts" (p.62).

The links among people in a network show certain characteristics, and in the literature they are variously

described as strength, distance, intensity, symmetry, reciprocity, clarity of expectations and multiplexity.

A variety of terms have also evolved to describe the structural characteristics of networks: these include size, density, clustering, proximity, openness, stability, reachability and centrality. The role characteristics of people within the network include star, liaison, bridge, gatekeeper and isolate.

By now the literature of network analysis is very large (eg. Freeman's bibliography in 1976 listed over 1600 publications and Pitts's bibliography on network analysis (1979) included 481 items that were published in the 1970's). Rogers and Kincaid (1981) identify the following problems inherent in it:

"Unfortunately, most of this network literature is (1) overmathematised, (2) confusing in terminology and concepts, and (3) devoid of much application that would aid the understanding of human behavior... The field has been characterised by sophisticated methodologies looking for theoretical problems to answer" (p.xii).

A particular problem is the lack of agreement on the meanings of terms; there is not so much a "network literature" as rather a collection of loosely coupled network literatures, none of which seems to take much account of the others. Cases in point are Farace, Monge and Russell (1977), an often-cited work dealing with networks

from an organisational communication standpoint, and Tichy, Tushman and Fombrun (1979) who discuss social network analysis for organisations. What the former call strength the latter call intensity, what the former call symmetry the latter denote as reciprocity, what the former call reciprocity does not appear to be dealt with at all by the latter (Farace, Monge and Russell pp.181-181; Tichy, Tushman and Fombrun p.508).

Despite such problems the field of organisational communication network analysis nevertheless offers tremendous potential for aiding the understanding of how the processes of interpersonal source contact work within organisations. In particular, by examining communication roles (such as liaisons, gatekeepers, isolates, etc.) it can be found who are especially prominent in the patterns of information flow and transfer.

LIAISONS

A specialised sub-literature on liaisons exists within the organisational communication and management literatures, but liaisons (sometimes not by that name) also figure prominently elsewhere. Anecdotal evidence for the importance of liaisons (broadly defined) may be found in Peters and Waterman's best seller In Search Of Excellence (1984). They report that characteristic of high-achieving companies are the devices of encouraging frequent, unplanned communication among different departments. Where informal communication was fostered, processes of information-

sharing, innovation and creative solutions to problems were enhanced.

In terms of the management of change and conflict, Lawrence and Lorsch (1967) found that in studies conducted in the food industry, successful conflict resolution was associated with the use of individuals who were designated as "integrators": their task was to make and maintain horizontal contacts among people in work groups other than their own, and in this way served in classic liaison or bridge roles.

Although the nature and functions of the liaison role have been considered in a variety of the subliterations of organisational studies (examples are "Liaison person", Jacobson and Seashore, 1951; "Opinion leaders", Katz and Lazarsfeld, 1955; "Great man", Glock and Menzel, 1958; "Magnetic centers", Walton, 1963; "Scientific troubadour", Menzel 1964; "Linking pin", Likert, 1961; "Information specialist", Hodge and Nelson, 1965; "Internal consultant", Allen et al., 1965; "Cosmopolite", Merton, 1957; "Technological gatekeeper", Allen and Cohen, 1968; "Group expert", Mulder and Wilke, 1970; "Expert", Roberts and O'Reilly, 1975; "Information star", Fischer and Rosen, 1982) the most thorough treatment exists in the literature of organisational communication networks.

Rogers and Kincaid (1981) define the liaison as "an individual who links two or more cliques in a system, but

who is not a member of any clique" (p.83). This role is similar to but not the same as a bridge, defined as an individual who links two or more cliques in a system and is also a clique member. By "clique" is meant people in a subgrouping within an organisation who interact relatively more with one another than with people outside their subgrouping.

Originally Jacobson and Seashore (1951) identified the liaison in an organizational context, finding that:

"Some individuals appear to function as "Liaison" persons between groups, and characteristically have many, frequent, reciprocated and important contacts which cut across the contact group structure".

By now the characteristics of the liaison role have been fairly well identified. Amend (1971) found liaisons tend to have a greater diversity of information output, and show centrality in their network. They are perceived as having greater control over information flow, and are seen as effective in their work (Tichy, 1973, 1981, Tichy and Fombrun, 1979).

MacDonald (1976) described liaisons as having relatively more contacts than other people, and are perceived as having more influence than other people (though they do not perceive themselves as such).

Schwartz (1977) and Schwartz and Jacobson (1977) found that liaisons have more committee memberships, gave more time to administrative duties, had more contacts, and were perceived by others to be the first source of information. Albrecht (1979) considered liaisons to have a "broader perception" of situations, identified more with their work and perceived themselves as being closer to management.

The literature on liaisons links up with the investigations into boundary-spanning (eg. Tushman, 1977) and the literature on innovation (eg. Coleman, Katz and Menzel, 1957), for liaisons themselves may span boundaries and as well will play a prominent role in fostering the diffusion of new ideas throughout the organisation (Wager, 1972, Sutton and Porter, 1968, Rogers and Agarwala-Rogers, 1975, Richards and Linsey, 1979, Richmond, 1977, Moch, Feather and Fitzgibbons, 1983).

NEW ZEALAND RESEARCH

In order to investigate the research (if any) done in New Zealand over recent years into the topic of interest, a search was carried out of the major bibliographic sources available (Cochrane, 1984, Freed and McNamara, 1980). In addition, a search was undertaken of as yet unpublished data in higher degree theses (Cochrane, 1985) in order to discover whether other relevant research had been completed in the New Zealand context.

Little of direct application to the present research was

found, but some points worth noting emerged. Inkson's study (1979) explored relationships between manual workers and their supervisors, and with their coworkers; there was also some attention to questions of whether manual workers considered that their company furnished them with sufficient information. Inkson reported that more than two-thirds of his New Zealand manual workers said they had "a good deal" of on the job interaction with their coworkers: overall, suggests Inkson,

"the results revealed an impressively high degree of interaction and suggested that the potential of technology to interfere with informal day to day contact between workers was less great than might have been supposed" (p.108).

When comparing New Zealand with United Kingdom workers, Inkson found that whereas over two thirds of the New Zealanders reported frequent interaction with subordinates, less than half the U.K. sample did so. Inkson suggested, however, that such interaction did not necessarily reflect close affective links:

"It may be that for many workers the presence of other workers around them is important, takes the stressful edge off their work, and enables them to pass the time in social interaction; but that the actual identity of the other workers is unimportant, as the type of contact is casual and superficial, and does not carry

any connotation of close affective involvement"
(p.110).

When assessing the relationship between manual workers and their supervisors, Inkson found results similar to those recorded by Seidman (1975): the vast majority of respondents (over 90% in Inkson's case) regarded their relationship with their supervisor as "good" (p.119).

These results are of interest in the context of the present research, but are not central to it; the adequacy or otherwise of information flow was not explored in these studies.

The other material of relevance was some evidence cited by Inkson about freezing works' managers' use of time. In one assessment of how managers' time is used (in 1976), typically they spent:

"Around 30% of their time in visits around their plants, about two-thirds of this on regular daily tours, and one-third on trouble-shooting. Nearly 50% of time was spent in office discussions with others, mainly union officials, engineering staff, production staff, MAF officials and outside contacts such as farmers and suppliers. The remaining time was mainly spent on clerical activities such as report writing and correspondence" (p.229).

A following survey in 1978 revealed that works managers estimated that they spent only 12% of total time out in the plant (30% in 1976), and the amount of time spent on industrial relations issues had risen from 18% to 28%. The effect of recurring industrial relations problems appeared to have kept those works managers within the office rather than in the plant (p.230).

Studies outside New Zealand of how people in different occupational groups allocate their time at work are also of relevance. Generally speaking it appears that the amount of time required to be spent communicating varies according to work activities (eg. McLaughlin, Rosenbloom and Wolek, 1965, Allen, 1966(a), Ackhoff and Halbert, 1958). For example, Ackhoff and Halbert found that whereas research chemists spend 33% of their work time on communication, the figure for engineers was 20%.

Stewart (1979) assessed information sources in use among Otago farmers, but his results are difficult to apply to the present research, since they had no relevance to organisational contexts.

Some recent work has been done in the area of management information systems (eg. Rivers, 1981, Campbell, 1982, Rae, 1981); they feature wide disparities of interest and indeed of definition of what is meant by a management information system. Some writers define it as the general organisational structure and the formal information flow

that exists therein; others more typically have financial information systems in mind.

The MIS theses were all at masters level and were typically brief, pragmatic accounts of approaches for improving management systems. None of them was directly relevant to questions of information sources.

In this way it became apparent that the amount of work directed to the specific topic in New Zealand, at least in a systematic research sense, was virtually nil; and as far as could be discovered, the extent of other research which could be said to be of any direct relevance was very low.

However one complicating factor, as will have been recognised through the review of the literature so far, is the fact that many studies, in a variety of disciplines, are of some indirect relevance to the topic of information source use. The present writer does not pretend to have accessed all the research done in this country of possible relevance to the subject, but has seen enough to be confident that an exploratory, descriptive approach to the topic seems to be warranted.

ORAL AND WRITTEN SOURCES

The issue of oral sources as opposed to written ones is normally addressed from the sender's point of view (as with the Berlo and Lasswell models of the source discussed later in this review) rather than the receiver's. Typically

writers on oral vs written means of communication will assess the particular strengths and weaknesses of each channel and offer guidance on which may be preferred in what situation. Melcher and Beller (1967), for example, determine six criteria for determining the relative effectiveness of oral vs written communication, being speed, opportunity for feedback, selectivity, acceptance, cost and accountability. In their discussion of similar considerations Sussman and Krivonos (1979) confirm Melcher and Beller's choice, then add an extra criterion, warmth.

Hatch (1977) and Timm and Jones (1983) opt for similar criteria when discussing selection of communication media: speed, feedback capacity, hard-copy availability, message intensity and complexity, formality and relative costs of media.

Again the perspective is essentially that of the sender of the message; "the communicator" is perceived to be the person who initiates the information, not the person who receives it. A survey of this literature suggests that the arguments for preferring one channel as opposed to another are quite well developed from the sender's point of view, but considerably less so from the receiver's. It might be objected that the receiver is likely to react to the use of a particular channel in much the same way as will the sender of a message, but such an opinion is difficult to verify.

Certainly the orientation towards the sender rather than the

receiver of a message reduces the likelihood that the receiver's attitudes towards certain sources (and implicitly therefore towards the information they habitually convey) will be well understood. This creates the danger that researchers' and practitioners' beliefs about sources will be developed mainly from a sender's perspective and increases the likelihood of an excessively simple "conduit" notion of communication, as recently discussed by Axley (1984).

More progress in this area can be made when the literature of how scientists use oral and written sources is examined. Presently it is unclear how well the characteristics of scientists' acquisition of information extrapolate to the non-scientific organisational setting, but in the absence of other evidence the scientific literature has to be considered.

Wolek (1970) found evidence to indicate that the complexity of scientists' tasks had a significant influence on the type of source of information they chose. Specifically, the more complex the task, the greater was the likelihood that oral sources would be used, and the lesser the complexity, the greater the probability that written sources would be used. In support of Wolek is the finding of Cohen et al (1982); they reported that:

"The perceived value of an information source depends upon the particular kind of... decision made" (p.1363).

Whitley and Frost (1973) also investigated the relationships among geographical location of scientists, source use and complexity of tasks. They came to the conclusion that the requirements of tasks tended to be more important than accessibility of sources in source choice. Similar results were recorded by Pruthi and Nagpaul (1978).

Conflicting evidence about the relative importance of oral and written (and internal and external) sources has been identified by various writers. For example Allen (1977), Frost and Whitley (1973) and Utterback (1971) all suggested that internal oral sources of information are more important for scientists than are external oral or written sources.

On the other hand, Johnston and Gibbons (1975) and Shotwell (1971) cite evidence pointing in the opposite direction, that external oral and written sources are more important than internal sources.

A relationship between stages of a given scientific project and sources of information was established by Fischer (1979), who found that the less advanced a project stage, the greater was the likelihood that written material would be employed; and the more advanced the project stage, the more important would be oral sources.

An attempt to reconcile these various findings was made by Hes (1980) who postulated that in the course of a scientific

project distinct stages occur: he named these the work programme development stage, the idea generation stage and the problem solving stage. In his study of 28 scientists, 23 science technicians and 3 administrators in a division of the New Zealand DSIR, Hes found some evidence to suggest that use of information sources varied depending on which stage of the work scientific workers had reached. He reported that:

"The work programme development stage of work was significantly associated with information from external sources (ie. either written or oral); idea generation with information from written material and problem solving with information from internal (ie. oral) sources" (p.197).

In contrast to the idea generation finding, Baker, Siegman and Rubenstein (1967) had found that scientists when generating their project ideas made primary use of external oral sources. Commenting on the Australian STISEC report (1975), Gregory (1979) said:

"Figures collected for the Australian STISEC report (Scientific And Technical Information Services Enquiry Committee) also show the importance of personal contact in communication between scientists... most scientists communicate with each other informally and personally most of the time" (p.37).

When Hes reviewed the relationship between occupational groups and sources of information, he found that:

"The association between the two variables was complex. Scientists used significantly more written material (.28) and significantly less information from internal (-.15) and external (-.12) sources than the other two occupational groups.

Science technicians used significantly more information from internal sources (.18) but, more importantly, they used significantly less information from external sources (-.21) than the other groups.

Finally, respondents in the administrative category used significantly more information from external sources (.35) and significantly less information from written material (-.30) than the other two groups" (p.195).

The finding that administrative staff used less written information is useful for the present study, but given that so few administrators were included in the research (n = 3) not a great deal of reliance can be placed upon it.

The external orientation of the administrators seems to run counter to other findings cited in this review which suggest that the majority of sources of interest to knowledge workers are internal ones. This finding may be explicable

in view of the fact that Hes's case study was located in a division of the DSIR in Palmerston North; the head office of the DSIR is in Wellington and presumably a considerable amount of administrative contact is required between the two centres.

When Hes investigated the extent to which oral information was received "formally" or "informally" he found that the great bulk of such information came informally (85%) with much the smaller part formally (15%) (p.184). By formal oral information Hes meant that received via meetings, in contrast to informal, unplanned discussions in laboratory or similar settings.

Hes's findings about administrative staff use of sources mainly (though not entirely) support the findings in similar settings of Smith (1966). Smith compared the information sources used by what he termed "organisation man" (manager) and "research man" (scientist) and found that the information sources they used tended to be quite different. The "organisation man" was much more likely to ask other members of the organisation for advice or more information than was the "research man".

Smith further proposed that it is helpful to divide information sources into two categories: research or administrative when considering the use made of sources by research centre staff. Research sources consist of scholarly or professional contacts, while Administrative

sources comprise formal communication methods such as memos, committee meetings or internal organisational documents.

Differences between how scientific and organisational groups view information have been assessed by de Solla Price (1975) and Vickery (1973). De Solla Price argued that decision making and the information required for it are viewed differently by the scientific community and market oriented sectors: "outside the hard sciences knowledge is not consensual and free" (p.28).

Vickery postulated a continuum of information use behaviour, based on the idea that information use is a function of the kinds of work activities engaged in. The scientist, producing knowledge, has a narrow subject scan and a reliance on specific types of information. Similarly the technician produces functional designs and also has a relatively narrow need for information. The manager tends to be more of a generalist with a relatively wide subject span, and has little time to devote to research as such (pp.47-48).

Along similar lines, Uphoff (1972) promoted the idea of information as a political resource, and divided it into the categories of:

- (A) Technical information (which is closely related to the production of goods and services) and
- (B) Political information (which has to do with the

exercise of authority or power)

Both Vickery's and Uphoff's models show similarities to Smith's model of administrative and research sources discussed elsewhere in this review. McClure (1980) adapted Uphoff's model of information types in his study of information use in university libraries, and divided participants into "technicians" and "politicians". He found that technicians were concerned mainly with the information sources that enabled them to do an adequate job. Once they perceived their work performance to be adequate their need to contact sources was satisfied. However McClure (1980a) makes the point that a small proportion of technicians:

"Wanted to be involved in organisational decision making but appeared to be frustrated by their exclusion from the process" (p.116).

McClure found that politicians were different in that they were likely to contact a substantially larger number of sources than others. As well as technician and politician, McClure also categorised other staff as recluse or zealot. He proposed a continuum of information source contact ranging from recluse to technician to politician to zealot. By recluse McClure meant a person with minimal information source contacts, and essentially it appears to be the same term as isolate from the literature of organisational communication network analysis. Given the problems caused by lack of standardised terminology in the field, it seems

unnecessary to compound them by using more synonyms.

"Zealot", however, seems to have no counterpart in the literature elsewhere (it means a person who attempts to contact all types of information source in excessive quantities) but since in his research McClure found only two individuals whom he defined as "zealots", and since other writers have not identified this category of person at all, it is doubtful whether this term also will survive in the literature.

In their survey of successful companies, Peters and Waterman (1984) found that there was much awareness of the importance of informal interpersonal communication. Informal communication was regarded as being essential to organisational functioning, and it was associated with a style of management which was democratic and welcoming of input to decisions from all organisational levels.

Studies of the effects of task and technology characteristics on channel use have been carried out in recent years (Randolph, 1978, Randolph and Finch, 1977, and Tushman and Nadler, 1978). Some evidence has been found to indicate that when their tasks are perceived as of high uncertainty, participants will prefer oral as opposed to written media. Oral media offer better opportunities to question other people and to reduce uncertainty by this means. These findings have been reinforced by Daft and McIntosh (1981) who suggest that (a) those involved with

tasks which have no single, objective solution are likely to prefer oral information sources, (b) analyzable tasks can be served by written reports, and (c) the amount of information required will be low if task variety is also low (p.220).

And similarly Holland, Stead and Leibrock (1976) introduce the concept of "richness" of information transfer, meaning fuller information conveyed by multiple channels (e.g. voice, gesture, tone, pause, emphasis, etc), enhanced by the opportunity to receive and give feedback:

"Individuals dealing with "low-certainty" technical information will use richer information transfer means than will individuals dealing with "high-certainty" technical information" (p. 164).

Interpersonal communication is seen as important because it has immediacy, is timely and provides "socioemotional support" for the information user. Nevertheless the authors point out that there are other considerations:

"First, some highly uncertain information may not (1) be present in the formal literature or (2) be easily transmittable through formal channels. Therefore, what seems to be individual preference for richer channels may actually be a forced choice of such channels during some situations. Second, some individuals may prefer richer (interpersonal) channels when uncertain situations arise because of the desire (or felt need)

to have contact with another person for some kind of emotional support" (p.166).

Quite a substantial literature is available on "uncertainty" in organisational contexts (e.g. Blandin and Brown, 1977, Duncan, 1972, Galbraith, 1973, Lawrence and Lorsch, 1967, MacCrimmon and Taylor, 1976, Mitroff and Emshoff, 1979, Tushman and Nadler, 1978). Blandin and Brown have attempted to relate perceived uncertainty to managers' information search behaviour and they regard uncertainty as a complex concept influenced by elements of the task, the task environment and management perceptions. When top level managers from two industries (wood products and electronics) were surveyed, it was found that the latter experienced greater uncertainty. In particular:

"Significant positive correlations were found to exist between (1) the level of uncertainty perceived by managers and their reliance on external information sources, (2) their use of informal sources of information, (3) their frequency of use of all information sources and (4) the amount of time they allocate to environment related information gathering activities" (p.177).

O'Reilly (1982) explored the impact of uncertainty and task complexity on source choice and found that no important correlations existed within the group surveyed. However there is some evidence that when task uncertainty and

complexity are investigated across a range of jobs, rather than within a single job category (social welfare officers), preferences for information sources are affected (Gifford, Bobbitt and Slocum, 1979, Tushman, 1978). This topic is discussed at more length in Chapter 3, Research Methodology.

In Australia, Maguire and Kench (1974) investigated the information needs of small manufacturers, and found that respondents showed a strong preference for oral rather than printed sources of information. In a subsequent survey of information used by medical researchers and practitioners, Maguire (1975) found an extensive ignorance and underutilization of formal information sources, with relatively more use of print information sources such as MEDLARS by respondents working in a research environment, and much less use of such sources by respondents in general practice. These medical findings are in line with those of Cohen et al (1982) in the U.S.A.

In a study of the information sources used by growers and advisers in the horticultural industry, Mitchell (1981) stated that personal spoken communication was consistently ranked the most frequently used source of information. Other sources to receive high rankings were agricultural bulletins and magazines, and suppliers' representatives also scored moderately high (p.31).

The factors which seem to influence choice of an interpersonal contact have been explored from many different

points of view, eg. from an interpersonal perspective (Thayer, 1967), in terms of distortion (Athanasziades, 1973a and b, Downs, 1967, Krivonos, 1983, O'Reilly, 1978) and organisational structure (Child, 1972, Haige, Aiken and Marrett, 1971).

Two principles which appear useful in helping to account for findings in these areas are homophily and heterophily (McCroskey, Richmond and Daly, 1975, Alpert and Anderson, 1973). By homophily is meant the extent to which pairs of people who interact are similar in certain respects (such as values, attitudes, status, education, etc) while heterophily is the extent to which such pairs are different in attributes. Rogers and Kincaid (1981) propose that:

"The most fundamental principle of human communication is that the exchange of ideas most frequently occurs between transceivers who are homophilous (and) more effective communication occurs when the transceivers are homophilous. When two individuals share a set of similar characteristics, common meanings, and a mutual value position, communication between them is likely to be effective, which is rewarding, thus encouraging homophilous communication" (p. 127).

Some implications of this for research on information sources are that the principle suggests that people are likely to obtain much of their work and related information from others who are similar (perhaps coworkers) and that

communication across organisational ranks is likely to be impeded. Also, as Rogers and Shoemaker (1971) suggest, homophilous communication may inhibit the diffusion of new ideas; if all communication within an organisation were homophilous on status grounds, new ideas entering the organisation at either the top or the bottom would be unable either to "trickle down" or "trickle up". In other words, for new ideas to diffuse, some heterophilous communication is needed (Whittemore and Yovits, 1973, Vaidya, Lloyd and Ford, 1975, London, 1977, Level and Johnson, 1978).

In his review of information sources used by multinational executives, Keegan strongly reinforced the importance of interpersonal sources:

"Human sources were clearly more important than documentary or physical phenomena sources combined, accounting for 67% of all important external information reported by respondents" (p. 413).

Also of interest is that:

"Executives in large business organisations rely much more on external sources for information about their business environment than is commonly believed... (and) the study emphasises how little the systematic methods of information scanning have become a part of the way in which executives learn about their business environment. Computer-based systems were not found in this study..." (p. 420).

There is also a specialised sub-literature on the use of information sources by members of the public who require advice or other information, e.g. Williams, Dordick and Horstmann, 1977, in the U.S. or Smith and Wood, 1981, in Australia. When people from three communities were asked where they would go first to obtain an answer about various topics (e.g. health, recreation, etc.), it appeared that members of the low-income black community depended most on interpersonal communication networks, the Mexican-American group relied on institutions and agencies, while the predominantly white middle-income group depended on print media, television and telephone sources.

"Except in the case of "shopping" where all three groups tended to depend upon the newspaper, the choice of information sources was far more predictable on the basis of community than upon the topic of information desired" (Williams, Dordick and Horstmann, p. 99).

Although it may be dangerous to extrapolate these findings too closely to the organisational context, it is interesting to note that there appears to be an association between higher education and non-interpersonal and print sources, while in the low income and presumably low education group, a preference seems to exist for interpersonal sources.

"SEARCH" FOR INFORMATION: ACTIVE OR PASSIVE?

The extent to which knowledge workers do or do not actively search for information on their work problems has been debated at length over more than twenty years. Back in 1963, Cyert and March found that search behaviour was "often simple-minded, biased and sequential". By sequential they appear to have meant that people are likely to work through a series of actions (e.g. contacting the same series of co-workers each time) without regard to whether such steps were appropriate to the nature of the problem being investigated. The sequential nature of information search was also described by Lindsay (1979) in his study of engineers' information source use. In similar vein, Foxall (1975) stated that decision makers vary considerably in the breadth and thoroughness of their search for alternatives.

In his very influential work on decision making, Lindblom (1959) found that search for information normally tends to be limited to alternatives near existing problems. Administrators tend to "muddle through", in his words, dealing with problems in an ad-hoc, unstructured fashion. Ebert and Mitchell (1975) considered that search behaviour should properly be seen as a function both of the individual and of the situation s/he is in.

If these findings seem to stress the limited nature of search behaviour by people in organisations, those of Wickesberg (1968) point in the opposite direction.

Wickesberg found that individuals seek information:

"Wherever in the organisation information, advice, counsel and expertise may be found... Formal organisation boundaries and levels yield to the demand of the task and the situation" (p. 257).

Such findings may point in opposite directions, yet they are not necessarily contradictory. Models of information-getting have been developed in recent years which can accommodate both these perspectives.

In 1967 F.J. Aguilar published a work entitled Scanning The Business Environment in which he developed a model of information acquisition still regarded as influential. He considered that the manager typically uses four separate activities in the acquisition of information, being undirected viewing, conditioned viewing, informal search and formal search. In more detail:

1. Undirected viewing. The manager has no specific purpose in mind except possibly a broad kind of exploration or else the feeling that something important has changed.
2. Conditioned viewing. From previous experience the manager is attuned to the appearance of key facts or events, but s/he does not set out to find them.

3. Informal search. The manager is interested in obtaining information for a particular purpose and makes some attempts to discover it, but in a relatively unstructured way.
4. Formal search. Deliberate attempts are made to obtain specific information, using especially designed procedures or systems.

This "scanning" is divided into two main categories, viewing as opposed to search, the former more passive and the latter more active. Aguilar considered that the mode(s) of viewing or search adopted depend on the urgency of the issue, the clarity of definition of the objective, the cost of scanning and the resources that exist.

Very recently this model has been taken up and modified by Daft and Weick (1984) who also put forward four elements (which they call interpretation modes) called undirected viewing, conditioned viewing, enacting and discovering. The last two have different names to Aguilar's yet essentially appear to describe similar processes.

Given that the field presently lacks agreement on terminology, and given further that Aguilar's model still has paradigmatic status in the area, it seems regrettable that other writers are unable to employ his terminology. However "enacting" is a term associated with Karl Weick (e.g. Weick, 1979), by which he means the process whereby an

organisation "constructs its own environment," perhaps creating a market for its products or services, and actively attempting to manage its information flow to and from the environment.

It should also be noted that the levels at which analysis is conducted are different in each case: Aguilar's level of analysis is primarily the individual manager; Daft and Weick's is the organisation. The orientation of the present study is closer to the former than the latter.

Returning then to the question of whether knowledge workers tend mainly to restrict the extent of their search or extend it, both Aguilar's and Daft and Weick's models are useful ways of considering the issue. It may be speculated that at Aguilar's steps one and two "search" as such does not exist, and scanning is only of a perfunctory nature. At steps three and four, the individual's interest is much more developed, and his or her behaviour will be characterised by the kind of energy that Wickesberg mentioned. Thus this model offers a more satisfactory overall viewpoint of the processes involved than do the comments of, for example Ebert and Mitchell (search behaviour is a function of the individual and the situation) or Wickesberg (search behaviour is a function of the task and the situation).

From studies of decision making in organisations it has been reported that the act of choice will often precede the processes of search for and evaluation of information. In

effect people may make their minds up very early on about the issue of concern then only subsequently consult sources of information, probably to confirm the decision already taken (Jacoby, 1975, Mintzberg, Raisinghani and Theoret, 1976, March and Olsen, 1976).

Further, Mintzberg, Raisinghani and Theoret say that their evidence suggests that:

"Four types of search behaviors can be isolated.

1. Memory search is the scanning of the organisation's existing memory, human or paper.
2. Passive search is waiting for unsolicited alternatives to appear.
3. Trap search involves the activation of "search generators" to produce alternatives, such as letting suppliers know that the firm is looking for certain equipment (Soelberg, 1967).
4. Active search is the direct seeking of alternatives, either through scanning a wide area or focusing on a narrow one" (p.255).

These four types show strong resemblances to Aguilar's model, particularly in respect of items 3 and 4. A progression is evident: source contact will move from passive to active as the individual or organisation proceeds from 1 to 4.

Mintzberg et al. say that their research strongly confirmed

Cyert and March's contention that:

"Search begins in local or immediately accessible areas, with familiar sources" (1963, p.120).

Other authors to have addressed the question of where knowledge workers get their information from include Wofford, Gerloff and Cummins (1977) who postulate a three phase model of the organisation's need for information. They consist of "factors known, factors unknown and factors unknown unknown." By this they mean firstly that every organisation knows certain things, secondly it "knows it doesn't know " certain other things and thirdly, there is still another category of "unknown unknown" which consists of things that not only are unknown to the organisation, but which it "does not know it does not know." They focus mainly on the organisation's relationship with its environment, citing the use of "key communicators who serve as linking pins" (p.457).

Hall (1974) and Hes (1980) reported similar results when they explored to what extent scientists reported "active" versus "passive" reception of information (that is, along similar lines to Aguilar's "search" vs "viewing"). Hes found that more than half (56%) of information received by scientists arrived "passively" (44% "actively") (p.184). Hes also investigated the incidence of "pointing out," wherein scientists made a point of showing a colleague a piece of written information. About 20% of information from

written material was pointed out by colleagues to respondents, with 80% not pointed out.

The simultaneous functioning of multiple information sources was commented on by Mintzberg (1978), who reported that managers attended to information that was frequently incomplete, unspecified and rapid fire. Managers' work is characterised by interruption and the need to manage a large number of processes and events at the same time.

In his review of the literature of organisational communication and decision making, Connolly (1977) saw three modes in which individuals in organisation acquire information:

- (1) The individual is a passive receiver. This includes normal social contacts, regular reading of professional and other publications and specific communications from other individuals.
- (2) The individual is an active searcher. This includes information sought out by the receiver in response to a specific decisional activity, e.g. a focussed library search or a request to a colleague for specific information.
- (3) The individual consults information stored accessibly; there is little or no search.

Connolly hypothesised that:

"Important individual differences in ability and style

exist between the three modes, with some individuals preferring to rely on, and performing more efficiently in, one mode rather than another" (p.212).

To this reviewer Connolly's model of three modes of acquiring information does not seem to add anything substantial to Aguilar's model published 10 years earlier, except perhaps that Connolly attempts to assess the organisational communication literature from a standpoint of decision making.

Stuart (1979) discussed a study carried out of use made by companies of the New Zealand Physics and Engineering Laboratory's technical information service. Stuart reports that:

"Every two months, lists of abstracts on current articles published on metal finishing are sent to over 200 firms, and typically more than 25% request further information. Interviews carried out with 20 firms, 10 who had used the service and 10 who had not, indicate large differences in the use of technical information by the user and non-user groups. The user group...are "active" in their problem solving by using books and literature within the firm or from libraries. The non-user group...use a "passive" fire-fighting approach by calling on DSIR, the suppliers and other firms in the industry" (p.22).

It is interesting to note the way in which Stuart characterises a preference for print as "active", and one for interpersonal sources of information as "passive".

Stuart goes on to say that members of the "active" user group tend to have more industry experience and more education than the "passive" group. Also, the firms in the user group tend to have more formal systems for filing and circulating information internally.

Thus Stuart identifies education as a possible factor in source choice, and specifically as an indicator of possible use of print sources. Other writers to mention education are Havelock (1969), Allen (1977) and Swinehart and McLeod (1960). Reporting on studies of use made of mass media sources such as radio, television and newspapers, Havelock found that more highly educated people are more likely to use newspapers for information than radio or television. Similar findings had earlier been reported by Swinehart and McLeod, who in their news media research found that people who use print media as information sources are characterised by higher educational attainment and higher socio-economic status. Havelock also reported that more highly educated and more experienced farmers relied less on extension (oral) information sources. Allen (1977) discovered that gatekeepers in the R & D setting tend to be better educated than their colleagues.

In a contrary finding, Mitchell (1981) in a survey of

information sources used by horticulturalists, found no relationship between educational level and choice of sources. (Except that people with only secondary education perceived more frequent use of television as an information source than those with some tertiary education: sig = 0.05.) The major predictors were found to be the nature of work and the length of time spent in that occupation (p. 33).

A specialised sub-literature also exists in source use among buyers of durable goods (e.g. Westbrook and Fornell, 1979, Newman and Staelin, 1973, Claxton, Fry and Portis, 1974, Newman, 1977). It is not intended to review this literature here, since the population of interest to writers in this area (general public) is considered to be quite different to the organisationally based knowledge workers of the present study. Moreover, as yet there appear to be few useful conclusions available from this segment of the marketing literature, e.g.

"Results (of research in this area) indicate considerable diversity of search among consumers, many appearing to do little, if any explicit information gathering" (Westbrook and Fornell, p. 303).

However, Westbrook and Fornell do arrive at one conclusion useful for the present study, which is that education of buyers appears to be correlated with a relatively larger extent of source use as part of pre-purchase behaviour, and the consideration of many brand alternatives. Also, there

was some evidence that education was associated with preference for "objective information" from print sources (books, pamphlets, magazines or newspapers) instead of "subjective information" from oral sources (the advice of friends, neighbours or relatives) (p. 309).

A survey of Canadian educators (Summers, Matheson and Conry (1983) found that education was a moderate predictor of source use, but much stronger were position held and attitude towards the source.

O'Reilly (1982) explored source use among social welfare officers, and found that more educated workers reported using office files less frequently than less well educated people (corr, = -0.17, $p < 0.01$) but used internal group members more frequently (corr. = 0.24, $p < 0.001$).

In their overview of the ICA Audit, Goldhaber and Rogers (1979) reported that:

"Education was moderately associated with communication behavior, but for some variables the relationship was curvilinear rather than linear. Those who were the least and most educated, wanted and needed the most information".

On the subject of supervisory status and information, they reported:

"Supervisory status was moderately associated with communication behavior. Supervisory/personnel (sic) tended to receive (and want to receive) more information than non-supervisors... Supervisory status interacted significantly with sex, job tenure and type of organisation" (p. 17).

In his discussion of information as a political resource, Uphoff argues that the owners of resources (economic or political power and social status, for example) have the most to contribute and receive the most benefit from information. As the "Matthew effect" suggests, to those who have (resources) is given...:

"Information plays an important role... as seen by the correlation of education, which gives access to information, with economic wealth, social status and political power... The independent effect of information cannot be firmly established because of the cumulative and reinforcing effects of possessing informational, economic, social and political factors of production" (Uphoff, p. 44).

It has also been noted (Mintzberg, 1978) that in the organisational context, information is directed, both orally and in print formats, to the person at the head of the organisation, by virtue of his or her organisational status. This has the effect of reinforcing the leader's control of key information.

The role of scientific and technological literature was assessed by Scott (1959) who argued strongly that the primary role of literature is to supply useful information which is not being deliberately sought by the reader. He commented that:

"Any approach which takes for granted that the reader of technical literature is typically engaged in a search for some particular piece of information is seriously out of touch with reality" (p. 256).

In the New Zealand context, Gregory (1979) said:

"The research journal is a... sort of hoax - it gives a totally misleading impression as a means of communication between scientists. Its orderly accounts of successful experiments, and well supported conclusions are a deception constructed around the untidy mixture of luck, hunches and inspired guesses that make up most research. Such references as are cited are often introduced at quite a late stage to fill a gap in the logical development of a research paper" (p. 37).

In effect the formal literature, as Fischer (1980) suggests, serves:

"As the initial step in a multistep problem-solving sequence; in other words formal channels serve not so

much as a reference source for consultation, but more as a source of stimulation for eventual problem-solving" (p. 74).

Stuart (1979b) touches on a similar topic: he suggests that when people are "looking for information", in a very real sense they are not doing so:

"The business information customer does not want information; he is looking for the solution to a current problem, or, if time permits, he is looking for solutions to anticipated problems" (p. 21).

Problem-solving comes up again in the discussion of information source use by Rothwell and Robertson (1973):

"The problem-solving phase of the innovation process differs most significantly from the idea-formulation phase in that the emphasis is on a deliberate search for information" (p. 214).

One interesting characteristic of source use seems to have been identified first by Allen (1966 a), and has been discussed subsequently by writers such as Johnston and Gibbons (1975), Fischer (1980), Gerstberger and Allen (1968) and Rothwell and Robertson (1973). Allen found that the frequency of channel or source usage tends to be inversely proportional to the performance of that channel in providing information (pp. 10-12).

That people seem to prefer more accessible sources is probably a relevant consideration here; being accessible is of course no guarantee of being useful.

Matters of cost are also germane: knowledge workers may be discouraged from using useful sources through either an economic cost or a psychological cost. Gerstberger and Allen cite as an example of psychological cost a reluctance by an individual to consult a colleague if so doing would be perceived as displaying ignorance.

Johnston and Gibbons suggest that when a problem-solver's personal knowledge is inadequate he is likely to "approach a particular general source to obtain a particular type of information" (p. 31). However, they add that:

"While all sources of information are important, it is that information with which the problem-solver is least familiar and which is least readily available to him at the commencement of the innovation that in practice provides the greatest contribution to solving the technical problems - a clear indication of the value of close links to sources of information outside the firm" (p. 32).

At this stage, it should be noted that the research being cited here concerns technical problem-solving, not administrative, political (in the context of the

organisation) or strategic information handling; and it deals especially with the process of innovation, rather than the process of coping with day to day events (which is more characteristic of the work of knowledge workers generally).

Given both these factors, the extent to which findings from the R and D literature may be applied to the situation of knowledge workers generally needs to be carefully assessed. Since only a part of the information processed by most knowledge workers can be held to be "technical" in nature, and since knowledge workers are also not engaged in the production of innovations, results from the R and D research need to be assessed and used with caution.

One finding from the communication network literature which appears quite closely allied to Allen's principle of inverse proportion is Granovetter's strength of weak ties. In his investigation of how people find jobs, Granovetter (1973) found that it was the "weak ties" between acquaintances (rather than between close friends) that were informationally "strong" in the job-seeking process. It seemed that close friends seldom possessed job information that the job-seeker did not already know.

Rogers and Kincaid (1981) however, in assessing Granovetter's theory, pointed out that there may be problems of cultural bias inherent in the theory. They investigated job-seeking in Mexico and found that precisely the opposite conditions seemed to apply, that strong ties were the

crucial ones in getting a job (p. 245). Langlois (1977) found support for the strength of weak ties only among those seeking upper middle class professional jobs in his study of French-speaking people in Quebec.

SOURCE RESEARCH PROPER

The place of "the source" in organisational communication has been assessed in numerous discussions and models. One model frequently cited is that of D K Berlo (1960), who locates the source in the SMCR model:

SOURCE	MESSAGE	CHANNEL	RECEIVER
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In discussing Berlo's model Hawkins and Preston (1981) make the point that the source of a message in effect is a gatekeeper, transmitting information only if it "is relevant or important" and thus acting as "a valve on the flow of information" (p. 7). The source thus makes decisions on behalf of receivers.

Another model often quoted is that of Lasswell (1948) who proposed a five element depiction of communication, consisting of Source, Message, Receiver, Channel, Effect. The analysis of this model by Rosenblatt, Cheatham and Watt (1982) touches on source credibility, status and power of the source, but does not go into further details.

It is noteworthy that both these models consider the source more from a sending perspective than a receiving one. The

attributes of gatekeeper, credibility, status and power "belong" to the source and are seen as means of influencing the recipients of the messages sent.

In contrast, in the context of the present research, this perspective is seen as an inadequate one, and it is considered that a more satisfactory viewpoint of the source will be obtained when taking the recipient's part. This is in line with the comment made by Dervin (1980) in her review of recent literature:

"As the literature moves into the 1980's, research is beginning to emerge that looks at information as a user construct than as an observer construct" (p. 95).

Paisley (1980) attempted to draw a distinction between information mode and information channel in his discussion of information acquisition:

"Messages communicated via different combinations of mode and channel have different meanings for the receiver.

The mode of information is the physical state in which it is encoded. The first technical information in prehistory was encoded in the oral mode... Printed, audio-visual and electronic codings have all been invented in the recent past, relevant to this time span.

The channel of communication is the medium or other arrangement by which information is conveyed from sender to receiver" (p. 122).

One of the more pressing problems facing research in the area of information sources is the lack of standardised terminology. In the opinion of this reviewer, the creation of new terms in the field is justified only if they demonstrably either clarify aspects of the theory or help to operationalise a concept for research purposes. It is difficult to see how either is achieved by use of the distinction between mode and channel, and it seems much more desirable to use the term sources to include both mode and channel.

In his discussion of the information acquisition processes of engineers, Lindsay (1979) reported that they tended to turn to the various sources available consecutively, in response to problems encountered in the course of their work.

The sources available to the engineers comprised the following:

Colleague in work group

Colleague in company

Colleague outside company

Consultant

Information specialist in company

Information specialist outside company
Supplier's representative
Handbook
Book of collected papers
Scientific/technical book
Textbook
Internal company report
Other company's internal report
Published technical report
Published monograph
Trade publication
Professional journal
Scholarly journal
Popular science/technology serial
Library in company
Library outside company
Professional meeting/conference
Continuing education course
On-line computer search
Current awareness service.

The list of sources is worth citing in full to illustrate the range of means from which information was considered to come to these engineers. It is noteworthy that of the 25 sources, 16 are print and 9 are interpersonal.

The nature of the sources included clearly locates this study within the framework of research into scientific (rather than organisational) information acquisition.

Further, the absence of attention in this study to any hierarchical elements also distances it from the organisational communication tradition.

Nevertheless, it is interesting to note that the study attempted to discern patterns of internal and external source contact, as well as print and interpersonal contact. Being a survey of one occupational group in one industry of course enabled the listing of sources to be highly occupation-specific, unlike the present study, where an exploratory, descriptive study across a number of different organisations would seem to require that the sources be somewhat more general.

Another survey of engineers' use of information sources may be found in Allen (1977). Allen's study of communication within work teams was primarily focussed on matters of time allocation but also produced findings relevant to the present study. The R and D engineers participating were said to devote around 77% of their time in "analysis and experimentation", 16% in "communication", and 6% in "other activities". Communication when broken down is almost equally split between written and oral communication activities, with slightly more time (52%) being devoted to oral communication.

When the category of "reading written materials" is analysed, it is found that the bulk of engineers' time was spent reading unpublished reports and other informal written

materials (75%), with the remainder of their time being devoted to books and journals. This 75-25 split is interesting, highlighting as it does this group's need for information which is presumably more current than published material could provide.

A major survey (and one very frequently cited) into information sources used by headquarters executives in multinational companies was published by Keegan in 1974. He explored source use by executives in the three discipline areas of general management, marketing and finance in respect of three categories, documentary sources, human (face to face) sources and physical inspection.

Some intriguing differences were apparent, so it is worth reproducing some of his findings below (percentages of time spent using the various categories of sources):

	GENERAL MANAGEMENT	MARKETING	FINANCE
Documentary	18	30	56
Human (Face to Face)	71	65	44
Physical Inspection	11	5	0

The relatively low use of personal physical inspection is worth noting, and it is significant that only people in general management make much use of it. Overall, these managers appear to obtain their information through other

people (in interpersonal or print communication) rather than directly.

Use of print sources increases markedly from general management to marketing, then again to finance. Managers in the last category spend more than half of their source contact time using print materials, in contrast to marketing staff (less than a third) or general management (less than a fifth).

Lastly, interpersonal contact is most important for general management, quite important for marketers, but only of secondary importance for finance staff. Differences of this magnitude suggest that job classification has a major influence on the types of information sources utilised. Doubtless, however, there are other variables involved which Keegan's study did not include (such as perhaps status or education of participants), but as an indicator of trends of source use this study is important.

From business corporations to educational institutions, and a study recently conducted by Summers, Matheson and Conry (1983) revealed patterns of source contact worth noting. Reproduced here is a rank ordering of 13 information sources preferred by educators in British Columbia, each with a mean score on a four point scale:

1. Conversations with colleagues	3.5
2. Notes, files, books in my office	3.3
3. Books or textbooks	3.2
4. Curriculum materials	2.8
5. School or district libraries	2.7
6. Workshops, courses, seminars	2.7
7. Educational journals	2.6
8. Conventions or meetings	2.5
9. Experts from outside	2.3
10. Abstracts and bibliographies	2.2
11. Public or university libraries	2.0
12. Research reports, dissertations	1.8
13. Computer or retrieval systems	1.3

(n= 1078)

It may be observed that the research has a marked bias in favour of print as opposed to interpersonal sources (four of the latter, but nine of the former). Some sources have elements of both print and interpersonal, of course: while libraries are "mainly" print they also feature interpersonal reference services, and while conventions are "mainly" interpersonal the print handouts normally available there may also be important. Rather than attempt to determine relative proportions of print and interpersonal elements within sources, or create a hybrid category of print-interpersonal to accommodate these sources, it will be the practice of this study to assign sources to either print or interpersonal depending on the primary nature of each.

Despite the restricted choice of interpersonal sources it is noteworthy that colleagues are ranked first, slightly ahead of notes, files, books in my office. The sources in second, third, fourth and fifth places have quite a lot in common; all contain "books" as an element in them, and it is not altogether clear how they should be distinguished. Problems of overlap among these sources may render this research less than entirely useful, but it is nonetheless interesting as an indicator of overall patterns.

Of the first five sources, then, four are print, and it is not until the sixth, then the eighth and ninth, are reached, that other interpersonal sources appear. One feature which the first five sources have in common is that they are all relatively close at hand. By "colleagues" one could infer people who are primarily (though not necessarily exclusively) nearby; "notes, files, books in my office" are of course very accessible; "books or textbooks" it may be assumed are reasonably nearby and "curriculum materials" likewise. "School or district libraries" may not be as close at hand, but presumably they are closer than the source in eleventh place, "public or university libraries".

It is worth noting that "computer or retrieval systems" is located in lowest ranking, almost at the point of no use at all. The impression gained from the list is that these participants use mainly traditional sources of information, which are primarily print-based, and largely close at hand.

Another feature of this research was an attempt to compare people who received a lot of information with those who gave a lot. Respondents were asked for their perception of themselves as people who disseminate information through person to person channels in terms of how often others came to them for information, and how often they gave other people information. (The report of the research (Summers, Matheson and Conry, 1983, does not make clear whether this was one question or two.)

In any event, the study found that the reported rate of dissemination was significantly related to the frequency of use of sources. That is, those who said they gave out a lot of information said they looked for a lot of information.

The complexity of the matter was stressed by the researchers:

"The respondent data revealed that use of information sources by educators is by no means a simply explained linear phenomenon. It is instead the result of a complex set of interactions among multiple variables each with differing capacity to predict information source use" (p. 85).

In 1982, Aiyepoku published the results of another survey with a strong print orientation, which explored the habits of regular consultation of information sources by Nigerian

senior civil servants. The ten sources included in the survey are listed below, together with the percentage of respondents who consult them regularly:

<u>SOURCE</u>	<u>CONSULT REGULARLY</u>
1. In-house memos	69%
2. Government documents	64%
3. Personal contacts	58%
4. Books & Magazines	48%
5. Newspapers & Magazines	43%
6. Conference proceedings	32%
7. Learned journals	32%
8. Theses & dissertations	9%
9. Indexing & abstracting services	8%
10. Others	6%

n = 384

It appears to have been the intention of the researchers to discover the whole range of sources from which civil servants obtained their information, but if such was the case, the scope of the sources included in the research was considerably too narrow. The basic assumption of the research (carried out from the National Library of Nigeria) seems to have been that print sources were virtually the only ones worth considering, and it is noteworthy that the only interpersonal source included was the broad category of "personal contacts". In his discussion of results obtained,

the author expressed some surprise that the interpersonal source was ranked so highly, and ventured the opinion that the quality of information available from such sources might be inferior since it did not come from a reputable print source.

In other words there seems to be some evidence of flaws in the research design of this study, but it is still of interest for its portrayal of the print sources the participants use.

In-house memos are shown to be the basic tool of trade of these knowledge workers, with nearly 70% reporting that they consult memo files regularly. The nature of the government documents located in second place was not specified, but they are assumed to include official gazettes, statutes, statutory regulations, white papers and the like.

The interpersonal source is listed in third ranking, with 58% of participants consulting this source regularly. Details of what the researchers considered "personal contacts" were not given in their report (Aiyepoku 1982a), but it is surmised to include colleagues, superiors and other people both within and outside their organisations.

The impression gained from the first three sources is generally of preference for information close at hand, both internal to the organisation and readily accessible.

Further down the list come traditional library sources such as conference proceedings and learned journals. It is noteworthy that primary print sources such as conference proceedings and journals are ranked much higher than secondary print sources, being bibliographic tools such as indexing and abstracting services. Theses and dissertations are also apparently not greatly favoured as reading material, and it might even come as something of a surprise that as many as 9% of participants claim to read theses regularly.

From mainly print to mainly interpersonal; an opposite orientation towards print and interpersonal sources is evident in a survey of information sources preferred by hospital staff and faculty (Cohen, Weinberger, Mazzuca and McDonald, 1982). The researchers surveyed three groups (Faculty members, house staff and senior residents) in respect of six sources (Journal reading, past experience, house staff, general internists, conferences and subspecialty staff). The basic assumption of these researchers appears to have been that other people constitute the primary means of obtaining information, and only "Journal reading" was included in the survey as a print choice. Also, as mentioned above in the discussion of Summers, Matheson and Conry's findings, the mainly interpersonal source of conferences no doubt often has a print element as well. (This does not apply to conferences as listed in Aiyepoku's research; there, conference proceedings are specified, which are exclusively print with

no interpersonal aspect.)

The focus of the hospital research was on the extent to which particular information sources were perceived as being influential in regard to medical decisions made by participants.

<u>House staff</u>	<u>Senior residents</u>	<u>Faculty members</u>
1. Journal reading	Journal reading	Journal reading
2. Past experience	Conferences	Conferences
3. House staff	Subspecialty staff	Subspecialty staff
4. General internists	Past experience	Past experience
5. Conferences	General internists	General internists
6. Subspecialty staff	House staff	House staff

The first point is that all three groups rate journal reading as their most influential source of information. This source is presumably characterised by being near at hand and up to date. Seeing the importance of this source, with the wisdom of hindsight it seems unfortunate that more print sources were not included, in order to explore whether the importance ascribed to this source also carries over to other print sources such as books.

However, it was also interesting that the most research oriented group (university staff) judged journal reading as considerably more important than interpersonal sources, conferences or past experience. Non staff members judged

reading as only somewhat more important.

These findings are in line with those of Hes (1980) who reported that scientists used significantly more journal sources than did science technicians. The next point worth mentioning is the closeness of the responses of two of the three groups (senior residents and Faculty members) who list all sources in the same order, while interns agree with only in respect of journal reading. It will also be noted that all sources except conferences are internal ones, demonstrating the researchers' assumption that significant sources are mainly close at hand.

Another recent survey into information source preference was published by McClure (1980a); the survey was conducted on the attitudes of professional university librarians to information sources. Unlike the survey carried out from the Nigerian National Library, this was weighted more towards discovering interpersonal sources (though print ones were also included). In all, 10 interpersonal sources were included and 6 print ones. The research also featured three categories of personal, experience-based sources, "Doing some research on my own", "Personal opinion", and "Past experiences". By rank order of preference, McClure lists the sources as follows:

1. Articles from library-related journals
2. Interpersonal contact with professional staff within the library

3. Committee or group meetings composed of library staff
4. Interpersonal contact with librarians outside the library
5. Doing some research on my own
6. Reports or statistical information produced by staff members in the library
7. Personal opinion
8. Book reviews
9. Interpersonal contact with library patrons (users)
10. Past experiences
11. Continuing education
12. Articles from journals not related directly to librarianship
13. Interpersonal contact with university faculty members
14. Committee or group meetings of professional library organisations
15. Interpersonal contact with paraprofessional staff in the library
16. Books
17. Committee or group meetings with non-library staff from the university
18. Vendors, jobbers, sales reps.
19. Brochures, advertisements, flyers
20. Other

The oral sources are interesting for the insight they provide into the interpersonal dynamics within the organisation: it is noteworthy that whereas contact with other professional staff is at No.2, contact with

subprofessional staff is down at place 15. The latter group seem to have very little influence on events.

As with the medical staff survey, the top ranked source is given as articles from journals in the disciplinary area (but in contrast, journals from outside the area are ranked in twelfth place). The next print source does not appear until sixth place (being internal reports). Of the top five sources three are interpersonal, one is personal and one is print.

A very wide discrepancy is evident between professional journals (in top place) and books (in 16th). At 12th place in the list are articles from journals not in the disciplinary area. Book reviews are in 8th place, and it may be assumed that the decisions referred to would include decisions on which books to acquire for the library collection.

Meetings with other library staff are quite an important source, in third place, and this category includes only internal staff meetings. Other meetings are listed, but they are in 14th place (professional library organisations) and 17th place (non-library staff from within the university).

The most used sources show a very strong internal emphasis. All the top seven sources are internal, in the sense of being either intra-organisational, or intra-professional, or

both. The impression given by these results is of a fairly closed group, very receptive to points of view from other professional library staff either within the library or outside it, but taking little account of other perspectives. Library patrons and university staff members are ranked at 9th, 13th and 17th places, suggesting that effectively they have very little influence on decision making.

The importance ascribed to personal reflection is very high. This survey is unusual for containing three personal, experience-based sources, and all three of them are ranked in the top half of the list. This finding tends to reinforce the impression that participants have a strong internal orientation and take relatively little account of what is said elsewhere.

Sources used by professional engineers in Norway are worth citing (Disch, 1977):

<u>Written Sources</u>	%	<u>Oral Sources</u>	%
Suppliers' information	16	In-house colleagues	8
Technical literature (textbooks)	13	Suppliers' inform-	
In-house files	10	ation	7.5
Foreign technical press	8	Outside colleagues	4.3
Domestic technical press	5	Courses, seminars	4
Abstract services	0.3	R and D institutes	2

The percentage figures refer to the percentage of

participants who found the sources of substantial use. It appears that those participants have a preference for written over oral sources: Stuart (1979b) speculates that this result is due to the fact that all participants had had university level training and hence were more attuned to written materials.

It may be noted that these participants use abstracting services considerably less than the civil servants cited by Aiyepoku (1982): 0.3% as against 8%. This is the first appearance, also, of suppliers as a significant external source, and they figure among both the written and the oral sources, being top source in the first and second to top in the second.

The place of textbooks is evidently quite important, being ranked higher than journals or magazines, unlike the experience recorded by Allen's engineers, who reported that much more of their time was spent reading unpublished reports than with books or journals. Like Disch's engineers, Summers, Matheson and Conry's educators also preferred books to journals, as did Aiyepoku's civil servants. McClure's librarians, by way of contrast were much more attuned to journals than books.

Probably, it comes as no surprise that Disch's engineers had in-house colleagues as their top oral source; that suppliers are so close behind in second place is unexpected and might be dismissed as aberrant were it not supported by findings

in Australia.

In their survey of small manufacturers, Maguire and Kench (1974) found that the information sources most often consulted were:

	%
Supplier	54
Someone in a similar business	38
Consultant in private practice	7
Technical institute or college	5
Standards Association	5
Trade Association library	4
CSIRO (Equivalent of the NZ DSIR)	3
Local public library	2
University	1
Research service of the NSW State Library	1

It is questionable to what extent the Australian survey has relevance to the present study, given that participants were in very small manufacturing units, with very few coworkers. However, the importance of interpersonal sources is reaffirmed here with the top three sources basically interpersonal, and the lowest sources mainly print. In fact, suppliers and people in similar businesses seem to be the only sources of any importance at all, with the rest of the sources having an insignificant impact.

Maguire and Kench (like Aiyepuku) question the reliability of the information available from these interpersonal

sources:

"There is no guarantee that either suppliers or other businessmen are especially well informed on technical matters. In fact some of the comments of our respondents would suggest the opposite as far as the suppliers are concerned."

Support for this viewpoint may be found in O'Brien et al. (1964) who reported that 45% of the small manufacturing businessmen in their survey considered that the quality of the information received from personal contact to be unreliable and biased. Only 23% made similar criticisms of business publications when asked about their weak points (Stuart 1979b, p. 22).

The role of the supplier was again shown to be important in a study carried out by Coleman, Katz and Menzel (1966) who surveyed 216 general practitioners in a mid-West region in the U.S. at the time of the introduction of a new drug. Their aim was to explore the sources of information from which G.P.'s found out about the drug, and they reported that initially more interpersonal than printed sources were cited as the first source of information about it. 57% of the doctors mentioned the pharmaceutical sales representative, followed by 18% citing company brochures.

Next studied were the network processes by which knowledge of the drug was diffused throughout the region's doctors.

Information about the drug was passed on first among "professional conversation partners", next among close friends and last to isolates.

Contrary findings were reported however by Christensen and Wertheimer (1978) who in a survey of where G.P.'s obtained their knowledge of drug information, found that general information about drugs was obtained from literature based services, that awareness of the existence of new drugs varied according to the drug, and that those using the drugs had been predominantly influenced by colleagues. As these results differed from those of previous studies, it was felt that:

"The findings from this study would appear to limit the extent to which prior findings may be generalised to different practice settings, drugs, practice specialists and time periods" (p.321).

COMMUNICATION AUDITS

Also worth mentioning in the context of information sources is the group of works dealing with communication audits (e.g. Baxter and Overell, 1980; Baxter and Peters, 1979; Foehrenbach and Rosenberg, 1982; Goldhaber and Krivonos, 1977; Goldhaber and Rogers, 1979; Goldhaber, Dennis, Richetto and Wiio, 1980; Greenbaum, 1974; Greenbaum and White, 1976; Hickson, 1972; Klauss and Bass, 1982; Machin, 1980; Odiorne, 1954; Richetto and Dennis, 1976).

A communication audit sets out to take an overview of an organisation's communication and information system, (in the sense of human rather than EDP "communication") and to make recommendations for improved management practices. Typically, part of the investigation includes an appraisal of the sources of information which organisational members report using.

In terms of their treatment of information sources, communication audits seem to divide into one of two categories: either a primary concern with interpersonal communication or a concern with print information within the organisation. Of the latter Greenbaum (1974) said in his national survey of industrial communication measurement practices that organisations are basically assessing the state of their in-house publications. An example of this is the International Association of Business Communicators (IABC) biennial communication audit carried out in the U.S.A., Canada and the U.K. (as reported in the IABC survey,

1983, and Foehrenbach and Rosenberg, 1982), where one major intention is to explore the perceived usefulness of in-house publications. The orientation of this research is very much towards print sources and this possibly reflects the fact that the consulting firm conducting these audits has the production of in-house publications, on contract, as a significant portion of its work. Although a few interpersonal sources are included, they are of much less concern.

The IABC audit features the following sources (here ranked in the order preferred by employees in the U.S., Canadian and U.K. companies surveyed):

1. My immediate supervisor
2. Small group meetings
3. Top executives
4. Employee handbook/Other brochures
5. Local employee publication
6. Orientation program
7. Organisation-wide employee publication
8. Annual state-of-the-business report
9. Bulletin boards
10. Upward communication program
11. The union
12. Mass meetings
13. Audiovisual programs
14. Mass media
15. The grapevine.

Item 10, Upward communication program, appears to refer to suggestion box schemes; item 11, The union, may involve both union publications, handouts, etc., as well as face to face contact. Item 3, Top executives, is assumed to mean primarily face to face contact, while item 6, Orientation program will be a mixture both of talks and printed handouts.

Of the sources which are unambiguously either interpersonal or "print", then, five (supervisor, small meetings, top executives, mass meetings and grapevine) are the former and eight (handbook, local publication, organisation-wide publication, annual report, bulletin boards, upward communication program, a/v programs (a "non-interpersonal" source) and mass media) are the latter.

It is noteworthy that the top preferred sources are all interpersonal, of a face to face nature. The only source of this nature not highly ranked is the grapevine, occupying bottom position. This result appears strange, especially in view of the various findings about the grapevine, such as that it is pervasive, fast, accurate, etc. (Newstrom, Moncza and Reif, 1974; Davis, 1953a, 1969) but it should be recalled that the list presented here is what people say they would like to receive, not what they say they do receive.

In contrast to the print orientation of the IABC audit, the

International Communication Association (ICA) audit focusses mainly on interpersonal sources, and this probably reflects the psychology and communication backgrounds of ICA members and audit designers. Their principal interest seems to be in exploring interpersonal aspects of organisational communication, with a relatively low extent of interest in print sources.

The ICA audit draws a distinction between sources and channels:

Sources

Channels

Subordinates

Face to face contact between people

Coworkers

Face to face contact among more than two people

Individuals in other units

Telephone

Immediate supervisor

Written (memos, letters)

Department meetings

Bulletin boards

Middle management

Internal publications (newsletter, magazine)

Formal management presentations

Internal audio-visual media (Videotapes, films, slides)

Top management

External media (T.V., radio,

The grapevine

newspapers)

(Goldhaber and Rogers, 1979)

Recalling now the earlier discussion of channels and sources (source is the ultimate place from which information comes, and channel is the means whereby information is transmitted), it will be seen that the I.C.A. "sources" of meetings, presentations and the grapevine have strong elements of channels inherent within them, while the "channels" of memos/ letters, newsletters/ magazines and external media all have elements of sources within them.

However all these sources or channels are to be defined, it will be seen that 12 (including all the "sources" proper) are primarily interpersonal and only 5 are non-interpersonal. The print sources are not as extensive in their scope as seems desirable, and in at least one instance (Internal publications) are too generalised: Memos are an internal source, letters an external one, and very likely internal will be more important than external.

Somewhat more balance is evident in the Organisational Communication Development (OCD) audit (Goldhaber, Dennis, Richetto and Wiio, 1979). Ten sources are listed, of which six (superiors, shop stewards, fellow employees, joint committees, meetings and rumors) are interpersonal, and four (bulletin boards, newsletters, circular letters and newspapers) are print. The focus is still mainly on interpersonal communication, as shown by its section on "Where I should like to see improved communication": here only the six interpersonal sources are offered for participants to select.

CONCLUSION

In conclusion, this review has surveyed a considerable quantity of partially conflicting viewpoints on information source use. Studies such as Aiyepoku's appear to have been designed to find out only what print sources are used, and when respondents cited the importance of interpersonal sources, this seemed to come as a surprise. Mintzberg on the other hand stressed the importance of interpersonal sources, perhaps at the cost of playing down the importance of print.

Klauss and Bass set out to write a book on computer based MIS, but after discovering from their respondents that such sources were very little used, abandoned this intention and instead wrote a book on interpersonal communication.

Various writers cited above in the areas of MIS and strategic information make sometimes sweeping claims about the importance of computer-based or print sources, and ignore interpersonal elements. To balance this, researchers in organisational communication explore interpersonal sources in considerable detail, but pay scant attention to print sources.

Other studies, such as Fischer in the area of the technological gatekeeper, or Smith in bibliometric studies, draw attention to the fact that both interpersonal and print sources may well be of crucial value, and imply that both must be explored.

Meanwhile, no simple model of information source use presently exists, nor does agreement on what sources are most important

under what conditions. This review of the literature suggests that the most necessary task facing researchers in the area is to attempt to reconcile the interpersonal versus print findings to arrive at some basic conclusions as to what the principal sources are, which are employed by a broad spectrum of knowledge workers, and to discover what the main characteristics are of such source use.

CHAPTER 3

RESEARCH METHODOLOGY

"... the only dogma a multidisciplinary field can afford is to legitimise its pluralistic approach at all costs" (MacDoniells, 1981,p2).

PROBLEMS OF COMMUNICATION RESEARCH

In 1977 Richetto surveyed a number of assessments of communication research, and came up with a list of seven problems which, he suggested, have been associated with it. In 1979 Goldhaber and Rogers also published an assessment of problems associated with research into organisational communication and also cited the same seven problems in the same order (though without citing Richetto).

The particular problems identified by Richetto (with Goldhaber and Rogers in brackets) are:

1. "Single instrument" approaches (Single instrument approach)
2. Situational variables (Situationalism)
3. Small, perhaps unrepresentative, samples (Small unrepresentative samples)
4. Lack of normative data (Lack of standardisation and

norms)

5. Limited examples of actual communication behavior (Limited measurement of actual behaviors)
6. Static, rather than dynamic measures (Measurement not done over time)
7. Uncertain predictive validity (Questionable predictive validity).

The specific issues associated with these problems are discussed below.

1. Single instrument approach. Much communication research has relied on a single approach- perhaps a survey questionnaire or a self-report form- which is not backed up by any other method. The complexity of organisations would seem to make research methods incorporating more than one instrument very desirable. Cook and Campbell (1979) talk about "mono-method bias" (p.66) as a further problem, whereby even if more than one method is used participants may fall into an attitude set which will influence them to respond along very similar lines to any methods employed.

Several researchers are often cited in respect of multi-method approaches.

Webb et al. (1969) suggest that:

"The most fertile search for validity comes from a

combined series of different measures, each with its idiosyncratic weaknesses, each pointed to a single hypothesis. When an hypothesis can survive the confrontation of a series of complementary methods of testing, it contains a degree of validity unattainable by one tested within the more constricted framework of a single method" (p. 174).

Denzin (1970) proposed that a "triangulation" of measures would provide mutual reinforcement, all contributing complementary data on the topic under investigation. Campbell and Fiske (1959) argue the case for a "multi-trait, multimethod matrix" approach (primarily for experimental or quasi-experimental research) in which each research method would be focussed precisely on the construct of interest. Initially at least, their interest was in assessing the validity of psychological tests, and it was seen as desirable to use multiple instruments dealing with multiple traits. The pattern of intercorrelations thus obtained allowed the detection of reliability and validity coefficients.

An approach similar to Denzin's is intended in the present research, with three methods being devised (questionnaire, network analysis and moderately scheduled interview), each of which should shed light

on the topic of interest and to some degree provide reinforcement for the other two. Because of the broad, exploratory intention of this research they cannot be as precisely focussed as in the Campbell and Fiske example, but notwithstanding, the network analysis and the interview data should in some cases serve to act as back-up evidence for the questionnaire findings.

2. Situational Variables. Many studies have been conducted in a single organisation, thus making it difficult to generalise findings to locations elsewhere. To compound the problem, it is rare to find replications of research done elsewhere; such are not favoured by journal editors in management or communication. Both these fields seem to be characterised more by a pressure to be "new" rather than to reinforce or test previous work.

Since the aim of the present research was to engage in a wide-ranging exploratory assessment, clearly a number of organisations had to be involved; they are described below in the Research Environment section. One risk of including so many organisations in the research is that the extent of organisational differences will be so great that the findings from them may not be well unified. Possibly fewer organisations, perhaps all in the same industrial grouping, would provide more unified results to the sort of investigation proposed here. However it is considered that a more restricted

approach would defeat the stated purpose of establishing a groundwork study for knowledge workers generally.

3. Small, perhaps unrepresentative, samples. In 1972 Porter and Roberts reported that the "knowledge base" of human communication behaviour in organisations consisted of fewer than 1500 persons. Doubtless this number has been vastly increased since that date, but even so the problem still seems to occur that individual studies are carried out on quite small numbers.

This writer is inclined to think that there is less merit in sheer size than there is in well-designed, (albeit small-scale) studies. Moreover, with a very large sample, correlational studies tend to acquire statistical significance of a level unwarranted by the real nature of the relationship under investigation (as reported, for example by Goldhaber and Rogers in their account of the ICA Audit, 1979).

Perhaps a problem more pressing than size is the issue of whether a sample is representative of the population to which it belongs. As discussed below, for both theoretical and methodological reasons the use of random sampling was judged inappropriate for this study. Therefore the appropriateness or otherwise of the 17 samples has to be determined on the basis of

whether they are representative of the wider group. This topic will be discussed in the section entitled the Research Environment further on in this chapter.

4. Lack of normative data. The disparate interests of researchers in the field of organisational communication have resulted in a fragmented and poorly co-ordinated body of research overall. One exception is the International Communication Association audit (described in the Literature Review above) which has had as a goal the development of an international data base of information on topics of communication within organisations, information sent by staff, satisfaction with communication and information sources used by staff.

This data base is open to researchers who wish to conduct assessments of particular topics, and indications are that it serves a useful function in this way (e.g. Siegerdt, 1978).

Although no direct use would be made of the I.C.A. data base in the present study, it was decided to investigate as many sources in common with the I.C.A. as possible to permit future research to explore some comparative aspects of source use. As mentioned in the Literature Review, however, the I.C.A. audit has a bias in favour of interpersonal sources, and appears relatively uninterested in print. Because the

Literature Review made it very plain that knowledge workers were in all probability dependent, in many instances, on print sources as well as interpersonal ones, it was felt that the present investigation had to include a much more extensive collection of print sources than featured in the I.C.A. audit.

Related to this issue is the question of external validity, and later on in this chapter an attempt is made to assess likely threats to external validity, and discuss ways in which the research was designed to avoid or minimise these.

5. Limited examples of actual communication behaviour.

Actual communication behaviour in complex organisational settings is of course notoriously difficult to investigate, because of the subtle, interactive and processual nature of communication itself. Hence it is no surprise to find that researchers tend to employ approaches such as measures of attitudes, message content, etc.

The present research acknowledges this as a problem by incorporating network analysis as one of its three investigative techniques, as potentially a means of checking aspects of the questionnaire, thus serving mainly as an adjunct or back-up to the questionnaire data. While it is not literally the observation of "actual" behaviour in the sense that, say, participant

observation is, nevertheless network analysis is thought to be quite close to an actual observation inasmuch as two people decide the extent of their communication on a given topic, each in effect acting as a check upon the other. If, as happens in most instances, there is fairly close agreement between the two parties on the extent of their communication, the researcher may feel confident that the evidence of communication behaviour occurring is considerably stronger than, say, simple attitudinal data (Knoke and Kuklinski, 1982).

6. Static rather than dynamic measures. The dominant metaphor used by writers discussing the lack of communication research done over extended periods of time is along the lines that "communication is a movie, but most communication research is just a snapshot" (Roberts and O'Reilly, 1974, Likert, 1967).

Reasons why one-shot research is often preferred are not difficult to cite; among them are problems of time pressure in most research programmes and insufficient funding. Perhaps more importantly, the rapidly changing aspect of many organisations today means that it is impossible to "hold steady" all conditions in between research measures. For example the departure or promotion of one, let alone several, central individuals in a study, or the arrival of new people, can vastly affect the dynamics of an organisation.

In a study such as this one, with 17 organisations involved, multiple applications of measures would firstly present considerable logistic difficulties. More particularly, with the rapid organisational restructuring that is so much a feature of New Zealand enterprises today, the analysis and interpretation would become complex well beyond the scope of one research investigation.

- 7 Uncertain predictive validity. The problem as identified here by Richetto, Goldhaber and Rogers and others, is that in the past, communication research has not explored the relationships, if any, between performance variables and communication variables. Thus the role of communication in organisational performance is probably not well understood.

For the present study, given that a major goal was an exploratory investigation, it was felt that it was not appropriate to look at outcome variables at this time. Undoubtedly such should be explored at some stage, but the first task was to conduct a wide-ranging, descriptive survey to establish some baseline data.

A discussion of this nature would be incomplete without reference to the frequent incidence of criticism of empirical methodology, voiced by writers such as Penman (1980) or Phillips (1981). Penman for example argues that

in the past communication research has been stunted by certain limiting scientific assumptions, viz.:

- "1. The mechanical model of human communication required to satisfy scientific requirements;
2. The most scientific conception of cause is one which focusses on external stimulation (à la Hume);
3. A logical positivist's methodology is the best possible" (p.4).

She talks in terms of the "deleterious effects on social research and theory of these assumptions, and their simple inadequacy to deal with much that is real and significant to us as humans" and goes on to argue that communication researchers have responded to the limitations imposed by those assumptions in one of two ways. Firstly, some have accepted the limiting nature of the assumptions and designed their research in such a way as to minimise the harmful effects of such limitations, while attempting to maximise the benefits conferred by the scientific approach. Secondly, on account of the serious limitations implied above, they have discounted the value of the scientific method altogether, and opted for a "non-scientific" approach.

Phillips attacked the current use of scientific method from several perspectives ("science is either an accolade or an opprobrium depending on your party"), such as:

"There is no escape from the sampling tautology that what is customarily measured in communication studies is ascribed rather than described. A wheat seed is real, an electron is inferred from evidence. Both can be construed as empirical, i.e. their existence can be conferred by observation with the naked eye or abided by instrumentation. An attitude, however, is an hypostatization, an "as if", which takes on existence... with all the imagination of the person who created the concept. There is no tangibility, but the fiction expands so that the behavior ascribed to the concept appears as the investigator looks for it, thus the concept is validated via distortion of reality" (p.366).

Other writers (e.g. Campbell, Daft and Hulin, 1982, Mitchell, 1985) defend the use of scientific method, but argue that much current organisational research is poorly done:

"A whole body of sound research concepts seems to have been suppressed; e.g. reliability of measurement, power of statistical tests, adequate and well thought through sampling designs - unfortunately a not uncommon phenomenon in the literature today is a "study" in which the authors sent a nonpretested, nonscaled questionnaire to a convenient sample of uncertain nature in which little or no thought was given to the reliability of the measurement or the meaningfulness of

responses. Nonetheless numbers are obtained and are subjected to the staggering array of sophisticated computer-assisted statistical techniques, and "results" are obtained and generalised to a population of which the original sample had very little relationship" (Campbell, Daft and Hulin, 1982, p.61).

However it is clear that problems do begin to multiply when a researcher attempts to transpose the experimental, research based processes of laboratory-style research to real organisational settings. People of a strongly nomothetic persuasion, for example, argue along the lines that:

"... the researcher is an empiricist who believes knowledge can best be achieved by means of first hand, controlled experimentation" (Scott, 1975, p.143).

Their assumption seems to be, as Duncan (1981) points out, that:

"... experimentation is limited to laboratory experiments with carefully selected experimental and control groups, intentional and precise manipulation of experimental variables, and highly controlled experimental conditions" (p.990).

Duncan further quotes Skyia and Sheehan (1977) to the effect that:

"... the classic experiment conducted in a laboratory or field setting remains the hallmark of empirical science even if it at times becomes mechanistic, unrealistic and results in unpredictable outcomes" (p.990).

When experimental research is conducted in real world organisational settings, certain contradictions are created via the collision between the norms of experimentation and the realities of organisational life. Duncan (p.991) points out that a study within a real organisation seldom enjoys the luxury of randomly selecting employees and placing them in experimental and control groups.

However a point which Duncan and others do not seem to address is the next problem: even if experimental and control groups could be established in organisations, the process of doing so may create new and foreign patterns of interaction, etc, thus in crucial ways altering the actual environment. In effect, one would then be researching not an actual organisation, but a laboratory group (which happened to be located in an organisation).

This might not be a very major consideration in some fields of study. One can readily imagine aspects of organisational functioning which would lend themselves reasonably well to investigation by experimental means. However since the focus of the present research was to be an exploratory study

to investigate the nature of source use among knowledge workers across a broad spectrum of organisations, it seemed necessary to disturb the normal functioning of the organisations concerned as little as possible. Hence it was decided to employ approaches which did not incorporate experimental or quasi-experimental elements.

At the crux of the matter is the question as to what seem to be the most appropriate means of investigating human behaviour in organisational contexts. The debate has been fuelled by considerations such as Hackman's (1982) which express concern that for all the effort invested in research into organisational behaviour, not enough has resulted, and hence non-traditional research approaches are necessary:

"The methodologies used in research on organisations have been far too limited and conventional ... Because the need for higher quality organizational research is pressing, now may be the time to break through the constraints of traditional methodologies and seek new approaches..." (p.8).

Along similar lines, Israel and Tajfel (1972) proposed that:

"We should now concentrate on searching for new avenues of approach particularly in the study of human social communication, without worrying too much about rigid conformity with the canons of experimental respectability. We need more ideas, not more

experiments; any provocative theory would be preferable to the inductive collecting of bits and pieces that has become our respectable habit" (p.4).

Another important issue in communication (and other behavioural) research is what has been termed destructuring. Possibly Barton (1968) first coined this term, but in any event it refers to the use of survey methods in social research, whereby:

"Using random sampling of individuals, the survey is a sociological meat-grinder, tearing the individual from his social context and guaranteeing that nobody in the study interacts with anyone else in it".

The analogy, Barton argues, is with:

"a biologist putting his experimental animals through a hamburger machine and looking at every hundredth cell through a microscope; anatomy and physiology get lost; structure and function disappear and one is left with cell biology".

Destructuring is seen as potentially a serious problem in organisational communication research, given that such research typically explores the nature of work, affective, social, innovation or other processes, taking particular account of the links among staff.

To avoid problems of this nature, it was decided in the

present research to maintain individuals in their social contexts to the greatest possible extent, and therefore to assess complete groups only, as far as was practicable.

Random sampling is seen as unsuitable for this research not only for the above philosophical considerations, but also since it was thought necessary to use network analysis as a supplementary research method, to back up the primary (questionnaire) method. Network analysis requires that all (or as many as possible) persons in a given work group are included in the investigation.

Returning now to the question of the complexity of organisational functioning, there are concerns that such complexity renders traditional scientific methods less useful than was once hoped. To illustrate this point, Fig.D. displays Boulding's hierarchy of system complexity, and as mentioned in the literature review, organisational processes are commonly regarded as occurring at level 8, possibly an "unknowable level" of complexity.

Fig.D. BOULDING'S HIERARCHY OF SYSTEM COMPLEXITY

Level

1. FRAMEWORKS
Representation of static, structural properties (e.g. description of biological anatomy).
2. CLOCKWORKS
Essentially a framework "in motion", such as share price movements over time; diffusion of innovation.
3. CONTROL SYSTEMS
System behaviour is regulated according to an externally prescribed criterion, (e.g. thermostats, heat-seeking missiles).
4. OPEN SYSTEMS
Reflect the variety to which exposed by the environment. (E.g., cells, biological systems involving complex chemical transformations and differentiated structures.)
5. BLUEPRINTED GROWTH SYSTEMS
Systems containing pre-programmed instructions for development (e.g., acorns and oaks). Observed behaviour produced by (concealed) generating mechanisms.
6. INTERNAL IMAGE SYSTEMS
Not yet self-conscious, but possess a detailed awareness of the environment acquired through differentiated information receptors, (e.g. pigeons, most higher-order animals).
7. SYMBOL PROCESSING SYSTEMS
Self-conscious, take in information and generalise and abstract into ideas and symbols. Possess and use symbolic systems (e.g. human beings). Groups, if members share a common definition of reality.
8. MULTI-CEPHALOUS SYSTEMS
Collections of individuals in elaborate shared systems of meaning (e.g. law), transcending the individual.
9. SYSTEMS OF UNSPECIFIED COMPLEXITY
(To avoid premature closure).

(The hierarchy is cumulative: each level incorporates the properties of all lower levels.)

Adapted from Boulding, 1956.

One argument advanced in the literature is that scientific research methods which were developed and are entirely appropriate for levels of relative simplicity in Boulding's model, are to a greater or lesser extent inappropriate for organisations. The fear is expressed that conventional scientific methods cannot do justice to the subtleties and ambiguities of organisational functioning, and hence blur what they should make clear.

The debates within the management and communication literatures traverse similar ground, and themselves form part of a larger set of contentions across a variety of disciplines in education, psychology, sociology and elsewhere.

Evered and Louis (1981), for example, argue that there are two major and opposite paradigms in social science, and that most organisational research may be located within one or the other. They are inquiry from the outside and inquiry from the inside. The former paradigm features the researcher's detachment from the organisation under study, the objects of interest are measured with research instruments, and all knowledge must be validated by processes of reasoning and explicit methodological procedures.

By way of contrast, inquiry from the inside requires that the researcher operate within the organisation. Knowledge is validated by experiential means and by testing what is

observed and experienced against what organisational participants consider to be reality.

Dichotomies which have emerged along similar lines in other fields of enquiry are:

High context - Low context, in anthropology (Hall, 1976)

Deep structure - Surface structure, in semiotics (Chomsky, 1965)

Phonemic (emic) - Phonetic (etic), in linguistics (Pike, 1967)

Ideographic research - Nomothetic research, in psychology (Allport, 1937)

Phenomenology - Positivism, in philosophy.

Although these two paradigms are presented here as at opposite poles of enquiry, in practice some research contains elements of both approaches. Nevertheless, Evered and Louis consider that there are very different epistemological assumptions underlying each paradigm, and possibly these assumptions often are not examined by those who hold them:

Greater epistemological appreciation seems to be an essential prerequisite to developing an appropriate inquiry approach whereby researchers would explicitly select a mode of enquiry to fit the nature of the problematic phenomenon under study, the state of knowledge and their own skills, style and purpose" (p. 386).

Accepting Evered and Louis's three criteria for selecting a mode of enquiry - the nature of the problem, the state of knowledge and the researcher's own skills - this writer concluded that a mixed approach seemed very desirable.

The "problematic phenomenon under study" is of course the use of information sources by New Zealand knowledge workers, and broad, exploratory research into the phenomenon appears to be the first necessary step. What is required from such initial research is a groundwork upon which later, more intensive studies could be built. Initial studies should be extensive and wideranging in nature, to establish some basic findings across a variety of sources and situations.

To achieve this aim, a mixture of nomothetic and ideographic approaches is seen as desirable; a mainly quantitative approach, the questionnaire) to serve as the basis of the study, and qualitative approaches (interviews and network analysis) to provide reinforcement.

Further, as the literature review revealed, the state of knowledge in this field is characterised by a multiplicity of diverse studies conducted by researchers in very different disciplines, with a conspicuous absence of integrative work. A considerable amount of study has been conducted into both scientific communication and R and D workers' information patterns, but relatively little into the information processes among knowledge workers generally

(and no such research in New Zealand).

Top priority would then seem to be for a study which attempted to take a broad overview of previous work, to take account of what appeared to be the major findings elsewhere, then to compare those results with findings from this country. To do this satisfactorily would call for an eclectic outlook and an integrative approach.

The researcher's own "skills, style and purpose" have to be those which are appropriate for a study of this nature. However, a major purpose of the research is to elucidate the nature of knowledge workers' contact with information sources across a variety of occupations, so a mixture of approaches would seem to be indicated here also.

VALIDITY

In the next section issues relevant to research validity are discussed. Fig.E. portrays a continuum of organisational communication research: at one end there is the positivist tradition in communication research, influenced as it is by so called "psycho-statistical" research approaches. At the other extreme is the qualitative alternative; its bias is to the exploration of meaning and significance in the viewpoints of research participants.

On the continuum are plotted the methods involved in this research. Data from the questionnaire are considered to be more positivist than qualitative, interview data the other

way around. It might seem a paradox that network analysis appears twice, but this may be the best way to suggest the double analysis this method can yield. Firstly, the raw data that initially emerge from network analysis appear in matrices which display a large amount of quantitative information about interaction patterns in the organisation. Secondly, once this information is arrayed in sociograms, they enable any observer with knowledge of that organisation's functioning to interpret communication patterns according to certain criteria. They also aid very materially in developing understanding of whether and how organisational structure should be changed, communication practices altered, and so on.

Since the research methods show both positivist and qualitative characteristics, the following discussion assesses validity from both perspectives. While from the qualitative perspective, validity is explored in regard to case studies, the various points made are of relevance to any research that is fundamentally or in important respects ideographic.

FIG.E. CONTINUUM OF ORGANISATIONAL COMMUNICATION RESEARCH

<u>Positivist</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>Qualitative</u>
	(1)	(2)	(3)	(4)	

* Nomothetic

* "Objectivist"

* Scientific (or
Scientistic)

* Ideographic

* Subjectivist

* Oriented
towards
Meaning

(1) Network analysis

(2) Questionnaire data

(3) Interview data

(4) Interpretation of network analysis

Inasmuch as this research employs methods of a quantitative nature (questionnaires and network analysis) it becomes appropriate to address questions of validity from a positivist perspective. It should be emphasised, though, that validity, from this perspective, is often examined in regard to experimental and quasi-experimental research. The present research does not have an experimental orientation, and hence some of the points made in respect of experimental research may not be applicable in this context.

Campbell and Stanley (1963) state the basics of the issue in this way:

"While internal validity is the sine qua non, and while

the question of external validity ... is never completely answerable, the selection of designs strong in both types of validity is obviously our ideal".

Campbell and Stanley then discuss:

"...eight different classes of extraneous variables; these variables, if not controlled in the experimental design, might produce effects confounded with the effect of the experimental stimulus". (p.5)

Neale and Liebert (1973) refine the question further when they draw a distinction between experimental internal validity and theoretical and conceptual internal validity, (p.35). The former refers to the necessity of showing that it was the particular treatment or manipulation that produced the obtained effects, and the latter refers to whether the treatment or manipulation employed produced the observed effect for the reasons suggested by the experimenter's theoretical rationale, or for some other reasons. Of these two, the latter will be of greater relevance to the present research, but possible threats to validity in either category will be considered together to unify the discussion.

Campbell and Stanley's eight classes are as follows:

1. History This refers to the effect of events that occur between measurements (as well as the experimental variable). Although in this research no variable is

experimental, nevertheless this issue is pertinent in so far as the forms of research enquiry take place at slightly different times in the organisation, and maturation effects (see below), as well as history effects, may independently as well as jointly affect organisational processes. The researcher had to assess carefully the impact on each organisation, and to conduct an assessment of organisational events that take place in between researcher visits which seem to significantly influence information and communication processes.

2. Maturation This should not be a major problem in so far as passage of time is concerned, as care was taken to ensure that all the research methods in any one organisation were employed within a relatively short space of time. Maturation issues are relevant, though, in that participants may tire of answering questions (especially if under work pressure) and thus the last research questions may be answered less exactly or completely than earlier ones.

3. Testing

"Testing as a source of internal invalidity refers to the possible effects of taking a test once upon an individual's score when he is administered the test for a second time" (Neale and Liebert, p.37).

Since this research does not call for administration of

any test more than once, this problem should not result.

4. Instrumentation or Instrument Decay This had potential to be a source of invalidity. As the researcher developed expertise in non-standardised and non-scheduled interview techniques, it was possible that different responses may have been obtained from participants towards the end of the research in comparison to the beginning.
5. Statistical Regression This did not apply since respondents were not selected for the research; participants comprised all members of the organisational sub-groups researched.
6. Experimental or Differential Mortality Differential mortality (differences in the number of subjects that are lost as a function of which group is being considered) was not an issue since control and experimental groups were not employed, but simple mortality (loss of group members from start to finish of the investigations) although potentially an issue, did not appear to constitute a problem.
7. Selection Biases did not occur in respect of individuals, since all members were assessed in the sub-groups chosen, but they may have occurred in respect of the organisations selected. While the

organisations could not be chosen randomly for practical reasons, attempts were made to select them on the basis of conforming to an organisational profile along the lines mentioned briefly below, and discussed in more detail in the section the Research Environment further on in this chapter.

The organisations, or the sub-groups defined as "organisations" within them, were high information users, conscious of using information, mainly "knowledge" rather than product or service oriented, probably highly politicised in organisational terms, dependent upon communication processes, geographically situated in one place, mainly of around 15-25 in membership, and predominantly of above-average educational level.

8. Experimenter Bias Rosenthal and Fode (1963) suggest that there are:

"... at least eleven possible ways that an experimenter's expectancies and desires can influence the results of his research:

- a) The experimenter may unintentionally influence his subjects to give expected-desired responses through unintentional paralinguistic cues, for example, by variations in his tone of voice
- b) The experimenter may influence his subjects to

give expected-desired responses by means of unintentional kinesic cues, for example, by changes in his posture or by changes in his facial expression

- c) The experimenter may influence his results by unintentionally reinforcing his subjects verbally when they give expected-desired responses
- d) The experimenter may unintentionally misrecord the subjects' responses" (p.18).

Other sources of bias could result from the experimenter's intentionally responding in the above ways and another possible bias is that the researcher may fabricate all his data.

To these should be added another possibility, a generalised problem of the kind of responses made by participants to the researcher, who, they know, was there "to look at our information and communication processes". Respondents may have started to view what they previously saw, for example, as administrative, bureaucratic, control or personality processes in information and communication terms, and to misrepresent or distort communication or information processes in response to the researcher's interest.

Given the interactive nature of this research, the researcher found it difficult to develop more effective measures to defend against these possibilities than a consciousness that they may occur and that they should be prevented. Careful detailing of the methods used throughout the research would also enable other investigators to replicate them and so conduct a form of assessment on the reported findings.

The question of the extent to which this research is generalisable to organisations other than those directly investigated leads us to the issue of external validity.

External Validity (following Neale and Liebert)

1. The Hawthorne Effect, (changed performance by participants in response to their awareness of being observed) should not have been a major problem in this research for two reasons.

- 1.1 The research did not seek to measure output or other performance over successive measurements. There was little opportunity for respondents to change their work patterns in reaction to the researcher, at least in comparison to the original Hawthorne studies.

- 1.2 The research methods were quick to apply. They

did not involve lengthy encounters between the researcher and participants and as such were not likely to be very influential in changing participants' behaviour.

Nevertheless, the possibility that the Hawthorne effect may have had some influence on results has to be considered and allowed for.

2. Pretesting was not used and thus was not a problem.
3. Privately Held Hypotheses and Demand Characteristics, (the extent to which participants' roles and behaviour in the research are influenced by their attitude towards the research) should be considered in respect of the three research methods used.

3.1 Network Analysis. Here there should be little opportunity for bias of this nature to intrude in so far as in the analysis of network data care is taken to cross-check respondents' indications of whom they communicate with. To the extent that there is close agreement among respondents on specific communication links (reciprocity) demand characteristics should not be an issue.

3.2 and 3.3. Questionnaire And Interview Data. If the researcher's assumption is correct that the concept of "information sources" is a relatively

neutral one, then the likelihood of respondents developing pre-conceived responses to questions is low. Since the issue of information sources lies at the heart of the investigation, demand characteristics had to be minimised, so the researcher attempted to monitor for any incidence of this bias in the pilot studies and thereafter. It is possible that respondents may have chosen to alter their responses to items as a political activity, that is, as a means of influencing their superiors through medium of the researcher. However, no specific instances of this were observed.

4. Response Sets and Veracity of Self-Reports. The types of response sets commonly identified are response acquiescence (also known as "yea-saying" - the tendency to agree with statements regardless of their content); response deviation (the tendency to answer items in an uncommon direction regardless of their content); and social desirability (the tendency to answer items in the direction that is most socially accepted irrespective of whether the answers are accurate).

Means of minimising problems of this nature included: researcher awareness of possible bias-effects; design of the questionnaire and interview plans in such a way as to remove all threat or stress for participants; design of the survey questions in such a way as to

frame questions in a neutral fashion, and thus to avoid "yea-saying" or "nay-saying"; by investigating each participant's responses for internal consistency; by using multiple measures (questionnaire, interview, network analysis) to develop an across-measure check of the consistency of participants' responses).

Earlier in this discussion it was proposed that since the present research has qualitative elements, it would be desirable to discuss aspects of validity in respect of qualitative work. This writer found a relatively small literature on qualitative research relevant to organisational contexts; but it was found that case studies and similar approaches have had some attention.

Wilson (1979) suggested that case studies and other qualitative research approaches have "certain basic generic qualities". They are:

- "1. Particularistic. They portray events in one particular situation as it exists in reality
2. Holistic. They try to capture as many variables as possible and often include description of history and context
3. Longitudinal. Usually they have a dynamic quality and tell a story that covers a period of time
4. Qualitative. Usually case studies use prose and literary technique to describe, elicit images and analyse situations rather than to summarise

quantitative data."

This researcher has no argument with numbers 3 and 4, but numbers 1 and 2 need closer scrutiny.

1. Particularistic: "as it exists in reality". The degree to which any research can literally describe reality must be open to question. There is a considerable gap between "reality" and a case study in its final form, and the mediating processes between these two include the researchers' objectives, their assumptions about reality, their ability to agree on the significance of what they observe, and the extent to which participants in the case are candid with the researchers. In effect the researchers interpret reality according to their own world view, their and their peers' paradigms of knowledge, and the dominant metaphors which they are employing to construct the case. All these processes mediate between the case description and "reality".
2. Holistic: "They try to capture as many variables as possible...": this cannot be literally correct, because in any complex organisation or situation the number of possible variables approaches the infinite, and thus a case study capturing as many variables as possible would have to be almost infinitely long. Even if we amend the description to read: "They try to capture as many significant variables as possible",

similar objections still apply. Even what is felt to be significant in a case study is too extensive to be contained in a typical case study length. What is seen to be significant is also differentially perceived among different researchers; what may be very important in one interpretation may be trivial in another. For these reasons case writers must necessarily selectively perceive their facts, adopt an intellectual framework or model against which they perceive their facts and in the light of which they construct their interpretation. Then they must selectively present those facts in a prose style designed to enable readers of a given educational standard to understand the facts and interpret them in the context of a certain body of knowledge.

While the final product of the case study may appear holistic, such is in fact an artifice of the writer, all the above-described processes in effect having intervened between the case study and "reality in its entirety".

If these assumptions are correct, then it follows that validity will be determined in a different manner for case studies than for more "objective" research. "Objective" research would seek to investigate phenomena observable directly by researchers, and validity would be independently determined through agreement of different observers.

In the instance of qualitative research, however, with its stress on the importance of the subjective experience of both the researcher(s) and the participants - in other words the assessment and the assignment of meaning by those thus involved - validation can be achieved only by asking questions of those involved. The extent or degree of validity may be determined by questions such as, "How well does this study represent reality as you see it?" Such questions may be put either in one to one (participant and researcher) interviews, or in group discussion settings. In either instance, care needs to be taken with designing the context in such a way as to neutralise or at least minimise status and power differences so that the likelihood of honest and accurate responses is increased.

At this stage one point should be stressed. Validity is not determined solely or even principally by the perceived accuracy of case descriptions. Of greater importance is the extent to which the research is successful in capturing the significance and relevance of organisational situations. What constitutes significance and relevance will of course normally differ among participants. If in reconciling and accommodating these different perspectives the researcher seems to be describing a situation in ambiguous terms, this should be welcomed, to the extent that an ambiguous description may be a true portrayal of an ambiguous situation.

Some support of the use of interviews of participants as

back-up to survey data may be found in the theory of validation proposed by Habermas (1974). Habermas suggests the viewpoints are validated not so much by showing their conformity to social or organisational norms of "truth", but rather through a "common conviction" or "experience of truth" which arises from dialogue among those concerned. This requires an equalisation - perhaps albeit temporary - of social power and status so that power differentials cannot significantly distort an emerging consensus. If participants have equal freedom to "put forward, call into question, and give reasons for and against statements, explanations, interpretations and justifications", then any resulting consensus should be the result of "the force of the better argument" rather than social pressures and power constraints.

UNIT AND LEVEL OF ANALYSIS

In this research the primary unit of investigation is the individual. The methods of enquiry (survey, interview, network analysis) are all geared to one to one interactions between the researcher and individuals in the organisations involved. The output resulting from these methods will refer, in the first instance, to individual responses. Once the data are received, though, they are analysed and interpreted in the light of what they reveal about organisational functioning on the level of groups. Particularly in the case of network analysis, information developed from the analysis is arrayed in sociograms which in effect comprise descriptive models of organisational

interaction patterns. The analysis and interpretation here are primarily at organisational level. By way of contrast, the interview data are of primary relevance to an individual level of analysis, and only secondarily to an organisational level. In the survey aspect of the research, the analysis starts at the individual level, then moves to the organisation.

Overall, it can be said that analysis begins with the individual, then is normally extrapolated to the organisation. At the stage of interpretation, however, the focus of interest is mainly on the organisational level, with subsidiary interest in the individual. One of the overall functions of the present research is to establish the extent to which findings at the level of the individual may apply at an organisational level. A major assumption underlying this process is that a simple equivalence is not tenable; by which is meant that processes shown to exist at one level do not necessarily apply at another. Equally, one cannot assume that processes at one level do not occur at others; the interpretation needs to explicate the nature of the relationships that seem to exist.

The researcher's task is rendered more complex by contradictory viewpoints on this issue in the literatures of the social sciences. One body of opinion proposes that the use of aggregate data may always be open to doubt, even for the study of aggregates. Proponents of this viewpoint argue that group behaviour can be interpreted only by

understanding the behaviour of individuals who comprise the group (e.g. Peston, 1959).

Other social scientists make the assumption that aggregate and individual processes are essentially similar (termed by Hannan, 1970, as the "homology thesis"), while others take the view that aggregate and individual processes are seldom similar (the "discontinuity thesis"). In 1950, Robinson published what was to become an influential article demonstrating that aggregate level data (information on people in groups) cannot reliably be used to study individual behaviour. As Langbein and Lichtman (1978) point out:

"Focusing on the Pearson product-moment correlation - coefficient (r) Robinson showed that an aggregate level coefficient need not equal the corresponding individual level coefficient. He buttressed his argument with empirical examples of discrepancies between individual and aggregate level measures ... Robinson popularised the term "ecological fallacy" (i.e. failing to see the trees for the wood) to describe any incorrect inference about individual behaviour from grouped data" (p. 9).

In recounting the history of the treatment of the ecological fallacy and "ecological inference" in the literatures of the social sciences from 1950 to the late 1970's, Langbein and Lichtman point out (p.10) that bias becomes potentially present "only when an investigator relies on grouped data to study individual behaviour". In other words, social science

methodologists do not appear to be troubled by the converse of the problem mentioned, viz, that assumptions drawn from the observation of individual level behaviour may not necessarily be relevant at the level of groups. Nevertheless the assumption of this researcher is that on the basis of the discussion cited above, extrapolation of findings between or among system levels has to be undertaken with caution.

In the organisational literature, the trend on this issue appears to be towards Hannan's homology thesis. Huber (1982) cites Miller (1972) to the effect that:

"...relationships among variables that hold true at one level of organisational analysis generally also hold true at other levels. For example, the effects of stress on the information processing effectiveness of an organisational unit are essentially the same whether the unit is a person, an ad hoc group or an established organisation" (p.140).

Huber also cites further support for this position (Miller, 1960, Meier, 1963, Driver and Steufert, 1969) and goes so far as to say that he was able to identify no evidence to the contrary (p.140).

While this writer would agree with the soundness of Huber's basic proposition, that when attempting to identify relationships among variables in organisational information systems, reasoning by analogy may be employed, it would seem

that directly equating relationships and processes on one level with those on others, may well be simplistic and misleading.

The assumption in this research will be that in the task of interpretation, processes of judgement and argument by analogy among organisational levels are potentially legitimate, yet comparisons need to be approached with caution.

OCCUPATIONAL CLASSIFICATION OF THE SAMPLE

The next stage in this discussion is the assessment of the relationship of the 17 groups surveyed to a wider population. There is not as much information available as desirable on the classification of people in the New Zealand workforce, but some pointers useful to the present research can be found.

The New Zealand Standard Classification of Occupations (NZSCO) classifies workers in the following major groups:

1. Professional, technical and related
2. Administrative and managerial
3. Clerical and related
4. Sales workers
5. Service workers
6. Agricultural, animal husbandry and forestry, fishermen and hunters
- 7-9. Production and related workers, transport equipment operators and labourers.

This investigation relates nearly entirely to the first three groups (but also includes a small minority of people from numbers 4 and 5).

Of the first three major groups the NZSCO says:

1. Professional, Technical and Related

"This major group contains the greater part of the highly educated and trained personnel who carry out professional functions in scientific, engineering, medical, legal, teaching and other fields. Also included are technicians who generally work under the supervision of the more highly qualified professional workers and perform allied functions."

2. Administrative and Managerial

"Major group 2 consists of occupations primarily concerned with the formulation of policy or laws and public regulations and interpretation of public policy, combined with ... the direction and management of organisations and enterprises."

3. Clerical and Related

"This major group covers occupations which are commonly thought of as "office jobs"; the great majority are primarily concerned with the setting-up and maintenance of records of all kinds relating to financial transactions, other business and industrial operations,

personnel, correspondence ... also included are those jobs concerned with the handling and routing of messages, verbal or recorded ..."

The NZSCO gives no indications as to relative proportions of workers in these categories. The latest statistics available may be found in vol. 4 of the New Zealand Census of Population and Dwellings 1981 (published 1983). The figures may be getting out of date, but at the time of writing data from the most recent census had not appeared.

Relative Numbers Employed by Major
Occupational Groups

Major Groups	Male	Female	Totals
1	103,119	80,847	183,966
2	42,273	3,720	45,993
3	67,143	147,618	214,761
4	75,345	51,756	127,101
5	50,304	56,325	106,629
6	116,091	30,201	146,292
7			
8 >	390,660	67,275	457,935
9			
Total			1,282,677

Above are shown the numbers of workers engaged in the

various NZSCO occupational groups. The groups of most relevance to the present research are nos. 1-3, totalling 444,720 out of 1,282,677 people in the entire workforce (or 34.7%).

There appear to be very few systematic assessments of the current situation of New Zealand information workers. One work which is often cited is Conway's brief paper published by the N.Z. Commission For the Future (1981). Unfortunately there is almost no interpretive discussion included, but the author does attempt to isolate and identify the categories which together include information workers.

Using the NZSCO breakdown, Conway considered that information workers are people from major groups 1-3 (as above), but he also included a variety of occupations from the categories of sales, service, farm and forestry, production and transport.

Examples of his inclusions are:

Sales: Manager, wholesale and retail trade; sales supervisor and buyer; technical salesman but not commercial traveller. Stock and sharebroker, advertising salesman, auctioneer, urban valuer.

Service: Housekeeper, house steward, head cook or chef, private enquiry agent, store detective.

Farm and Forestry: Forest and logging manager, forest adviser and logging planner.

Production and Transport: Supervisor, overseer, foreman;

mechanic and serviceman for typewriters, duplicators, calculators; radio and television repairman, linesman, broadcasting station operator, quality inspector.

This writer would have no argument with many of Conway's re-classifications, (for example sharebroker, forest advisor and broadcasting station operator would all seem to be good examples of occupations primarily concerned with handling information), yet some of his inclusions are questionable; e.g. housekeeper, head cook or linesman all seem more service than information oriented. However any listing of this nature always seems to leave itself open to charges of lack of internal consistency (e.g. the OECD inventory (1980) lists library assistants as information workers but classes librarians as service workers). Nor is there ever likely to be a well agreed upon taxonomy of occupations accepted worldwide : the very rapid changes in organisations and in the technology of the workplace virtually guarantee that numerous occupations, particularly those in the information handling area, will continue to change in character.

Thus researchers have to accept some ambiguity among these classifications. One strength of Conway's approach is that it is closer to the OECD norms than is any other New Zealand work sighted so far. It should be noted, however, that since he has taken occupations from NZSCO major groups 4-9, of course the combined total for the information worker category is larger than elsewhere.

Conway points out that there has been considerable recent growth in the numbers of workers in the information worker category, as shown below:

N.Z. population	grew	9.3%	from 1971 to 1976
Work force average	grew	12.7%	from 1971 to 1976
Information sector			
average	grew	19.9%	from 1971 to 1976

There also seems little doubt that this trend has continued since then.

It is not intended here to claim easy generalisation from the results found in this study to NZSCO groups 1-3, nor to Conway's broader classification of information worker. Nevertheless the observation may be made that virtually all participants in the study would be categorised as within these classifications.

Hence the study is strongly focussed in this area, and it can be said that if any generalisation may be permitted, it would be to members of the professional, technical, administrative, managerial and clerical groups, and not to groups 4-9.

The extent to which any generalisation may be claimed in this study presents special problems, given the decision not to use random sampling methods. The practice, from

philosophical and methodological considerations, of using entire groups instead of using individuals obtained by random sampling methods means that the usual logic of statistical method has not been followed and hence questions of generalising outside the sample become more difficult.

Points relevant to this issue are considered in the following section.

FIG. F ORGANISATIONS SURVEYED

TYPES OF ORGANISATIONS, NUMBERS AND LEVELS OF PARTICIPANTS AND RESEARCH METHODS USED

Research Methods (1) Questionn. (2) Network Analysis (3) Interview	1 Govt. Dept. Main Centre (1)(2)(3)	2 Profess. firm Main Centre (1)(2)(3)	3 U.S. Multinat. Main Centre (1)(2)	4 Polytech Main Centre (1)(2)(3)	5 Govt. Dept. Provinc. Centre (1)(2)(3)	6 Govt. Dept. Main Centre (1)(2)(3)	7 Broadcast ing Unit Provinc. Centre (1)(2)	8 Volunt. Agency H Q Main Centre (1)(2)(3)	9 Govt. Dept. Provinc. Centre (1)(2)	10 Profess. Firm Main Centre (1)(2)(3)	11 Govt. Dept. Provinc. Centre (1)(2)(3)	12 Hospital Main Centre (1)(2)	13 Europ. Multinat. Main Centre (1)(2)	14 Law Enforce. Group Main Centre (1)(2)	15 Govt. Dept. Main Centre (1)(2)	16 Polytech Main Centre (1)(2)	17 High School Provinc. Centre (1)
Level 1 Top Management N = 16		15	31					107		139, 140		169, 170	182, 183 191, 193 194		232		316-318
Level 2 Middle Management N = 78	2, 13	16-18	32, 33	46		74	91	108	119 120	141-143	158	171-180	184-189 192 195-198 202-207	208-210	233-239	279	293-315
Level 3 Supervisors N = 60	1, 4, 9, 11		34-36	47-49	62-65	75-78	92-97		121-125	144-148	159-162	181	190	211-215	240-253	280	
Level 4 Non-Superv. Staff N = 164	3, 5-8, 10, 12, 14	19-30	37-45	50-61	66-73	79-90	98-106	109-113	126-138	149-157	163-168		199-201	216-231	254-278	281-292	
N =	14	16	15	16	12	17	16	12	20	19	11	13	26	24	47	14	26

THE RESEARCH ENVIRONMENT

Figure F. displays the organisations surveyed in this study. In each instance the nature of the organisation concerned is stated. Of the 17 organisations, 5 are private sector, 7 are conventional government departments, and 5 are semi-autonomous (such as polytechnic, broadcasting station, etc.). The relative numbers of participants per category are:

1.	Private sector	88
2.	Government departments	145
3.	Semi-autonomous	85
		—
		n = 318

The top row of cells in the figure contains a brief description of the organisation (e.g. "govt. dept.") and whether it is located in a main centre (here defined as either Auckland, Hamilton, Wellington, Christchurch or Dunedin) or in a provincial centre. All organisations were located in a centre of at least 20,000 population, so no rural venues were included. The relative proportions of participants from main and provincial centres are:

1.	Main centre	233
2.	Provincial centre	85
		—
		n = 318

Six of the organisations are situated in Wellington, four in Auckland, two in New Plymouth, and one in Lower Hutt, Hamilton, Napier, Christchurch and Blenheim. The writer personally conducted the research in 6 out of 17 instances. In the remaining 11 cases the persons in charge of the research application on site either had had some experience in social science style research or at least had some background in interviewing. In every case care was taken to ensure that the person applying the research was thoroughly familiar with the objectives of the study, and was able to apply the questionnaires, and conduct the interviews, so that application would be consistent across organisations. Normally the person conducting the survey was a member of the staff who had elected to participate in the research either to obtain useful knowledge for the benefit of the organisation concerned, or as a project requirement in their university studies (or both).

The research appears of primary relevance to Wellington and Auckland. The South Island is less well represented, with only two venues, and thus the study is in effect dominated by North Island urban locations; out of the 17 organisations 12 are situated in either Auckland, Hamilton, Wellington or Lower Hutt. This has the effect of narrowing the focus of the research, and possibly strengthening the applicability to North Island organisations.

Probably this line of argument cannot be taken too much further; little is presently known about the extent of

homogeneity or heterogeneity from north to south. There is a certain amount of "folklore" to the effect that organisations tend to be more conservative, for example, in the south than in the north, but firstly, there is no evidence as to whether or to what extent this is true; and secondly, even if it were correct, the implications for the present study remain to be assessed.

The research methods used in the study are also featured in the figure above, showing the methods used in each organisation. In eight places all three methods were employed, in another eight, two methods, and in one, one method was used.

It was decided that for the purposes of this research the participants would be divided into four levels by status within their organisation, being top management, middle management, first-line supervisors and non-supervisory staff. Some of the theoretical problems surrounding this terminology have been discussed in the section in Chapter 1, Introduction, entitled Sources of Information.

PROTOCOL

Some of the practical issues which had to be assessed when assigning staff to one or another of these status levels were as follows. After each staff member had completed his or her questionnaire, the entry on the back page dealing with status level (see the questionnaire in the appendices) was checked against that person's position on the formal

organisational chart. In most instances what the respondent had said was their status level was verified by their placement on the organisational chart. In no instance was any respondent more than one level out (e.g. there were no cases of office boys claiming to be top managers) but in a number of cases there would be one level of difference between the status claimed by the respondent and awarded by the formal chart. Such differences did not predominantly go in either upwards or downwards directions (e.g. there were instances of supervisors according to the chart claiming to be middle managers, and middle managers according to the chart claiming to be first line supervisors).

These differences in opinion offered some interesting insights into the clarity or otherwise with which these workers understood their relationship to their organisation. Sometimes it seemed that status levels were in practice obscure, and reporting relationships not well understood. In most instances however the apparent contradiction was readily resolved by discussion among participants, and in the few cases where resolution could not be obtained, the opinion of the respondent was preferred over that of the organisational chart.

Further discussion of the relative numbers of participants in each organisation and on each organisational level appears in Chapter 6, Conclusions.

RESPONSES

In most organisations surveyed a complete or virtually complete return of questionnaires was obtained. 100% response rate was achieved in organisations 1, 2, 5, 7, 8, 13, 16 and 17; one respondent was missing from 4, 6, 9, 10, 11 and 13; two were missing from 3 and 14; and 4 were missing from organisation no. 15. This provision of complete or almost complete groups was considered important for the purposes of network analysis.

CRITERIA FOR CHOICE OF ORGANISATION

The participating organisations were chosen according to various criteria. First, they had to be staffed mainly or entirely by knowledge workers, but they could be in either public or private sectors. Second, the organisations had to be complex in nature (rather than simple, ad-hoc groups, for example) and of a permanent rather than temporary nature. The organisations thirdly had to be heavy and constant users of information, regardless of whether this was transmitted mainly by oral, print or other media. Each organisation fourthly had to be engaged in much interaction with its environment. Since one of the aims of the study was to assess aspects of participants' contact with the environment this was considered necessary. Fifth, organisations had to be reasonably "conventional" in structure and processes; disqualifying factors might have been a large preponderance of very old or very young staff, all male or all female staff or other such possibilities. It was not intended to include scientific laboratories, nor R. and D. style

enterprises, as these had already been much studied in the past. Sixth, all very small organisations were excluded from the study, as the smallest unit accepted was of 12 people. The effect of this restriction was to focus attention only on groups above a certain "critical mass"; it was considered that the dynamics of very small groups were likely to be in important ways different to those of knowledge workers in complex and information rich environments.

In most (but not all) cases these 17 groups comprised self-contained entities within a larger organisation. A brief description of each now follows to illustrate the relationship between it and its parent body.

Organisation

1. This was a specialist unit within a large government head office, concerned with the provision of advice on new technology and techniques to other branches both elsewhere in head office and throughout New Zealand.
2. This organisation was a department within a professional practice specialising in particular commercial services offered to the business community; there were many links with clients overseas and elsewhere in New Zealand. Organisations 1 and 2 are both described in detail in the section on the pilot studies in chapter 5, Discussion of results.

3. This was the accounts section of the New Zealand subsidiary of a U.S. multinational, dealing with accounts receivable and payable within New Zealand, payroll and other aspects, and maintaining constant contact with branches within New Zealand and overseas.
4. No. 4 was a department within a technical institute specialising in offering courses of relevance to the business community; the programmes offered being for both full-time and part-time students.
5. This unit within a government department offered a public service involving considerable customer interaction and the maintenance of both routine and special-case communications with head office, mainly in the area of financial transactions.
6. A specialised service was also offered by this unit, but this time involved with social rather than financial services. Unlike the preceding five groups, this did not consist of all staff within the unit, but rather comprised a subsection of it, being the professionally trained staff. However, this professional group normally conducted a large amount of their day to day communication on work matters with one another, and hence could be seen in various important respects as a complete group.
7. This comprised the entire staff of a provincial

broadcasting unit; intensive communication was carried out with the community, with the larger parent body, and within the group between the different specialist areas.

8. This group represented the whole head office of a national voluntary agency. Information flows were maintained with the local environment in respect of the organisation's mission, and also with the provincial branches of the organisation in their various locations throughout the country.
9. This was a subsection of a social service agency within a government department, containing a variety of both professional, trained staff in several specialisations and their clerical and secretarial assistants.
10. The whole membership of a professional practice in a main centre was included here, consisting of partners, professionally qualified support staff and assistants. Much internal and external communication was evident.
11. Technical services were offered by this group, which comprised a self-contained unit within a larger entity. Relatively little communication was sustained with this larger entity, with much more attention being given to contacts with both the general public and specialist groups within the community.

12. Like group 6, these people represented the professional staff from within a larger department. In this case all of them had senior responsibilities, and had as their primary duties administering their sections, coping with their information flow and communicating with their staff, rather than personally offering services to the clientele.
13. Similarly to 6 and 12, this group comprised the senior and middle management from their organisation. Unlike all the other groups so far, they were in two rather than in one location, with approximately 20 in one place and 6 in another site in the same city. This organisation appeared to feature a lot of interpersonal communication, with the principal tasks being the co-ordination and management of the services offered by the company as a whole.
14. This group comprised the entire membership of a law enforcement unit in a city setting. Of the organisations considered so far, this was the only one to be involved in shift work (which created particular needs for effective internal communication). There was constant information flow internally, with the parent body, with the community generally and other specialist groups in other agencies and in the community.
15. This was by far the largest of the organisations studied, and consisted of one large department with a

partially developed internal substructure of three subunits. It would have been more convenient for this study had the department conformed to the more usual pattern of 12-20 or so in number, but as often happens, reality did not coincide with research convenience. It appeared that internal communications tended often to be considered a problem by participants, possibly partially as a result of the somewhat ungainly organisational structure.

16. Like 4, this was a department within a technical institute, this one offering courses of mainly a full-time nature to students who would attain a professional qualification thereby. As, it seems, in all tertiary educational institutes, a vast flow of internal communication appeared to characterise this organisation.
17. The last organisation, like 6,12 and 13, also comprised a subsection of more senior staff. The communication was mainly internal in nature, but particularly at the most senior levels, interaction with the community was important. There would also have been a two way information flow with the Education Department and other schools in the region.

THE RESEARCH OBJECTIVES

Because of the exploratory, descriptive nature of this study it was decided that it was not appropriate to use formal

hypotheses. Had the field of study been more advanced, probably it would have been appropriate to use a formal hypothesis - testing approach, and if future investigations are built on the findings in the present study, it might well be useful to employ hypotheses.

It was decided that for a comprehensive study of this nature it was necessary to address the most basic questions. After reviewing the relevant literature of the area, the basic questions which seemed to be implied thereby were, put informally:

1. What sources of information do knowledge workers use, and how often do they use them?
2. What sources do knowledge workers prefer to use, and how often do they want to use them?
3. Is there a difference between use now and use preferred, and if so, how great is the difference?
4. How important are interpersonal sources of information in comparison to print sources?
5. How important are internal sources of information in comparison to external sources?
6. Does the use of information sources vary according to a person's organisational status?
7. Does the use of print information sources vary according to a person's level of education?

The list of information sources was created also after study of the literature. Choosing the interpersonal sources was

reasonably straightforward; a pattern of subordinates, coworkers, superior, people in other units, meetings, top management and the grapevine had been established in earlier research. To these were added personal contacts outside the organisation and seminars, courses or workshops, out of a conviction that both could well be important.

The print sources were less easy to determine. From other audit studies were derived memos and letters, however it was considered essential to separate them in respect of internal and external sources. Also from audit studies were taken in-house newsletters and mass media sources and it was felt that these required no changes. Studies of an M.I.S. nature tended to feature computer-based information retrieval systems, so that source was included, and studies with a library or information retrieval orientation normally made reference to books, journals, records, government documents and libraries, so they were included. It seemed necessary to distinguish between books, journals etc. available in informal or non-library settings, and those available in the context of a formally organised library.

Many other sources were considered for possible inclusion in the study, but were eliminated for one of two reasons. If a source had been included in just one other piece of research, and on the basis of this writer's experience did not seem important, it was not included. The second reason had to do with questions of space and reasonable size: although it would have been interesting to include other

sources, it was deemed highly desirable to keep the list to a manageable size, hence it was restricted to the sources mentioned above. (See also the questionnaire in the appendices.)

Nevertheless to allow for the possibility that the sources given for participants' responses were too restricted, in respect of both interpersonal and print sources an extra category was left as "Other(s) (specify) ...". In practice it was found that only four respondents wrote in their own source, and in two of these instances they referred to the union. With the wisdom of hindsight, possibly this could have been included as a source, but its omission is not considered a major gap in the study.

In the following section the seven objectives of the study are shown, then each is followed by a listing of key points associated with them, derived from the literature review.

THE OBJECTIVES AND THE LITERATURE REVIEW

1. To investigate the present frequency of contact by participants with information sources, and to determine which sources are most used.
2. To investigate what participants consider to be their preferred frequency of contact with information sources and to determine which sources are most highly preferred.
3. To find out in respect of which sources participants record the highest and lowest discrepancies between information presently received and information preferred.
4. To assess the relative extent to which staff use interpersonal as opposed to print sources of information.

5. To assess the relative extent to which staff use internal as opposed to external sources of information.
6. To explore the relationship between the organisational status of participants and their contact with information sources.
7. To investigate whether there are differences in the use of print sources by relatively well educated and less well educated staff.

In addition to these seven, a further, generalised objective of the research was to continually assess the available means of analysing the data, and if necessary to devise further means of getting the most out of the data.

Objective 1

To investigate the present frequency of contact by participants with information sources, and to determine which sources are most used.

Literature review (Pages cited refer to pp in Ch.2, Literature Review)

1. Information defined as "required" is more likely to come from frequently used sources (Ference, p. 42).
 - 2
 - Subordinates' contacts are mainly lateral, managers' both lateral and downward (Bacharach and Aiken, p. 55).
 3. People avoid too much new information (Greller and Herold, p. 55).
 4. Most sophisticated group uses sources more frequently (Porcano, p. 57).
 5. Source use is a highly complex phenomenon (Summers, Matheson and Conry, p. 135).
-

Objective 2

To investigate what participants consider to be their preferred frequency of contact with information sources, and to determine which sources are most highly preferred.

Literature review

1. Staff value being kept informed (NZEF, p. 52).
2. Disregard of financial (quantitative?) information (Reckers and Stagliano, p. 57).
3. Rich information environments imply the availability of

many sources (Paisley, p. 64).

4. Sources preferred are those found useful in the past (Broadbent, p. 68).
 5. Quality of sources a subjective not an objective phenomenon (Pfeffer and Salancik, p. 73).
 6. Source credibility as a factor in preference (Clausen, p. 74).
 7. Lower quality (but more accessible) sources may be used in preference for higher quality, less accessible sources (O'Reilly, p. 74).
 8. Staff prefer a high level of interaction with coworkers (Inkson, p. 94).
 9. Requirements of tasks more important than accessibility in source choice (Whittley and Frost, p. 100).
 10. Top preferred sources are all interpersonal (IABC, p. 153).
-

Objective 3

To find out in respect of which sources participants record the highest and lowest discrepancies between information presently received and information preferred.

Literature review

1. Accessibility of sources will affect use (Mason, p. 40).
 2. Cost of using sources (Gerstberger and Allen, p. 41, Blau, p. 43).
 3. Access to information may be restricted (O'Reilly and Anderson, p. 45).
 4. Information gaps often exist (Spitzer and Denzin, p. 45).
 5. Computer-based systems very important (Keen, p. 59).
 6. Computer-based systems not used (Keegan, p. 111).
-

Objective 4

To assess the relative extent to which staff use interpersonal as opposed to print sources of information.

The literature review shows mixed results in respect of interpersonal and print sources, but overall it seems likely that knowledge workers will use interpersonal sources more than print. If this is the case, it is not yet known which among the interpersonal and print sources will be most used.

Literature review:

1. Accessibility will have an influence on choice of source (Allen, p. 39).
2. Much communication is social in character (March and Simon, p. 40).
3. Staff tend to use personal sources more than print (Keegan, p. 48).
4. Low use of print sources is a surprise (Klauss and Bass, p. 49).
5. MIS researchers stress the importance of print sources (Gessford, p. 49).
6. Both print and interpersonal may be necessary (Smith, p. 61).
7. Interpersonal sources preferred by top managers (Mintzberg, p. 62).
8. People seek immediate rather than stored information (Inkeles, p. 67).
9. Emphasis on print sources by information resources writers (p. 75).
10. Interpersonal contact important in innovation (Isenson, p. 82).
11. Managers use networks of oral sources (Edstrom and Galbraith, p. 85).
12. High task complexity associated with use of oral sources; low task complexity associated with written sources (Wolek, p. 99).
13. Print sources more important early in a project; oral sources more important later (Fischer, p. 100).
14. Interpersonal communication is timely and has immediacy (Holland, Stead and Leibrock, p. 107).

15. "Uncertain" information not available in print (Holland, Stead and Leibrock, p. 107).
 16. Task complexity not relevant to source choice (O'Reilly, p. 108).
 17. Small manufacturers prefer oral to print sources (Maguire and Kench, p. 109).
 18. Research staff use print sources more than do practitioners (Maguire, p. 109).
 19. Print sources more important to finance than general management or marketing executives (Keegan, p. 134).
 20. Interpersonal sources more important to general management than finance executives (Keegan, p. 134).
 21. Journals important to medical staff (Cohen et al, p. 141) and to library staff (McClure, p. 143).
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Objective 5

To assess the relative extent to which staff use internal as opposed to external sources of information.

Literature review

1. Accessibility will influence choice of source (Allen, p. 39).
2. Suppliers representatives are important (Menzel and Katz, p. 42).
3. Different organisational functions may require internal or external sources (Cleland and King, p. 47).
4. Both internal and external important in formulating ideas (Fischer, p. 80).
5. Boundary spanners bridge the gap between the organisation and its environment (Aldrich and Herker, p. 81).
6. External sources important in idea-formulation, while internal sources are more important in problem solving (Fischer, p. 82).
7. Liaisons link internal cliques (Rogers and Kincaid, p. 86).
8. External oral and written sources are more important than internal ones (Johnston and Gibbons, p. 100).

9. External sources important to executives (Keegan, p. 111).
 10. Search begins in local areas (Cyert and March, p. 118).
 11. Sources not commonly used often the most useful (Johnston and Gibbons, p. 127).
 12. Weak ties may be informationally strong (Granovetter, p. 128).
 13. Strong ties may be informationally strong (Rogers and Kincaid, p. 128).
 14. In-house memos important (Aiyepoku, p. 138).
 15. Internal sources the most important for librarians (McClure, p. 143).
 16. Suppliers important to engineers (Disch, p. 146), to small manufacturers (Maguire and Kench, p. 148) and to doctors (Coleman, Katz and Menzel, p. 149).
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Objective 6

To explore the relationship between the organisational status of participants and their contact with information sources.

It seems likely that as a person advances up the organisational hierarchy, use of information sources will increase. However it is not clear if this is the case, and if it is, which sources will be used more, and what difference will there be among organisational levels in source use.

Literature review

1. People with lower income may be information poor (Dervin, p. 45).
2. Subordinates' contacts are mainly lateral, managers' both lateral and downward (Bacharach and Aiken, p. 55).
3. Most sophisticated group uses sources more frequently (Porcano, p. 57).
4. Income level as being associated with access to information (Nowak, Rosengren and Sigurd, p. 71).
5. Managers as 'linking pins' in their organisation (Likert, p. 80).

6. Managers as more likely to ask other people for advice than were scientists (Smith, p. 103).
 7. Print sources more important to higher income groups (Williams, Dordick and Horstman, p. 112).
 8. Status a stronger predictor of source use than education (Summers, Matheson and Conry, p. 123).
 9. Supervisory staff receive (and want to receive) more information than nonsupervisory (Goldhaber and Rogers, p. 123).
 10. Head of organisation is sent more information by virtue of status (Mintzberg, p. 124).
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Objective 7.

To investigate whether there are differences in the use of print sources by relatively well educated and less well educated staff.

It seems intuitively likely that well educated staff will use some print sources more than will less educated people, but if so the nature of those sources and the extent to which this is the case are not known. There may be a simple relationship along the lines that as educational level increases, use of print sources also increases but this remains to be determined.

Literature review

1. Task structure may have an effect (Walsh, p. 39).
2. Less educated people may be information poor (Dervin, p. 45).
3. Education as associated with access to information (Nowak, Rosengren and Sigurd, p. 71).
4. More educated manufacturers use more print sources (Stuart, p. 121).
5. More education associated with more use of newspapers (Havelock, p. 121).
6. More educated farmers use (oral) extension services less (Havelock, p. 121).
7. No relationship between education and source use (Mitchell, p. 121).
8. More educated buyers use more sources (Westbrook and Fornell, p. 122).

9. More educated social welfare staff use office files less and coworkers more (O'Reilly, p. 123).
10. Most and least educated wanted the most information (Goldhaber and Rogers, p. 123).

From this comparison of the research objectives with the literature review, it may be speculated that some of the variables of relevance to the objectives are as shown below, in summary form:

Objectives

Relevant Variables

- | | |
|--|--|
| 1. Frequency of contact now; sources most used | "Conditioning effect" of sources; status level; avoidance of new information; sophistication of users; a complex phenomenon. |
| 2. Frequency of contact preferred | Staff want to be informed; financial (quantitative?) data overlooked; many sources often available; habitual use of sources; quality subjective not objective; source credibility a factor; accessible sources preferred; task requirements may determine; interpersonal sources favoured. |
| 3. Discrepancies between now and preferred | Accessibility a factor; cost an issue; access may be restricted; conflicting opinions on what is and is not used; information gaps. |
| 4. Interpersonal as opposed to print | Accessibility; interpersonal favoured over print; print sources important; both necessary; top managers prefer interpersonal; immediate information sought; interpersonal important in innovation; networks important; task complexity with oral sources; print sources important early in a project, oral later; interpersonal immediate; unknown information not in print; task complexity not relevant; small business prefer oral, research staff use print; print used more by finance staff; general management use interpersonal; journals used by medical and library staff. |
| 5. Internal and external sources | Accessibility; suppliers' reps.; different functions imply different |

sources; both important in idea formulation; organisations use boundary spanners; different project stages require different sources; liaisons link internal groups; external sources important; executives use external sources; search begins locally; little-used sources likely to be important; strong ties may be important; in-house memos important; internal sources used by library staff; suppliers' reps important to engineers, manufacturers, doctors.

6. Status and sources

Lower income implies information poor; managers' contacts both lateral and downward; greater sophistication implies greater source use; access to information associated with income level; managers as linking pins; managers use people more than scientists; higher income associated with print use; status a strong predictor of source use; supervisory staff use more information than non-supervisory; status attracts information.

7. Education and sources.

Task structure; less education implies information poor; education implies access to information; educated manufacturers and print sources; education and newspaper use; educated farmers and less oral use; no relation between education and source use; educated buyers use more sources; educated staff use records less and coworkers more; most and least educated wanted most information.

CHAPTER 4

ANALYSIS OF THE DATA

"The student soon comes to the realisation that what is ideally taught in the classroom is very difficult, if not impossible, to achieve in the actual research situation. This conflict between what ideally should be done and what realistically is done is frequently quite perplexing to many student researchers" (Black and Champion, 1976, p. 271).

In this chapter it is proposed to deal in turn with each analytical method used in the research and to describe it, specifying how and why it was applied to the data.

The major steps in the research analysis were, in brief, as follows:

1. The pilot studies. Cluster analysis and network analysis.
2. Examination of the Rankings of sources.
3. Crosstabulations of status and all sources and Breakdown of education and print sources.
4. Pearson, Spearman and partial correlations for further assessment of status and education.

5. Discrepancy analysis, assessing the differences between information now and information preferred.
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1. The Pilot Studies

At an early stage in the research it was assumed that because of its descriptive and exploratory nature several analytical methods were desirable to shed light on the central issues from various different directions. It was considered necessary in a study of this nature to explore the implications of the findings as widely as possible.

To this end several analytical methods were brought to bear on the data from the pilot studies. The first method was simple rank ordering by aggregated responses, enabling the visual inspection of source preferences in the first two groups. This method is described in more detail below in this chapter, Examination of The Rankings of Sources. Once an overview of participants' responses had been obtained, further analyses of the data were conducted using cluster analysis and communication network analysis.

Cluster analysis was carried out using the Genstat V statistical package (Release 4.04B, Rothamstead Experimental Station, 1984) on the Massey University Prime 750 computer. This package furnishes a variety of ways of looking at the data, including hierarchical clusters of staff (which at specified levels link staff according to a profile of responses), dendrograms (which display links among all staff

or variables in a given cluster run in the form of a table) and cluster plots (which show variables clustered in a geographical relationship in a figure). For examples of all these, see Chapter 5, Exploratory Analysis of the Pilot Studies.

Theoretical aspects of cluster analysis have been discussed over many years now (eg Cronbach and Gleser, 1953, Ward, 1963, McQuitty, 1957, Cattell, 1944, Landy, 1972, Pinto and Pinder, 1972), and a number of different aims have been identified. What all cluster analysis studies have in common is an attempt to encompass several scores or individual traits simultaneously, with some investigators trying to isolate "types" of people who show similar score patterns, and others attempting to differentiate groups of variables. Sometimes a participant may be assessed more than once on the same set of variables, and the consistency of the profile measured (Cronbach and Gleser, 1953, p 456). Ward (1963) argued that:

"Situations often arise in which it is desirable to cluster large numbers of objects, symbols or persons into smaller numbers of mutually exclusive groups, each having members that are as much alike as possible. Grouping in this manner makes it easier to consider and understand relations in large collections; hence it often increases efficiency of management" (p236).

Or as Robinson, Athanasiou and Head (1969) put it:

"A fundamental aim of attitude measures is the meaningful location of those population groups which are maximally different from other groups."

A general goal of cluster analysis was expressed by Pinto and Pinder (1972):

"Cluster analytic procedures, when applied to samples or organizations, should help us to conceptually reduce their diversity and complexity, and allow us to speak in more general terms of groups or "types" of organisations, rather than speak of individual companies or units" (p409).

The present research intention is along similar lines, except that the focus is here on clustering individuals rather than groups. The questions the researcher wanted to ask included: Will this technique cluster participants in any manner that is useful to the present investigation? Will the technique cluster sources in a useful manner? If participants or sources are so clustered , by what features will they be characterised?

The rationale for this approach was two-fold: first, it seemed very appropriate to research of exploratory intent to engage in this kind of assessment, and secondly it seemed possible that if participants or sources could be grouped and their similarities assessed, some of the important dynamics of source use and preference might be revealed.

The exploratory analysis of the pilot studies in chapter 5 contains more discussion of the use of cluster analysis.

Next employed in the pilot studies was communication network analysis, and specifically production, innovation and social networks. (For details see the questionnaire in the appendices.) The production network concerns participants' day to day discussions about the work they do; the innovation network shows the patterns of interaction that occur in the discussion of new ideas, and the social network shows how people group when talking about social matters.

Network analysis in this form is oriented entirely to internal communication, taking no account of information flow across organizational boundaries.

The first step in analysing network data is to construct matrices and sociograms of participant responses (for examples see Chapter 5, the Pilot Studies). These enable the reader to identify subgroups or cliques of persons who, they say, habitually interact on various topics, and by this means both weak and strong aspects of the communication processes within a given section may be identified. From this recommendations as to desirable new developments in the section can be developed.

Network analysis was used in all but one of the 17 organisations included in this study, originally with the intention that it should serve as a major investigative

method in the research. In practice, in the pilot studies it was found to be of considerable value in casting light on the links among people grouped by the cluster analysis, yet it was also found to be enormously complex and time consuming.

Whereas network analysis appeared extremely useful to a micro-level investigation of links among staff in organisational sub-sections, it seemed of much less value to a study which attempts to take a broad overview of source contact trends. Nevertheless, although it transpired that this study could not make a lot of use directly of the voluminous quantities of data generated by network analysis, such still appeared very worthwhile as back-up information (as in the pilot studies) should it be needed.

2. Examination of the Rankings of Sources

Following the analysis carried out of the data from the two pilot studies, it became clear that required next was a broad overview of all participants' responses. Subsequent analytical methods (such as correlation coefficients, breakdown processes and so on) would be needed to follow up some of the key factors identified in the early analyses, but meantime an overview of the study was considered necessary, in line with the exploratory and descriptive intent of the research.

The approach decided on was a simple ranking of sources by averaged participants' responses. The tables produced by

this means are shown in Chapter 5, and they are as follows. First, the sources used now by the whole sample are ranked from most to least frequently used, then the sources which the sample prefer are similarly ranked, together with the mean frequency of present use and preferred use along a five-point scale of 1 (Never), 2 (Rarely), 3 (Sometimes), 4 (Often) and 5 (Very Often). The third table shows discrepancies between information received now and preferred, with sources ranked by size of discrepancy.

In tables 12 and 13 the sources are ranked by standard deviation, offering another means of viewing the data.

By this ranking system, and comparisons among rankings, is developed an overview of the data which enables the researcher to establish some basic findings as to what are the sources the sample, in aggregate, say they use now, would prefer to use, and the discrepancies that eventuate. This is seen as a very basic form of analysis, but nevertheless is one which, according to this writer's reading of the literature, has never been attempted previously in a study of this magnitude. Other studies have set out to take similar overviews, but they have normally been conducted in respect of either smaller, industry-specific groups, and/or contain the biases discussed in the literature review either towards interpersonal sources or towards print sources.

From this section of the analysis readers should be able to

obtain an overview of the interpersonal and print sources of most significance to participants in the study.

Similar rankings of sources are next shown in respect of the status subgroups in the sample; in each of the instances of nonsupervisory staff, first-line supervisors, middle and top management, sources now, preferred and discrepancies are given. Then to this information are also added comparisons with the population means (or discrepancies); in this way each status subgroup may be compared with the results for the sample as a whole. (See the relevant tables in Chapter 5 for further details.)

The analytical method as described above would not be described as highly sophisticated, but it is seen as appropriate both to the data and to the exploratory intentions of the study.

For each of the four status sub-groups, their sources now, preferred and the discrepancies are displayed and discussed, so by the end of that section in Chapter 5, the reader should have received a clear overview of the source contact preferences of each group in turn, plus an idea of the main differences among levels.

In developing the questionnaire, it was accepted that the five point scale chosen was possibly not ideal to the task; very likely a seven or nine point scale would have been preferable. However it was decided to use a five point

scale in an attempt to obtain some comparability with the major overseas research in a related area, the I.C.A. communication audit (Goldhaber and Rogers, 1979) which also used a five point scale.

For similar reasons the format used in several communication audits elsewhere (employing now and prefer dimensions) was also adopted in the present research. In the event it was decided not to make explicit comparisons between the findings of this study and those overseas, for various reasons, including the interpersonal bias of the I.C.A. approach, and different research objectives and interests among studies, which made comparability difficult.

The basic methodology of ascertaining discrepancies in access to information sources was simply to ask participants to respond to two statements in respect of each information source listed.

The two statements were:

"This is the frequency with which I now receive information from (each source)" and

"This is the frequency with which I would like to receive information from (each source)."

Then discrepancies were found by subtracting the mean score of the population's (or a subgrouping within it) responses

to source x now and source x preferred.

Some clarification is needed in respect of negative discrepancies (most particularly for the grapevine), where comparisons are drawn between, for example, the whole sample's discrepancy and a subgrouping's discrepancy (as in tables 16 and 19). In table 16 nonsupervisory staff showed a discrepancy of -0.3. Table 11 shows the entire sample's discrepancy of -0.4. A comparison of those two groups produces a difference of +0.1.

Table 19 provides another example. The total sample's discrepancy is -0.4. The discrepancy shown by supervisors is -0.5, producing a difference of -0.1. On the face of it, the difference between -0.4 and 0.5 may look like +0.1, but the difference is shown as -0.1 for the following reason.

The discrepancy for any source is defined as the difference between what is received now and what is preferred. In the great majority of instances the latter is greater than the former, producing a "positive" discrepancy. In the rare instances where information now is greater than information preferred, a "negative" discrepancy is formed. Any negative discrepancy signals that there is no shortage of information from that particular source; therefore the larger the negative discrepancy, the greater is the distance from a positive discrepancy. In the case of table 11, then, the supervisors at -0.5 are further from a discrepancy than are the sample as a whole (-0.4), therefore the difference

between the two groups is -0.1 not +0.1.

3. Crosstabulations of Status and All Sources and Breakdown of Education and Print Sources

Following the identification in the pilot studies of status as a very major factor in source use, it was decided to explore in more detail the varying use of and preference for sources by different organisational status levels. The approach selected to do this was the crosstabulations procedure of the SPSS package on the Prime 750 computer. Crosstabulations was selected for its display of the joint frequency distribution of cases, as defined by the categories of status and source variables.

A variety of statistics is also available from the crosstabulations procedure (eg the chi-square statistic) but it was considered that the primary value of this procedure for this study lay mainly in the scope it offered for examination of relative percentages of responses to sources by people of different status levels. This process enables the reader to observe different trends in the use of sources by differing levels, and is considered to be very much in keeping with the exploratory intent of this study. It also appeared appropriate to the objective of the research to assess or devise suitable means of analysing the data obtained.

Given next that the literature review suggested that there might be strong correlations between status and education,

it was felt desirable to focus next on the variable education as a way of establishing some basic findings. Controlling for status while assessing education and sources, and controlling for education while assessing status and sources, would be left to the next step in the analysis, partial correlations. Crosstabulations and breakdown in the SPSS package operate very similarly, and breakdown was used in order to assess whether it seemed appropriate for this kind of investigation.

4. Pearson, Spearman and Partial Correlations

In this section is discussed the use of different correlation coefficients as a means of exploring the data. Use of multiple methods in this way may have been less likely in an hypothesis - testing style of research, but was seen as appropriate in this study, given its exploratory intent. The purposes of using several different correlations were firstly to assess the extent to which these different approaches tended to support or contradict one another in terms of their basic results and generally to discover whether this kind of approach appeared to be a suitable means of analysis for this study, and secondly to discover what seemed to be the major trends in the data, in respect of the variables explored.

The researcher was also aware that the use of several different correlation methods might normally not be appropriate, laying the study open to the charge of "significance - hunting," that is, jumping from method to

method until a high correlation was found in respect of any given pair of variables. To avoid the possibility of the study being seen in this light, care has been taken not to overstate the importance of results which are found to be statistically significant. Such results are seen to be relevant to the study, not so much in their own account, but in terms of the possible implications that may be suggested thereby. In other words any statistically significant results are seen essentially as indicators of possible relationships in the study, those relationships to be explored by various means.

The suitability of these analytical methods should also be assessed on grounds of level of measurement. In the present study most variables have categories which cannot be said to be equal interval (eg the frequencies of source contact were never, rarely, sometimes, often and very often); though there is undoubtedly a form of symmetry in these categories it cannot be argued that they are of "equal distances" apart, but may properly be considered ordinal in nature.

The standard classification of levels of measurement was developed by Stevens (1946), who identified nominal, ordinal, interval and ratio as the four main levels. Traditionally it has been held as quite improper to analyse variables existing at lower levels of measurement with methods developed for the purposes of higher levels. A different point of view has begun to be aired in more recent times, featuring the opinion that statistics originally

designed for interval level variables, such as the Pearson correlation coefficient, may be used "even if the data satisfy only the assumptions of ordinal level measurement" (Nie et al., 1976, p 276). These authors warn, however, that this is not yet standard procedure so users should pursue it cautiously.

Abelson and Tukey (1959) similarly argued that the proper assignment of numeric values to the categories of an ordered metric scale will allow it to be treated as though it were measured at the interval level. Labovitz (1970) suggests further that except in extreme instances, interval statistics may be used for any ordinal-level variable:

"Although some small error may accompany the treatment of ordinal variables as interval, this is offset by the use of more powerful, more sensitive, better developed and more clearly interpretable statistics..." (Quoted in Stewart, 1979, p 118).

Since this study is mainly exploratory in character, it has been considered appropriate to fall in with Labowitz's argument (1972) that strict rules linking specific statistics to particular levels of measurement should not be blindly adhered to. Tufte (1970) had a similar proposition:

"The distinction between interval and ordinal measurement is usually of little importance in data analysis. The wise assignment of numbers to ordered

categories, coupled with the use of techniques that exploit the properties of numbers, is generally preferable to working with ordered categories."

(p.438).

Another perspective on the matter emerged when some initial analysis was done in this study, and Pearson's correlation coefficient was contrasted with nonparametric correlations (using the SPSS Nonpar. Corr. option, Spearman coefficients were employed). It appeared that because of the large n in the study (318) Spearman came out in most instances as approximately equal to Pearson. Thus even if in theory one should use nonparametric correlations (such as Spearman's rho or Kendall's tau), because the status of the data is only ordinal, in practice, in this study, Spearman and Pearson delivered very similar results. (See Chapter 5, Table 26, Comparison of Correlation Coefficients...) Then, an added advantage of Pearson is its extension to partial correlation coefficients. Partial corr. calculates a matrix of Pearson product-moment correlations, describing the relationship between two variables while adjusting for the effects of one or more additional variables. For the purposes of this study it was decided to focus particularly on status and education variables, given that these had emerged in the literature review and in the early analyses as of importance.

The findings from this approach appear in Chapter 5, Discussion of the Results.

5. Discrepancy Analysis

Some of the theoretical aspects of operationalising an enquiry into uncertainty and using discrepancies are dealt with in Chapter 2, Literature Review (Communication or Information Gaps) and in Chapter 5, Discussion of Results (Uncertainty and the Discrepancy Approach).

Table 28 Comparison Table shows comparisons or discrepancies between information now and information preferred in respect of every source (shown on the vertical axis) and in respect of all possible respondent answers (shown on the horizontal axis).

Reading from left to right, the numbers 1-1, 1-2, 1-3, etc are shown. These represent the possible options, in turn: now, never, prefer, never (1:1); now, never, prefer, rarely (1:2); now, never, prefer, sometimes (1:3); and so on.

The numbers in the cells beneath display the absolute frequency of participants' responses to each option. At the bottom the total number of responses is shown, and beneath that is the percentage of total for each comparison. On the right hand side is the number of respondents, and it will be observed that in most cases there is very little missing data (with the exception of course of people responding to the question on subordinates).

The numbers were obtained by running a program using if

statements [eg If (AM.NW1 EQ1 AND AM.SH1 EQ 1) DISCREP =1]
within the SPSS package (Nie et al, 1976) on a Prime 750
computer.

As will be discussed in more detail in the chapter
following, previous research does not seem to have addressed
the matter of discrepancy analysis in the kind of detail
considered appropriate for this study. Essentially
discrepancy analysis has appeared as what could be a very
useful method of exploring information or communication gaps
in organisations, but from methodological difficulties
mentioned in Chapter 5, has never apparently found
widespread favour.

A feature of the present study, then, is an attempt to
develop a method of analysing discrepancy data which would
skirt methodological problems, and enable the researcher to
compare findings from the discrepancy analysis with findings
from other forms of analysis.

The approach displayed in the Comparison Table appears to
achieve both these goals. Data from this table are analysed
and discussed in more detail in Chapter 5, p. 416 ff.

Table 28

COMPARISON TABLE

Comparisons (Discrepancies) Between Information Now and Information Preferred (e.g. 1 - 3 = Receive (1), Prefer (3).)

Frequency of Responses To Each Comparison N = 318

1 = Never
 2 = Rarely
 3 = Sometimes
 4 = Often
 5 = Very Often

	1-1	1-2	1-3	1-4	1-5	2-1	2-2	2-3	2-4	2-5	3-1	3-2	3-3	3-4	3-5	4-1	4-2	4-3	4-4	4-5	5-1	5-2	5-3	5-4	5-5	
1. Subordinates	3	0	1	1	0	0	6	4	5	0	0	1	19	36	1	0	0	3	53	14	0	0	0	2	21	N = 170
2. Coworkers	1	0	0	0	1	0	3	6	12	2	0	2	40	53	13	0	0	6	107	25	0	0	0	2	41	N = 314
3. Other Units	3	1	11	0	1	0	14	45	26	6	0	0	64	65	10	0	0	0	51	13	0	0	0	3	3	N = 316
4. Superior	0	0	2	0	3	0	5	9	4	0	0	2	18	53	19	0	0	3	102	23	0	0	1	2	51	N = 297
5. Meetings	6	4	9	1	1	0	9	31	24	5	0	2	51	53	13	0	0	4	68	7	0	0	0	2	20	N = 310
6. Top Mgt.	10	8	23	1	7	0	13	53	37	6	0	0	36	54	12	0	0	0	29	7	0	0	1	0	11	N = 308
7. Grapevine	6	0	0	0	0	8	21	14	2	5	7	22	70	23	2	2	17	30	45	5	3	7	5	7	15	N = 316
8. C. Outside	45	5	3	2	3	16	46	33	5	4	0	8	59	24	3	1	0	7	33	6	1	0	0	1	7	N = 312
9. Seminars	12	8	27	11	3	1	17	48	28	5	0	1	73	40	4	0	1	1	22	5	0	0	0	1	1	N = 309
10. Memos	1	1	1	0	1	0	4	17	7	2	0	1	48	54	6	0	1	12	108	11	0	0	3	10	29	N = 317
11. Letters	12	8	12	3	2	1	29	62	19	2	1	2	74	32	1	0	1	6	34	5	0	0	2	4	5	N = 317
12. Newsletters	2	2	0	2	0	0	18	21	7	2	0	2	62	40	2	0	1	12	93	6	0	0	0	9	27	N = 308
13. Records	14	4	8	1	0	1	23	35	11	4	0	1	55	32	1	0	0	3	64	11	0	0	0	6	22	N = 302
14. Books	23	15	19	5	3	3	34	38	13	3	1	2	57	21	3	0	0	7	38	2	0	0	0	1	10	N = 298
15. Journals	28	16	20	4	6	2	36	26	27	2	0	1	53	23	7	0	1	4	37	7	0	0	1	0	7	N = 308
16. Library	26	25	30	4	3	0	19	32	15	4	0	0	42	21	2	0	0	1	50	0	0	0	0	2	19	N = 295
17. Government Docs.	34	20	18	3	2	0	45	38	13	1	0	3	43	28	3	0	0	2	29	2	0	0	2	0	20	N = 306
18. CBIRS	31	9	36	12	13	0	10	18	12	3	0	3	21	13	4	0	0	1	41	6	0	2	3	5	40	N = 283
19. Media	29	9	5	1	2	6	40	22	6	2	4	5	79	22	4	0	3	6	42	5	0	0	0	2	14	N = 308
N =	286	135	225	51	51	38	392	552	273	58	13	58	964	687	110	3	25	108	1046	160	4	9	18	59	363	
% =	5	2.4	4	0.9	0.9	0.7	6.9	9.7	4.8	1	0.2	1	16.9	12	1.9	0.1	0.4	1.9	18.4	2.8	0.1	0.2	0.3	1	6.4	

CHAPTER 5

DISCUSSION OF RESULTS

"The modern age has a false sense of superiority because of the great mass of data at its disposal, but the valid criterion of distinction is rather the extent to which man knows how to form and master the material at his command" (Goethe, 1810, cited in Diebold, 1979, p.41).

In this chapter the aim is to present in order the results of the analysis, and to attempt to "form" or sum up the key findings which emerged in the process.

First, the sources of information will be reviewed in terms of what was found during the field investigations. Second, the two pilot studies are explored in particular detail as a means of displaying how participants in each of the two pilot organisations reacted to questions of information source use. Third, moving on from the pilot studies, an examination is made of all participants' responses to issues of source use. In this section participants' mean scores are compared in respect of frequency with which they receive information now, and frequency with which they would prefer to receive information. Fourth, participants' responses are broken down by hierarchical level and an assessment is made of each level's responses about information now and

information preferred. Fifth, aspects of the relationship between organisational status and source use are investigated; sixth, education and source use are examined, and seventh, correlations among education, status and use of sources are explored in more detail. Last, the question of how discrepancy data may be analysed is addressed, and a way of employing this data is shown.

SOURCES OF INFORMATION REASSESSED

In Chapter 1 the sources of information covered in the research were defined. The function of the present section is to reassess those definitions in the light of what was learnt during the course of the research.

1. Subordinates

Subordinates were defined as those people who report to the respondent either directly or through an intermediate supervisor. Of the 318 people participating in this research, 170 answered the question relating to the frequency of information from subordinates now, and the same number answered the question regarding the frequency of information they would like. Thus there are 148 missing responses for this source and this is the largest instance of missing data, the nearest others being in respect of the use of computer-based information sources, (30 missing, now, and 37 missing, would like), use of an organised library (22 missing, now, and 24 missing, would like) and use of organisational records (20 missing, now, and 22 missing, would like).

The researcher's assumption that subordinates are normally in a direct line relationship to the respondent was largely borne out. However, in some of the organisations surveyed, relationships were not so clear cut. For example, in one of the professional firms included, staff solicitors are employed at a level of seniority below partner and above law clerk, secretary or clerical assistant. Staff solicitors are delegated the responsibility of dealing with particular client problems, and to this end they form what might be described as project teams of one or two staff solicitors, perhaps a law clerk and a secretary to handle the typing etc. In the context of these project teams, the law clerk and secretary, in effect, act as subordinates to this individual. In this way the patterns of work tend to blur organisational relationships, creating an inability to produce a strict definition of the term Subordinate, and, to a lesser extent, Immediate superior. Although there is some ambiguity about the term, then, this did not seem to constitute a major problem in the context of this research.

2. Coworkers

By this term is meant the group of people with whom one interacts most on the job. It implies that they are mainly, but not exclusively, on the same or a very similar organisational level as oneself, and primarily in the same department or unit. In some instances, however, the category coworkers might also include individuals on higher or lower organisational rankings, and in departments other

than one's own. Also some overlap is possible between coworkers and the categories of immediate superior and subordinates. No problems were reported with this term, although in a few instances respondents asked for clarification of exactly what the word included and excluded.

3. People in Other Units

It was assumed that these were people in departments or sections other than one's own, of every organisational level except top management. No difficulties were found with this term.

4. Immediate Superior

For most respondents this category caused no problems; overall there was little evidence that people were confused about who their immediate superior was. There were some exceptions: a case in point is the "variable superior" referred to in the discussion above on subordinates. One's superior on project A might be different to one's superior on project B, and the person shown as one's superior on the organisational chart might be different again.

Analogous to this situation is the problem referred to by one word-processor operator in an organisation surveyed: "I don't have a boss; and I want one", was the comment. The job description for the position merely called for the individual to do the word processing "as requested", and no reporting relationship was specified. In her interview this

person explained further that for guidance on the details of her work she would normally approach the most senior of the clerical staff, who, it appeared, had become a de facto supervisor though without receiving formal recognition of this.

Instances such as the above in several of the organisations surveyed made the researcher aware that reporting relationships were sometimes not as tidy as desirable. Possibly the special ("knowledge worker") character of the organisations was a factor. The optimum forms of organisation of knowledge work are not as well understood as those of production or service work, broadly defined; possibly the ambiguity of the organisational tasks is reflected in unclear staff relationships.

Nevertheless in most instances it appeared that reporting relationships were sufficiently well defined, and where this was not the case, people seemed to attach themselves to other persons of higher informal standing, thus awarding them de facto supervisory status.

5. Department or Unit Meetings

There was a variety of practice evident among the organisations surveyed. Participants met in a range of times from weekly to hardly ever. Some meetings were called on an "as necessary" basis, others were held on a fixed schedule regardless of the amount of business to be done at them. It appeared that only a minority used a pre-

circulated agenda. The purpose of the meetings appeared variable also. In some organisations clearly the accent was on using meetings as a means of transmitting information down the hierarchy. In other instances the intention was to have the group focus on, and perhaps solve, common problems. One department had a segment of each meeting devoted to "The too-hard basket": issues of greater than usual complexity, or matters on which a decision had been stalled had to be raised at this time, thus reducing the possibility that they would be overlooked. Probably most departments were oriented more to downwards (one way) information flow at meetings than using them as a means of making decisions.

6. Top Management

Occasionally there were instances where people who classified themselves as at this level had mild objections to the use of this phrase, preferring whatever their own organisation's specialised term happened to be: "senior partners", for example, or "executive staff". The researcher gained the impression that "top management" had somewhat pejorative connotations for some senior staff. However, it was noteworthy that individuals below this level raised no objections to the use of the term "top management".

Sometimes, particularly in smaller organisations, people were unclear as to whether they themselves belonged in this category, or whether "middle management" might be a better designation, but overall such instances were rare.

7. Grapevine

Initially, there was some doubt as to whether this source could be sufficiently well distinguished from others (especially coworkers, superior and subordinate), to justify being included. After all, information on the grapevine is probably transmitted almost exclusively by people in those three categories, hence overlap among sources seems excessive. However, it soon became clear that the grapevine required a separate listing. In interviews respondents said that they certainly saw the grapevine as a separate source, and that often they considered it to be an important one.

The grapevine seemed to be distinguished from other sources by the nature of the information it carried. Grapevine information tends to be immediate, personal in its orientation, and political in nature, that is, concerned with human events occurring (mainly) within the organisation.

8. Contacts Outside the Organisation

When this term was drafted the researcher had in mind people outside the organisation who were personally reasonably well known to participants in the study, and who hence could be seen as potentially fairly regular, rather than just one-time, sources of information. Nothing in the two pilot studies required an alteration of this definition, but by the end of the data gathering several instances had been discovered where participants took the term to include

clients or customers (who may be just one-time sources of information) as well as people outside, better-known to them.

The main reason the focus was on sources reasonably well known to participants, was so that they could provide a reliable assessment of their contacts' information quality. The assumption was that people are better placed to comment on the information from people they know well than from those they do not.

Although, then, some respondents had customers or clients in mind when they thought about contacts outside their organisation, the evidence from the interviews suggests that most respondents had in mind personal contacts who were reasonably well known to them.

9. Seminars, Courses or Workshops

Participants appeared to have no difficulty with this source; it was designed to encompass a wide range of training and learning events.

10. Memos From Within the Organisation

Prior to the research it was considered that there might be a potential problem of overlap between this source and letters from outside the organisation, but in the event respondents did not seem to experience any difficulties.

11. Letters From Outside The Organisation

12. In-House Newsletters

13. Organisational Records

14. Books Etc. Not In An Organised Library

15. Journals Etc. Not In An Organised Library

16. Organised Library Facilities

While no specific difficulties were noted with this group of sources, it was evident that organisations had a variety of different practices. The category organisational records meant different things to different people, but this variety of perceptions did not seem to constitute a problem, given the breadth of the category.

Of the organisations surveyed, several had their own libraries: they varied in the extent to which they were formally organised and administered. Some of these library facilities were located close to respondents; others were in buildings elsewhere.

17. Government Documents

18. Computer-Based Information Retrieval Systems (CBIRS)

In respect of CBIRS it was found that there were a variety of such systems employed: participants used, for example, in-house data bases, systems located in another centre to

which they were linked on-line and (very occasionally) data bases overseas such as those accessible via the Post Office Oasis network.

19. News Media

No difficulties were found.

In this discussion of sources there is potential for confusion in respect of the writer's use of singular and plural forms of the sources. While "coworkers", for example, is the plural form of the noun, and in some contexts will require a plural form of a verb, "coworkers" is also in this discussion regarded as a source and hence may at some points legitimately require a singular form of a verb.

The decision as to whether singular or plural verb forms are used will be made in the context of each particular sentence, on the basis of what sounds better in each context.

EXPLORATORY ANALYSIS OF THE PILOT STUDIES

The pilot studies were undertaken as a means of obtaining initial, exploratory data in the area of interest, of testing the research instruments and generally of developing and testing the research methodology.

In preparation for carrying out the study, the researcher had identified several organisations which had available for

research purposes departments (or discrete sections) of knowledge workers.

In this section the two pilot studies will be analysed in some detail, to provide a lot of initial information on how the participants in the first two organisations saw the sources of information in their now and prefer dimensions.

As a means both of displaying the data and of providing some initial analyses of it, a CPL clustering program was run as part of the Genstat V statistical package (Rothamsted Experimental Station, 1984) on the Massey University Prime computer. The program was run three times, firstly for the 30 participants in groups one and two and sources now; secondly for the same people and sources preferred; and thirdly for the same participants and sources both now and preferred combined. These analyses were run only on the questionnaire data pertaining to sources; no demographic (age, sex, education, status, tenure etc.) data were provided.

Fig. G. PILOT STUDIES: PERSONNEL IN GROUPS 1 AND 2

	<u>SEX</u>	<u>AGE</u>	<u>STATUS</u>	<u>TENURE</u> (years)	<u>EDUCATION</u>
1	M	36	Supervisor	18	C
2	M	35	Manager	18	C
3	M	28	Staff	1.5	P
4	M	33	Supervisor	3	C
5	M	21	Staff	0.5	P
6	M	23	Staff	1.5	C
7	M	22	Staff	1.5	C
8	M	36	Staff	1	P
9	M	36	Supervisor	0.5	C
10	M	27	Staff	1.5	C
11	M	47	Supervisor	24	P
12	F	25	Staff	1.5	C
13	M	38	Manager	21	C
14	F	21	Staff	5	P
15	M	39	Senior Partner	13	C
16	M	33	Partner	8	C
17	M	33	Partner	4.5	C
18	M	30	Partner	6.5	C
19	F	26	Secretary	1.5	S
20	F	28	Secretary	1.5	S
21	F	25	Secretary	2.5	C (Secretarial Qualif.)
22	F	25	Secretary	0.5	C (Teachers Qualif .)
23	M	30	Staff Solicitor	2	C
24	M	35	Staff Solicitor	1.5	C
25	M	25	Staff Solicitor	1	C
26	M	29	Staff Solicitor	1.5	C
27	M	25	Staff Solicitor	0.5	C
28	M	27	Staff Solicitor	2	C
29	F	21	Law Clerk	0.5	C
30	F	21	Typist	0.5	S

C = Completed Tertiary
P = Partial Tertiary
S = Secondary

Fig. H. SOURCES OF INFORMATION

<u>Genstat/CPL Analysis Number</u>	Now Receive (1)	Should Receive (2)	Now & Should Receive (3)	
Subordinates	1	1	1	2
Coworkers	2	2	3	4
People From Other Units	3	3	5	6
Immediate Superior	4	4	7	8
Department Meetings	5	5	9	10
Top Management	6	6	11	12
The Grapevine	7	7	13	14
Personal Contacts Outside	8	8	15	16
Seminars, Courses or Workshops	9	9	17	18
Memos	10	10	19	20
Letters	11	11	21	22
In-house Newsletters	12	12	23	24
Organisational Records	13	13	25	26
Books Not In A Library	14	14	27	28
Journals Not In a Library	15	15	29	30
Organised Library Facilities	16	16	31	32
Government Documents	17	17	33	34
CBIRS	18	18	35	36
News Media	19	19	37	38

Overview of Group One

Group One is the EDP section of a large government department located in a main centre. (See Fig. I)

Status: There are two managers (2,13) of approximately equal status, who supervise four supervisors (1, 4, 9, 11) who in turn supervise eight staff (3, 5, 6, 7, 8, 10, 12, 14).

Education: All personnel have either completed or are completing a tertiary level qualification in EDP.

Tenure: The section is divided into two subgroups, the

first of four people who have grown up with the organisation, averaging about 20 years service each, and the second of 10 individuals averaging just under 2 years service. The EDP section has experienced a massive surge in growth over the past two to three years.

Age: The ages range from 21 to 47 with a mean age of 30.6.

Sex: Only two women are employed, both of whom are young, one of whom is qualified, and the other of whom is completing her qualifications.

Researcher's Impressions

From the researcher's observations on site, discussions with participants, etc the organisation seemed characterised by:

1. A poorly developed organisational structure: "Half the people here are temporary one way or another" : the researcher was put in mind of Toffler's concept of "ad hocracy."
2. A sense of uncertainty: especially the newer staff seemed unsure about what they were supposed to be doing and how they were supposed to be doing it.
3. A feeling of division: some of the younger, new

arrivals called themselves "the bottom group" and the more senior people "the top group".

4. Overload and underload: the top group seemed overloaded with work and the bottom group underloaded. There appeared to be failure to delegate, partially explicable in terms of the impermanent nature of the staff.
5. A shared sense of potential: "We're on the threshold of really major developments".
6. An awareness (by the top group) of having power: "We'll be making the decisions about who gets the new technology, and the new technology is going to change the whole organisation".
7. A consciousness of being an information-handling and information-dependent organisation, and a perceived need (particularly by the top group) for information. Interest was expressed in the research, so long as it could tell them something useful about their organisation.

Overview of Group Two

Group Two is a department of a large law firm situated in a main centre. (See Fig. I)

Status: There is one senior partner (15) and three other

partners (16,17,18), four secretaries (one for each partner: 19-22) six staff solicitors (23-28), a law clerk (29) and a typist/word processor operator (30).

Education: All partners, the staff solicitors and the law clerk have completed law degrees, two of the four secretaries have completed polytechnic or teachers' college courses and the other two secretaries and the typist have secondary education.

Tenure: The senior partner has been a partner for 11 years and the other three for 3.5, 2 and 2 years respectively. The mean tenure for the partners is 8 years, and for the rest of the staff is 1.3 years.

Age: All staff are in their twenties (10) and thirties (6), with the partners somewhat (though not greatly) older than the rest.

Sex: All the partners and all the staff solicitors are men; six women are employed, of whom four are secretaries, one is a law clerk and one a typist.

Researcher's Impressions

Group Two appeared to have an ethos of very high pressure work activities (at least particularly for the four partners and their secretaries). This department had also experienced recent very rapid growth, having been created and developed entirely by the senior partner. This

individual was very highly regarded by others: the other partners, for example, had all made the transition from staff solicitors through coming to work for him, and this department was still seen as a fast-track, high rewards domain. There seemed to be a strong sense of pride at being an elite, high achieving group.

Participants spoke of the costs of this, however: long hours (e.g. 8.00am to 7.00pm) were commonplace for all levels of staff, and the researcher was told by a number of staff that they found it very difficult to cope with the demands on their enthusiasm and time. For a number of people, family and leisure activities were severely curtailed.

If the partners, their secretaries and one or two staff solicitors were overloaded, it was also evident that other staff solicitors were underloaded. Partners appeared to lack the time to either adequately oversee what staff were doing or to train and develop their skills further.

The organisational structure compounded this problem : there was no formal chain of command within the department (other than between each partner and his secretary). The four partners operated in a kind of collegial relationship, and the six staff solicitors comprised a pool from which partners could draw an individual to assist on a particular project (See Fig. I).

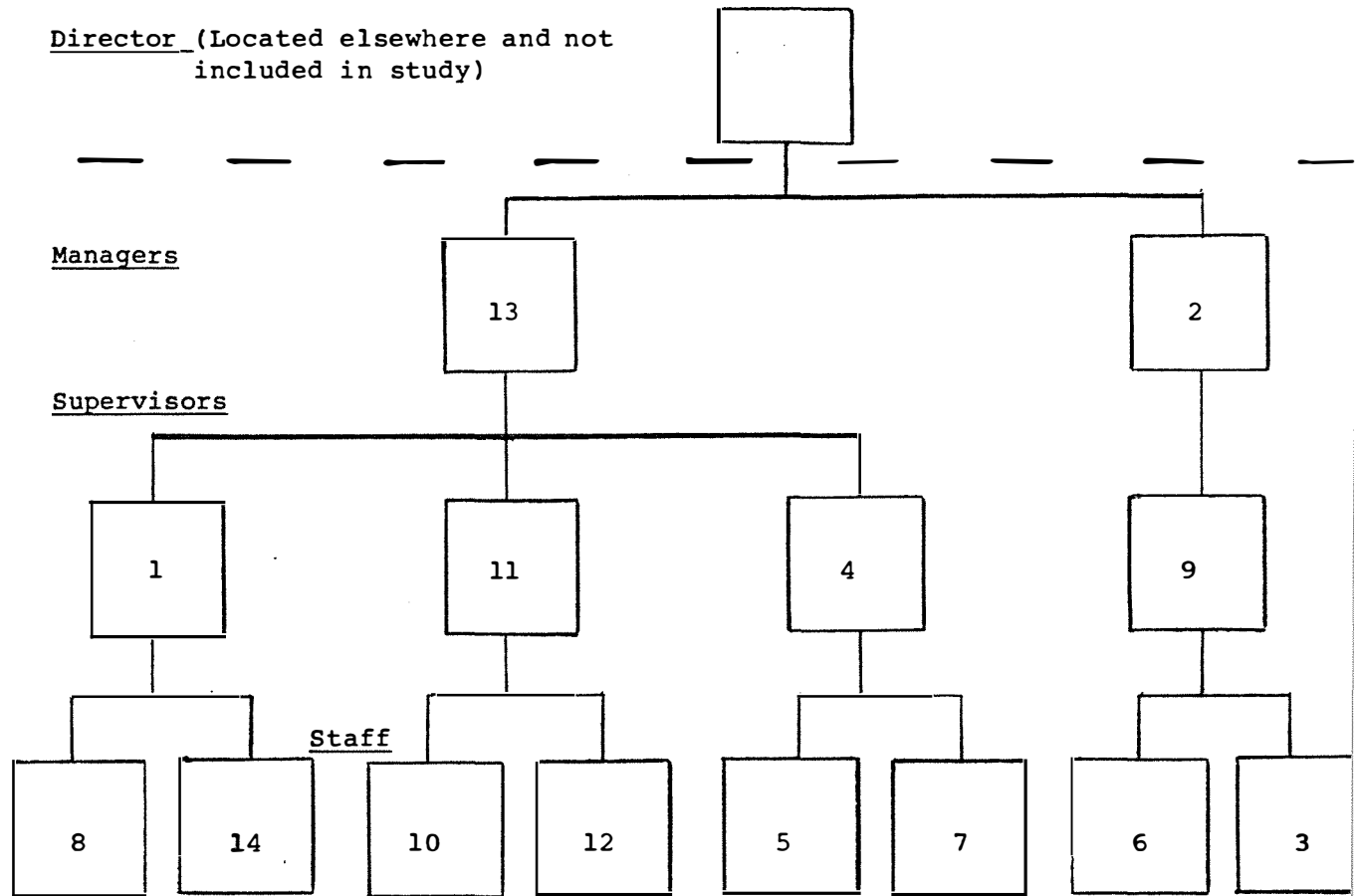
Each staff solicitor worked in his own very small office,

and several of them described to the researcher how isolated and uninvolved they felt. Perhaps because of the ethic of confidentiality in the department, often they did not seem to approach other solicitors for advice on particular work issues. Several made remarks to the effect that they knew they were "re-inventing the wheel", or "working in the dark", but they did not know how to overcome this.

Fig. 1. Organisational Structure of Groups 1 and 2

Group 1

Director (Located elsewhere and not included in study)

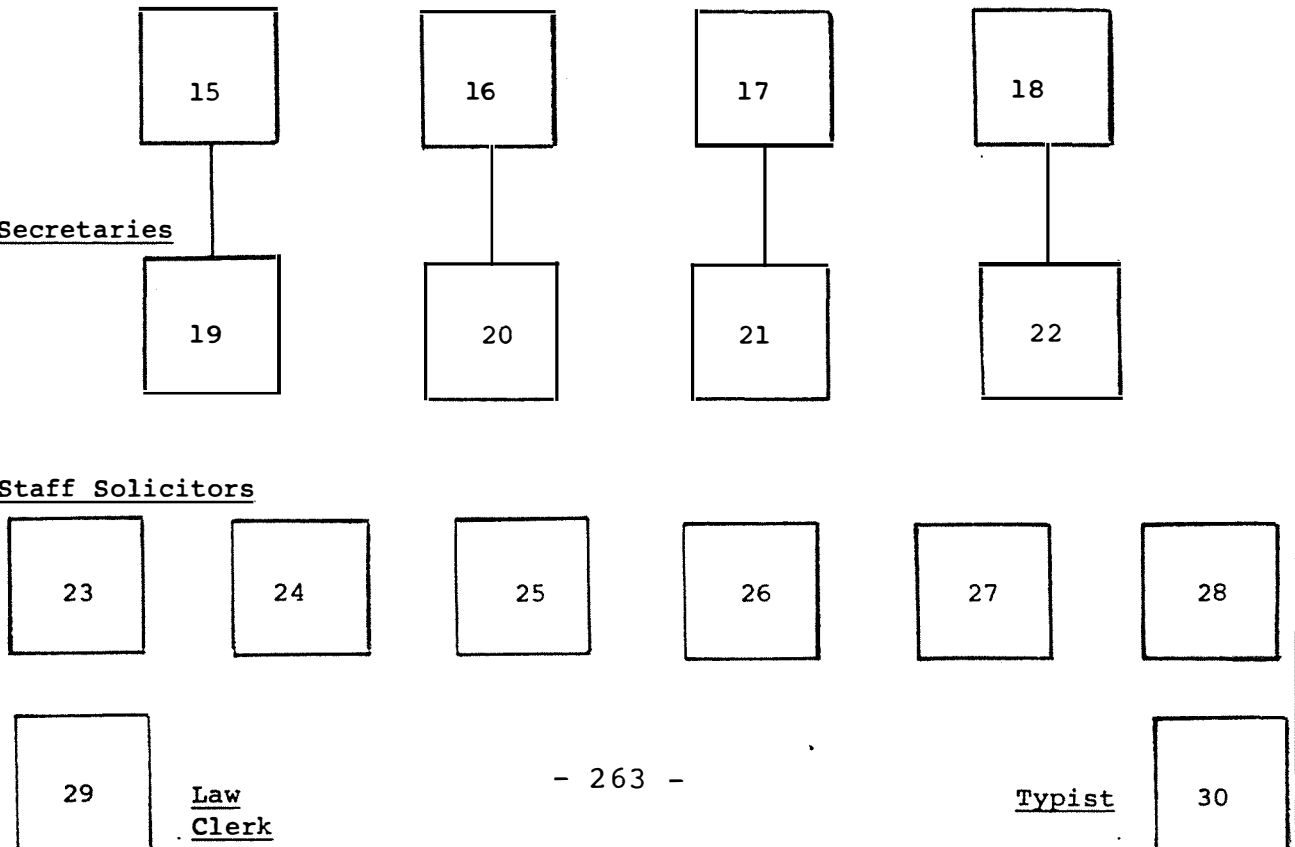


Group 2

Partners

Secretaries

Staff Solicitors



Comparison of Groups One and Two

Both groups are somewhat unusual, yet also share a number of characteristics in common. Both have developed very rapidly in recent years, one through the demands of its large parent body for EDP services (demand-pull), the other out of the charisma and skills of the senior partner (initiative-push); and both are experiencing the stresses and pains of this. Both are dominated by men, and only in the first is there any indication of the arrival of women into skilled positions. The average age in both organisations is young; with only one exception all participants are under 40, and 16 participants (just over half) are less than 30.

Further, both groups share a sense of pride in their place in the scheme of things, and both seem to have a strong commitment to their respective work duties. At least partially arising from very rapid growth, the organisational structure in each organisation appears deficient, with concomitant problems of poor delegation, inadequate supervision practices and insufficient training. These lead to problems of overload at the top and underload at the bottom.

Both are very aware of their dependence on and use of information, and both make use of EDP technology, though in different forms. Participants in these groups are probably better educated than most New Zealand knowledge workers, and on average have probably been in their jobs for a lesser period of time.

In each instance there is a group of senior staff who have been in the organisation considerably longer than the rest, and a larger group of more junior staff who have been there only for a short period of time.

The results obtained from these two organisations proved sufficiently interesting as to justify the publication of two further articles on the study (Sligo, 1984, Sligo, 1985c), the first of which dealt mainly with the topics of information of concern to the participants in the pilot studies, and the second with the sources of information in use.

(On the basis of this work, in 1985 the Development Finance Corporation asked the writer to undertake a study of topics of communication and information sources in small businesses; this report appeared in the same year (Sligo, 1985d), and a further article based on the first eight organisations in the major study appeared about the same time (Sligo, 1985b).

Sources Now: Clustering the Participants of Groups 1 and 2
Table 1 displays the first result of the analysis. In the hierarchical clustering process, at level 68.0, manager (2) from Group 1 and senior partner (15) from Group 2 are linked. This provides a very interesting indication, firstly, that the most senior people in each organisation have given very similar responses in respect of sources now

and secondly, that their responses were sufficiently unlike those of other people to set them apart from everybody else.

In other words, despite the fact that Group 1 is a government department, and the section is a very specialised one dealing with EDP services, and that Group 2 is a department of a private sector law firm, nonetheless two of the three most senior individuals are alike, and distinct from the rest, in their reported source contact behaviour.

*** HIERARCHICAL CLUSTERS ***

Table 1

Hierarchical Clusters of Staff.
Sources Now, No.1

LEVEL 68.0

15 2

UNGROUPE

1	5	12	25	4	17	18	13	3	23
11	10	8	30	19	21	14	27	29	26
6	28	7	24	16	20	22	9		

LEVEL 67.0

15 2

UNGROUPE

1	5	12	25	4	17	18	13	3	23
11	10	8	30	19	21	14	27	29	26
6	28	7	24	16	20	22	9		

LEVEL 66.0

5 12

15 2

UNGROUPE

1	25	4	17	18	13	3	23	11	10
8	30	19	21	14	27	29	26	6	28
7	24	16	20	22	9				

LEVEL 65.0

5 12

15 2

UNGROUPE

1	25	4	17	18	13	3	23	11	10
8	30	19	21	14	27	29	26	6	28
7	24	16	20	22	9				

Also in Table 1 at level 66, a second linkage appears between two of the "bottom group" staff members (5 and 12) in Group 1. They have a variety of characteristics in common - a similar age, educational background, status and length of time in the organisation.

As discussed in the Research Environment section, in both the pilot studies three methods of research were employed: questionnaires, interviews and network analysis. In order to explore further the relationship between 5 and 12, the network data were examined, and these two individuals were found to be closely linked.

NETWORK ANALYSIS

Relevant data from the production, innovation and social networks are shown below:

(1) Never	(2) Rarely	(3) Sometimes	(4) Often	(5) Very Often
<u>Production</u>	5 reports (3)	about 12		
	12 reports (4)	about 5		
<u>Innovation</u>	5 reports (3)	about 12		
	12 reports (4)	about 5		
<u>Social</u>	5 reports (3)	about 12		
	12 reports (4)	about 5		

It is noteworthy that in the production network:

5 has only 4 links of a strength of (3) or greater (2 x (3) + 2 x (4))
 12 has only 3 links of a strength of (4) or greater (2 x (4) + 1 x (5))

In the innovation network:

5 has only 3 links of a strength of (3) or greater (2 x (3) + 1 x (4))
 12 has only 3 links of a strength of (4) or greater (2 x (4) + 1 x (5))

In the social network:

5 has only 2 links of a strength of (3) or greater (2 x (3))
12 has only 3 links of a strength of (3) or greater (2 x (3) + 1 x (4))

In other words persons 5 and 12 are quite strongly linked in all three of the informal networks; each network will tend to reinforce the others and shape similar attitudes.

Returning to the hierarchical clustering, there is no change for the next 8 levels, until at level 57.0 persons 4 and 17 join 15 and 2 (Fig. E). 4 and 17 are respectively a supervisor in Group 1 and a partner in Group 2. That is, the hierarchical clustering method has now grouped together four senior people (senior partner, partner, manager, supervisor), two from each group. This result then holds constant for the next four levels.

Table 2

Hierarchical Clusters of Staff

Sources Now, No.2

LEVEL 57.0

5 12

4 17 15 2

UNGROUPED

1	25	18	13	3	23	11	10	8	30
19	21	14	27	29	26	6	28	7	24
16	20	22	9						

LEVEL 56.0

5 12

4 17 15 2

UNGROUPED

1	25	18	13	3	23	11	10	8	30
19	21	14	27	29	26	6	28	7	24
16	20	22	9						

LEVEL 55.0

5 12

1

4 17 15 2

UNGROUPED

1	25	18	13	3	23	11	10	8	30
19	21	14	27	29	26	6	28	7	24
16	20	22	9						

LEVEL 54.0

5 12

4 17 15 2

UNGROUPED

1	25	18	13	3	23	11	10	8	30
19	21	14	27	29	26	6	28	7	24
16	20	22	9						

LEVEL 53.0

5 12

4 17 15 2

UNGROUPED

1	25	18	13	3	23	11	10	8	30
19	21	14	27	29	26	6	28	7	24
16	20	22	9						

LEVEL 52.0

1 5 12 25 4 17 15 2 18 13

30 19 21 14

27 29

UNGROUPED

3	23	11	10	8	26	6	28	7	24
16	20	22	9						

From this it seems that the reported practices of source contact among senior people are sufficiently distinctive, firstly, to group them together (notwithstanding that they are from very different organisations), then secondly to exclude from their group people of lesser seniority.

Looking next at the network analysis for each pair of people (2 and 4 from Group 1, and 15 and 17 from Group 2), the data are as follows:

(1)	(2)	(3)	(4)	(5)
Never	Rarely	Sometimes	Often	Very Often

Group 1

<u>Production</u>	2 reports (3)	about 4
	4 reports (1)	about 2
<u>Innovation</u>	2 reports (2)	about 4
	4 reports (1)	about 2
<u>Social</u>	2 reports (2)	about 4
	4 reports (1)	about 2

In the production network:

2 has 5 links of a strength of (3) or greater (3 x (3) + 2 x (4))
 4 has 11 links stronger than (1) (5 x (2) + 2 x (3) + 2 x (4) + 2 x (5))

In the innovation network:

2 has 12 links of a strength of (2) or greater (9 x (2) + 2 x (3) + 1 x (4))
 4 has 11 links stronger than (1) (5 x (2) + 3 x (3) + 3 x (4))

In the social network:

2 has 12 links of a strength of (2) or greater (7 x (2) + 3 x (3) + 2 x (4))
 4 has 9 links stronger than (1) (6 x (2) + 3 x (3))

From this it is evident that 2 and 4 are very weakly linked in all three networks; yet despite only very occasional

interpersonal contact, evidently there are considerable similarities in their use of information sources.

Over- and Under-reporting

Another interesting point arising from the data above is the over- and under-reporting evident; that is, the lack of agreement between 2 and 4 as to the frequency of their interaction. It is also noteworthy that 2 is senior to 4 in the section hierarchy, and in a separate work area, as shown in Fig. I.

Farace, Monge and Russell (1977) suggest that:

"... one predictor of the way an individual's links will be directed is her or his status in the organisation. At lower levels, people tend to over-report contacts on task-related matters with higher-level members, while those at higher levels tend to under-report their links with lower-level members" (p.199).

The pattern of over- and under-reporting in this instance runs opposite to the direction identified in the literature, with the lower-level person under-reporting his contact to the staff member above, and the higher-level person over-reporting his link with the individual below.

For the individuals in Group 2, the network data are:

(1) NEVER	(2) RARELY	(3) SOMETIMES	(4) OFTEN	(5) VERY OFTEN
--------------	---------------	------------------	--------------	-------------------

Group 2

<u>Production</u>	15	reports	(5)	about	17
	17	reports	(4)	about	15
<u>Innovation</u>	15	reports	(5)	about	17
	17	reports	(4)	about	15
<u>Social</u>	15	reports	(4)	about	17
	17	reports	(4)	about	15

Here it is interesting that where there is over- and under-reporting (production and innovation networks) again it runs counter to the direction suggested in the literature, with the more senior person over-stating links relative to the more junior person's under-stating them.

Unlike persons 2 and 4 in Group 1, these two individuals are strongly linked.

Homophilous Characteristics

Near the bottom of Table 2 at level 52 the next major additions appear, and now there are three separate clusters consisting of:

1. Both managers, two supervisors and two staff from Group 1, plus three of the four partners and one staff solicitor from Group 2.
2. The typist and two secretaries from Group 2 plus one staff member from Group 1.
3. A staff solicitor and the law clerk from Group 2.

Members of these three clusters seem to show strongly homophilous characteristics. The first one, for example, now contains 7 out of the 9 most senior people in the two organisations. The second cluster is composed of four women of similar ages, three of whom do secretarial work, and the third cluster holds two people of similar status and tenure in the firm.

Fig.J. shows a dendrogram which displays all major relationships among these staff. The vertical axis has all staff members organised by broad clusters, and the horizontal axis shows the levels at which relationships first appear.

Fig. J. Dendrogram Showing Relationship Among Staff. Sources Now

DENDROGRAM ***

LEVELS 69.0 67.0 65.0 63.0 61.0 59.0 57.0 55.0 53.0 51.0 49.0 47.0 45.0 43.0 41.0

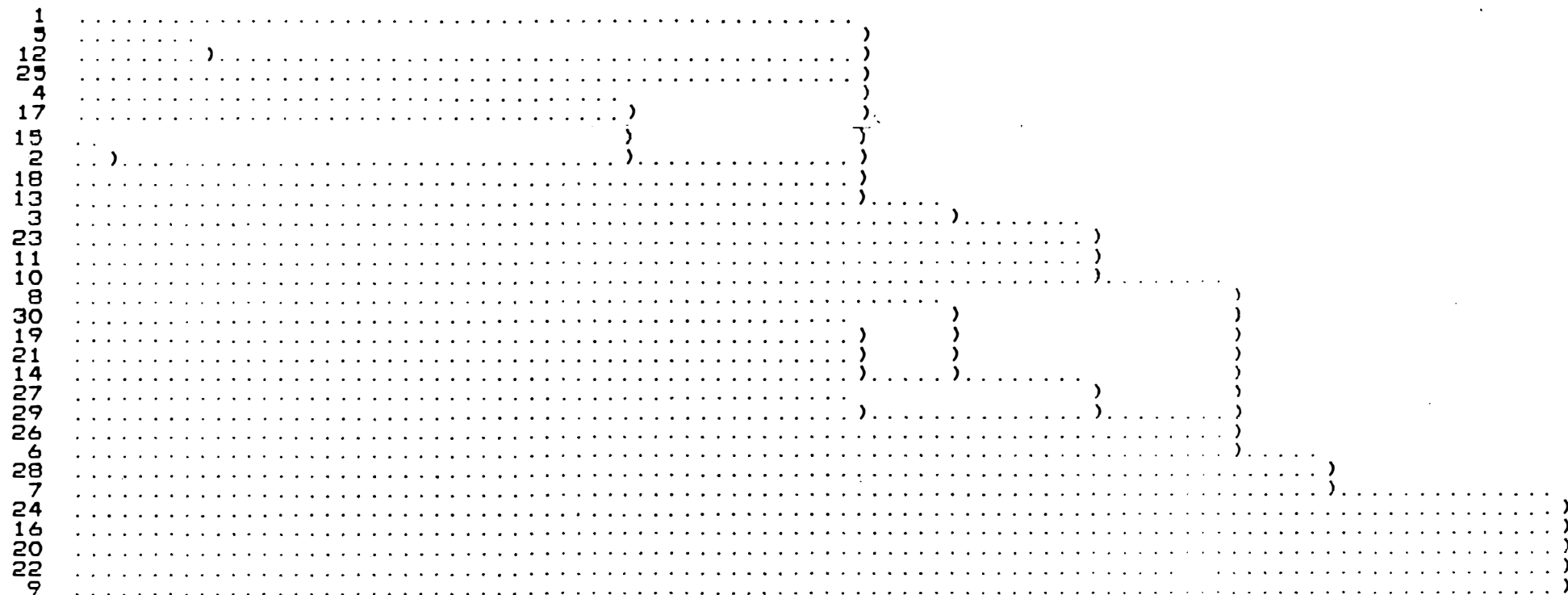
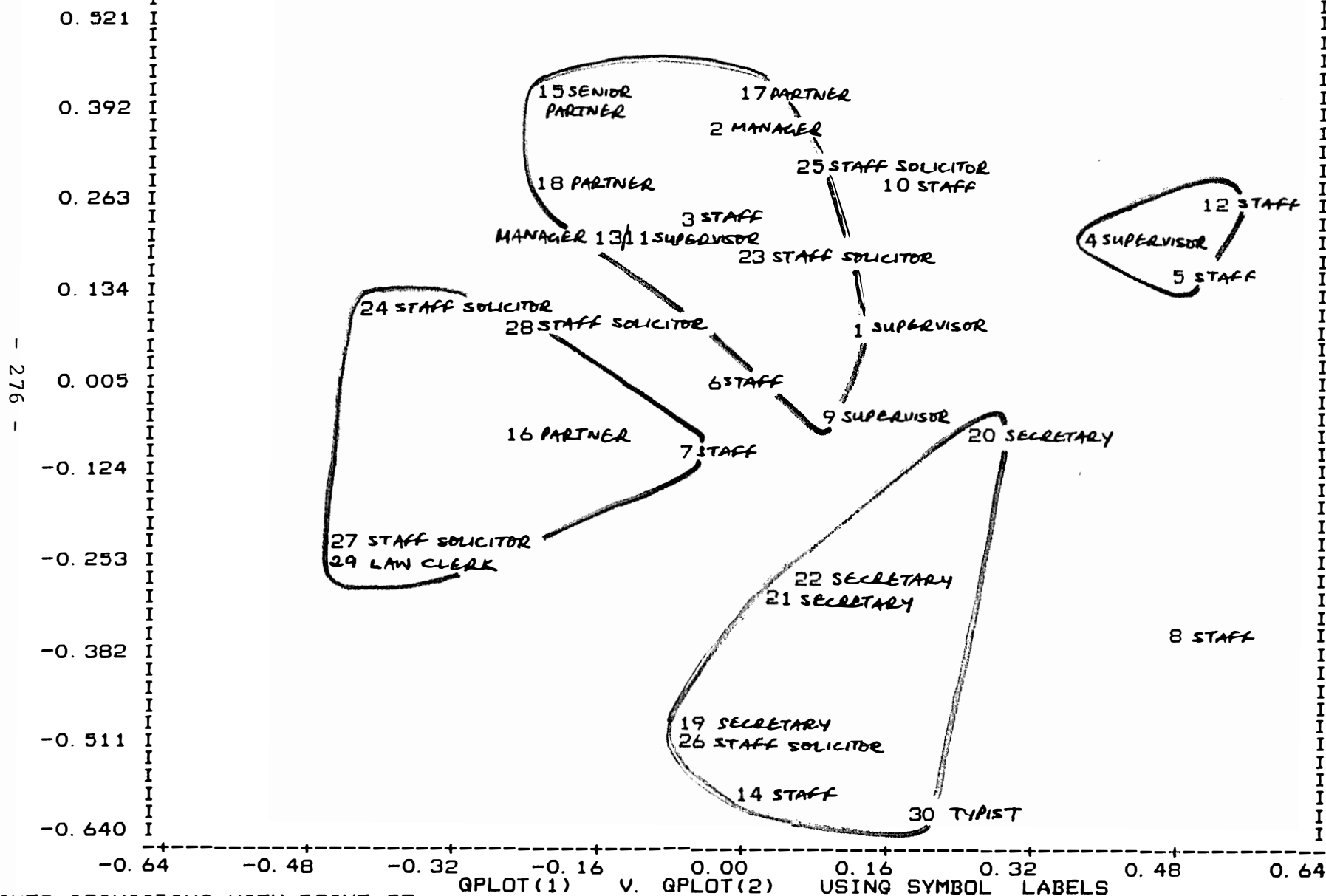


Fig. K. Cluster Plot of Staff. Sources Now, Option 1



Clustering All Staff In the Pilot Organisations

Probably the most useful clustering of all is depicted in Fig.K. Here the staff from the two organisations are shown in relationship to one another, and the researcher has drawn lines showing apparent sub-groupings. This process of identifying sub-groupings tends to be controversial: much debate is possible over whether a given data point should or should not be included or excluded in a cluster. The present instance is no exception, and doubtless, there could be a number of other ways of sub-grouping the participants in Fig. K.

Major Patterns Evident

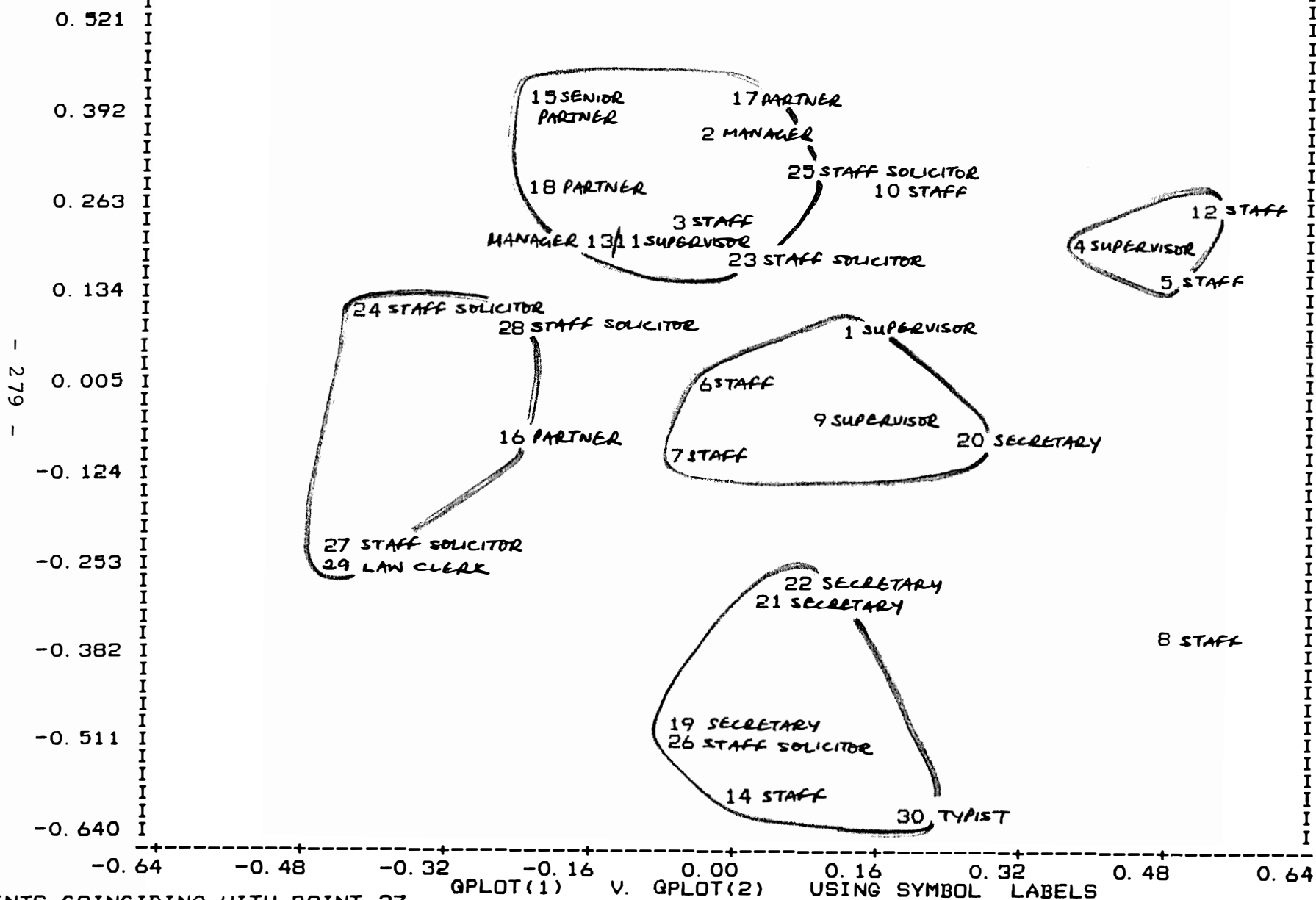
However, notwithstanding this, the major patterns seem reasonably clear. Four main groups appear, consisting of:

1. A senior staff group, containing both managers and three of the four supervisors from Group 1, plus three of the four partners from Group 2. One other staff member from Group 1 and two staff solicitors are also present. This group consists of 11 people, of whom eight are at a senior level in their organisations. It should also be recounted that not long after this survey was conducted in Group 2, the staff solicitor who appears near the centre of the senior staff group (23) received a promotion to partner level: in this instance it may be said that this analysis acted as a predictor of future events!

2. A cluster of three, consisting of two staff members and one supervisor from Group 1. The last is the only supervisor missing from the senior staff group, and his cluster is discussed further below.
3. A cluster of six individuals, all but one (7) from Group 2, and all but one (16) of non-senior status. They comprise three staff solicitors, one law clerk, one partner and one staff member from Group 1. On grounds of status the only odd person out is the partner (16); the rest are intermediate level people, mainly from Group 2.
4. A mainly secretarial cluster (4 secretaries, one typist, one staff solicitor, all from the law firm, and one staff member from Group 1). Six of the seven are women and five of the seven perform secretarial work.

Other subgroupings are just as plausible; for example Fig. L. shows another way of looking at the same data as given in Fig. K, but with different boundary lines drawn. In Fig. L there are now five clusters rather than four, but the results, while being rather less clear-cut than in Fig. K, still very strongly indicate that participants are clustering by hierarchical level.

Fig. L. Cluster Plot of Staff. Sources Now, Option 2



POINTS COINCIDING WITH POINT 27

Returning now to cluster 2 mentioned above, it will be seen that this is the smallest cluster, consisting of three people from Group 1, two of whom are staff (5 and 12) and one of whom (4) is the "missing" supervisor from the senior staff cluster.

Status and Tenure

It will also be observed that supervisor 9 from Group 1 is on the very outskirts of the senior staff cluster in Fig. K. Supervisors 4 and 9 are the two supervisors who have been in their organisation only a relatively short period of time (3 years and 0.5 years respectively) in contrast to the tenure of the other two supervisors (18 and 24 years respectively). The latter two (1 and 11) are both closer to the centre of the senior staff group than the former two: from this it may be argued that membership of the senior staff cluster appears in this instance to be dependent on the two factors of status and tenure.

Summing up, it appears that supervisors 4 and 9 are in a kind of transition between senior staff and other staff. One of them (9) is attached to the senior group, but has the weakest links of all; and the other (4) is clustered with non-senior staff members (5 and 12) but is closer to the senior group than they are. Possibly as length of tenure increases, 4 and 9 would move closer to the centre of the senior group.

Communication Network Analysis

The relationship among supervisor 4 and staff 5 and 12 may be explored further in terms of their network data.

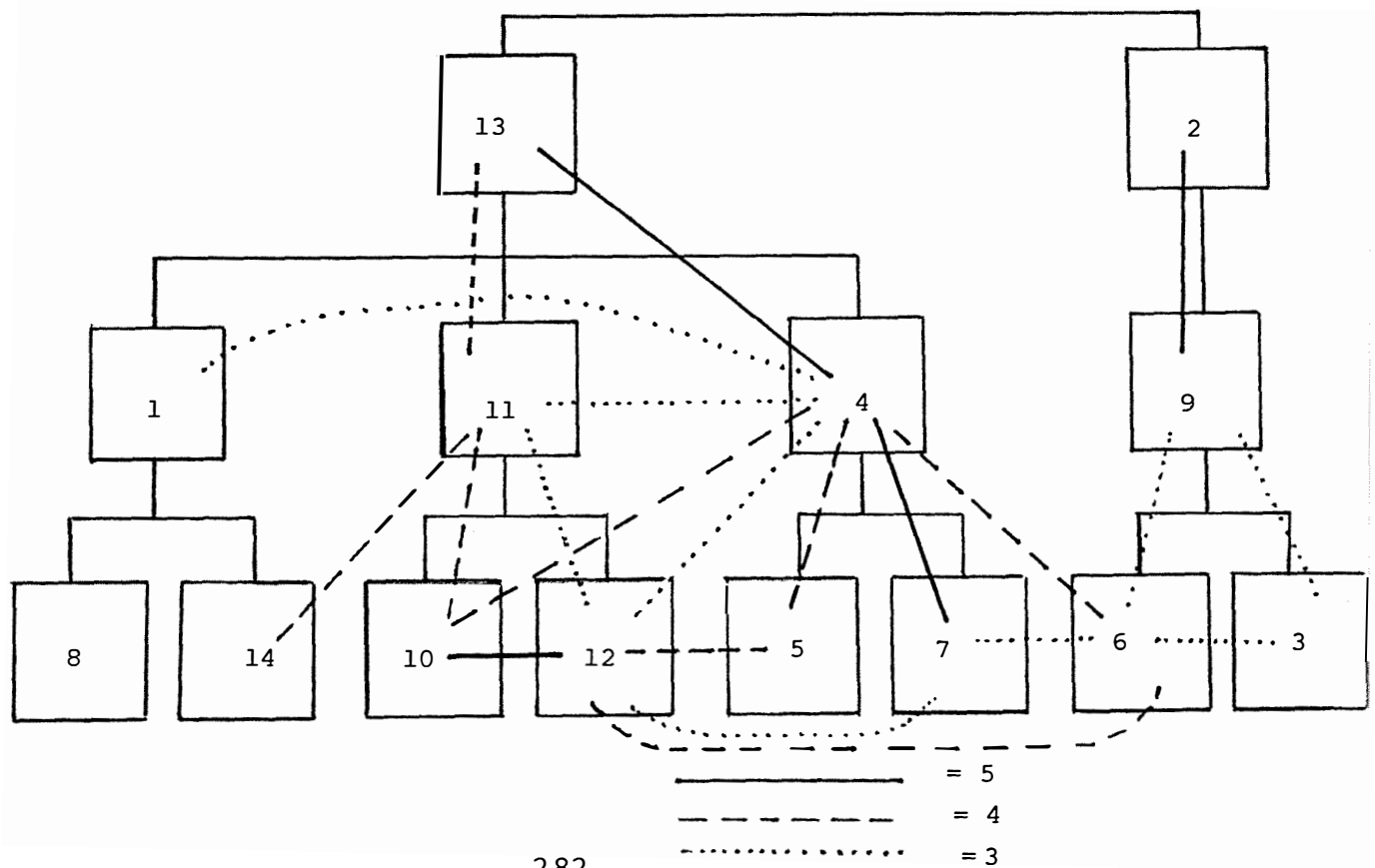
(1)	(2)	(3)	(4)	(5)				
NEVER	RARELY	SOMETIMES	OFTEN	VERY OFTEN				
Production		Innovation		Social				
4	5	12		4	5	12		
4		4	3		4		3	2
5	4		3		5	2		3
12	3	4			12	2	3	

Strong links are evident in the production and innovation networks and relatively weak ones in the social network.

To display the relative strengths of the relationships, the strongest ties are presented in the matrix and sociogram in Fig. M.

Fig. M. Group 1 Production Matrix and Sociogram
Highlighting Persons 4, 5 and 12

	3	4	5	6	7	10	11	12	13
3	X								
4		X							
5			X						
6				X					
7					X				
10						X			
11							X		
12								X	
13									X



Detailed Findings From the Network Analysis

Primarily only relatively strong ties (3,4 and 5) are shown, and to provide a more straightforward analysis only the production network is given. The innovation and social networks did not appear to add any major contributions to the discussion.

Where two people do not agree about the strength of their links (over- and under-reporting) the following procedure has been used. If disagreement = 2 (eg where A reports the strength of the link as 3 and B as 5) an average is taken (link = 4). If disagreement = 1, the report of the person who shows less systematic distortion (neither under-reporting nor over-reporting much) has been adopted.

The matrix and sociogram are focussed mainly on persons 4, 5 and 12. There are other strong ties in the group, but for clearer visual display these have been dropped where they appear irrelevant to 4, 5 and 12's network of relationships.

A great deal of information is provided in Fig. M about interpersonal contact in this department. Supervisor 4 appears as a person with very strong links both with his own manager, but especially with staff on the level below. Particularly noteworthy are the strong ties with staff both in his own section and other supervisors' sections. Person 12, for example, has a link of the same strength with 4 as with her own supervisor. Thus it could be argued that when it comes to discussing production (ie. everyday work) with a

supervisor, she is just as likely to choose another supervisor (4) as her own supervisor (11).

The communication within the subgroup headed by supervisor 9 is especially of interest. This communication seems characterised by weak links: 9, 6 and 3 all record a strength of only (3), which suggests relatively little discussion about work matters occurs in this subgroup. However, staff member 6 has his strongest links with supervisor 4 in the next subgroup, thus avoiding his own supervisor, and with staff member 12, two subgroups along.

Staff member 12 maintains strong links with three of her colleagues on the same level as herself, but only weaker links with her own supervisor (11) and the supervisor of the next subgroup (4). Supervisor 11 has strong ties with 12's coworker 10, and with staff member 14 in the next group.

More could be said, but the primary usefulness of the network analysis has been in demonstrating the strength and diversity of the ties supervisor 4 has with staff members on the level below. It appears likely that the extent and nature of these ties results in similarity of attitudes and work patterns which include use of information sources.

Also apparent in the sociogram are the relatively weak links 4 has with his fellow supervisors: there is virtually no link with supervisor 9, and only medium links with supervisors 1 and 11.

Nevertheless it is also evident from the sociogram in Fig. M that supervisor 4 still has a strong link with his own manager 13, and possibly this helps account for his positioning in the cluster analysis (Figs K and L) as closer to the senior staff group.

CLUSTERING THE SOURCES

The next stage in the analysis of the use of sources now by the pilot organisations is to assess how the 19 sources cluster, in terms of similarities in the way these 30 participants regard them. As above, the CPL program firstly provides hierarchical clusters, grouping the sources at successive levels.

Table 3 Hierarchical Clusters of
Sources Used Now, No.1

*** HIERARCHICAL CLUSTERS ***

LEVEL 58.0

15 14

UNGROUPED

1	7	16	17	18	6	9	13	8	11
19	5	12	10	2	4	3			

LEVEL 57.0

15 14

UNGROUPED

1	7	16	17	18	6	9	13	8	11
19	5	12	10	2	4	3			

LEVEL 56.0

15 14

10 2

UNGROUPED

1	7	16	17	18	6	9	13	8	11
19	5	12	4	3					

LEVEL 55.0

15 14

10 2

UNGROUPED

1	7	16	17	18	6	9	13	8	11
19	5	12	4	3					

LEVEL 54.0

15 14

10 2

UNGROUPED

1	7	16	17	18	6	9	13	8	11
19	5	12	4	3					

LEVEL 53.0

15 14

11 19

10 2

UNGROUPED

1	7	16	17	18	6	9	13	8	5
12	4	3							

The Strongest Groupings

Table 3 shows the first grouping: books and journals not in a library appear at level 58.0. To give an indication of relative strength of association, this level may be compared with Table 1, where the first linking appeared at level 68.0.

The joining of books and journals would not be unexpected, but this association is not greatly stronger than the next one which emerges at level 56; memos from inside the organisation and coworkers. One is print and the other interpersonal, and both are internal sources.

It is interesting that memos should be linked with coworkers: the literature (especially that emanating from organisational communication writers) is full of references to the importance of coworkers, but only a few discussions (eg. Aiyepoku) make mention of the place of memos as an information source. This linkage then foreshadows the possibility that memos may be identified further in the research to come.

Towards the bottom of Table 3 the third separate association appears, being letters and news media. Both are print, external sources. To this stage three separate groupings have emerged: a print (mainly internal) cluster; an internal (mixed nature) cluster; and an external print cluster.

No new clusters appear until level 44.0, and it may be assumed that relationships further down the listings are based on more tenuous linkages.

The relationships among the sources are also displayed in the dendrogram in Fig. N. On the vertical axis the sources are shown, and the range of levels is displayed on the horizontal axis. It will be noted that in comparison with the dendrogram for personnel (Fig. J), the level at which relationships appear, here begins lower and ends lower (i.e. people cluster more readily than sources do).

Table 4 Hierarchical Clusters of Sources
Used Now. No.2

LEVEL 44.0

16 17

15 14

11 19

10 2

UNGROUPED

1 7 18 6 9 13 8 5 12 4
3

LEVEL 43.0

16 17

15 14

11 19 5 12 10 2 4

UNGROUPED

1 7 18 6 9 13 8 3

LEVEL 42.0

16 17

15 14

11 19 5 12 10 2 4

UNGROUPED

1 7 18 6 9 13 8 3

LEVEL 41.0

16 17 18

9 15 14 13

11 19 5 12 10 2 4

UNGROUPED

1 7 6 8 3

LEVEL 40.0

16 17 18

9 15 14 13

11 19 5 12 10 2 4

UNGROUPED

1 7 6 8 3

LEVEL 39.0

16 17 18

6 9 15 14 13 8 11 19 5 12
10 2 4

UNGROUPED

1 7 3

Weaker Groupings

In Table 4 at level 44.0 another cluster appears comprising organised library facilities and government documents. Intuitively this seems a reasonable association: both consist of collections of formal, print sources, and the latter is normally found within the former.

It is noteworthy that of the eight sources clustered so far, seven are print. Apparently print sources lend themselves better to this form of analysis than do interpersonal ones. That is, staff seem to see print sources as in closer relationships to one another than they see interpersonal sources.

At the next level down three more sources appear (meetings, newsletters and immediate superior) and the four clusters reduce to three: books and journals; government documents and library; letters, news media, memos, coworkers, meetings, newsletters and immediate superior. This last cluster consists of four print and three interpersonal sources.

By level 39.0 at the bottom of Table 4 the three clusters have collapsed into two: library, government documents and CBIRS in the first, and top management, seminars, journals, books records, contacts outside, letters, news media, meetings, newsletters, memos, coworkers and immediate superior in the second.

Fig. N.. Dendrogram Showing Relationships Among Sources Now

*** DENDROGRAM ***

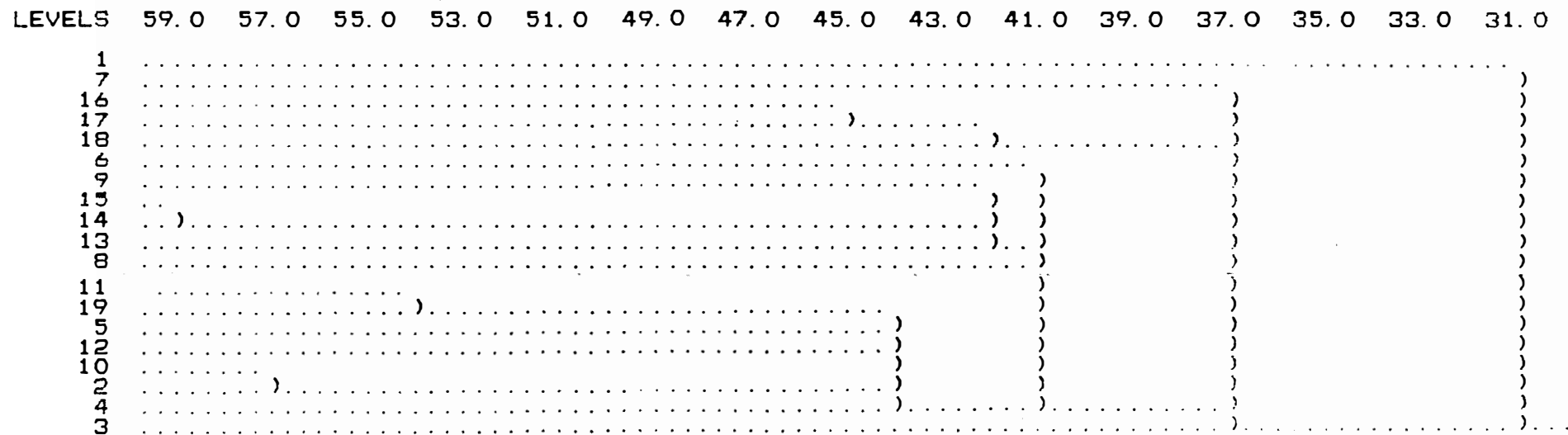
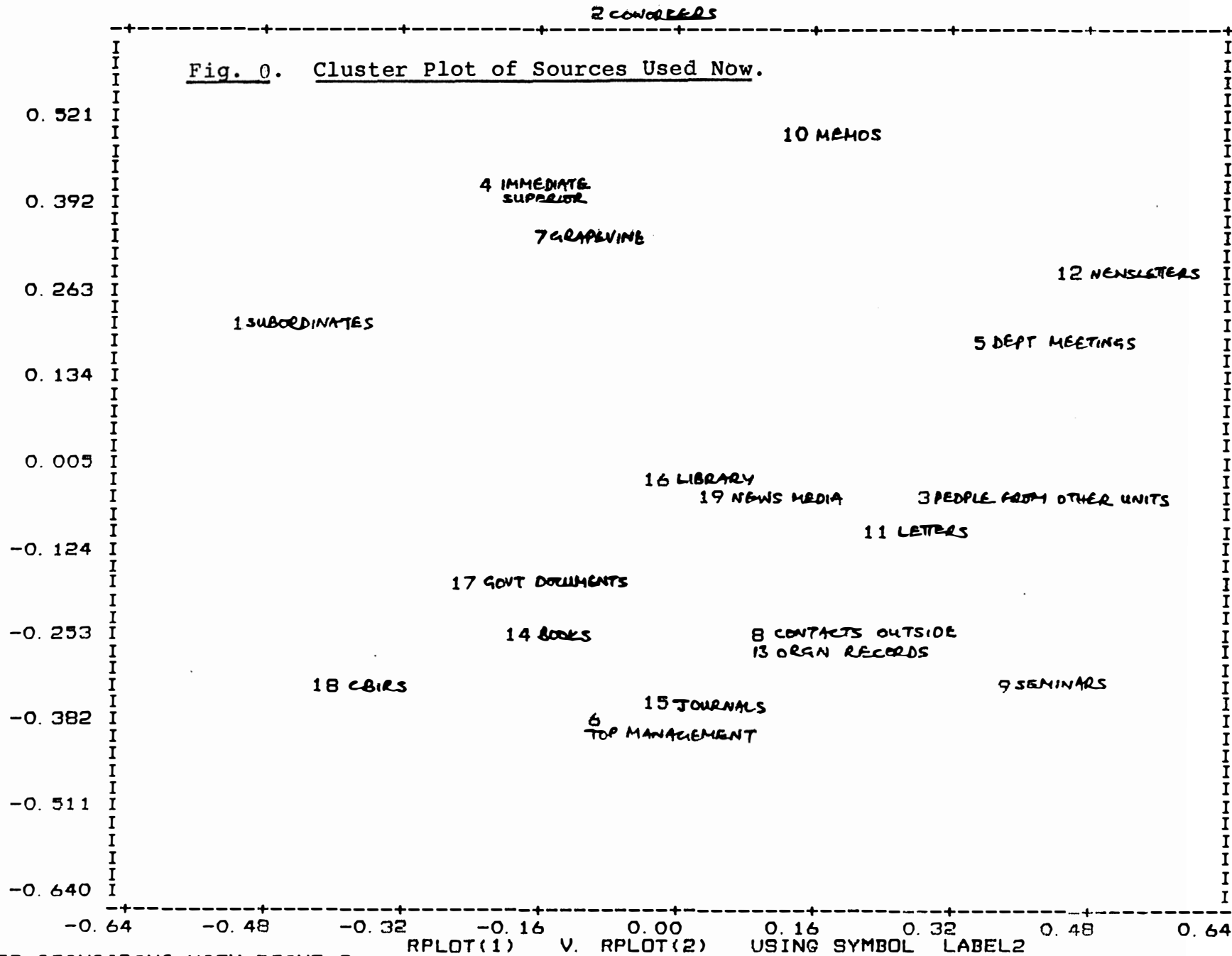


Fig. 0. Cluster Plot of Sources Used Now.



Visual Clustering of Sources

In the cluster plot of sources in Fig. 0 the relationships among sources already discussed are displayed visually. There is a progression evident from the positive end of the vertical axis - coworkers, memos, superior, grapevine - to the negative end, with CBIRS, journals, seminars, top management - which may be taken to indicate extent of use, from high use (positive) to low use (negative).

On the horizontal axis there is discrimination on the basis of commonality of use. At one extreme there are subordinates (used as a source only by people with subordinates) and at the other end there are newsletters (seen by a majority of respondents).

The individual sources resist easy clustering: there is a broad dispersion across the plot, in effect signalling that the use of sources by these respondents is extremely varied, and that sources are not really regarded as being in groups, but are seen as distinct entities. Nevertheless there is some evidence of two broad clusters emerging on the vertical axis, with mainly interpersonal (probably more frequently used) sources at the top, and mainly print (probably less frequently used) sources broadly dispersed at the bottom.

Sources Preferred: Clustering the Participants

In this section a similar procedure is followed: first the participants are clustered according to their stated preference for sources (rather than stated use now); then

the sources are clustered.

Table 5 shows the first linkage identified by the program: at level 72 (just above the level for the sources now in Table 1) staff members 10 and 5 from Group 1 appear. From the network analysis in Fig. M it is seen that 10 and 5 are in the "bottom group" but do not have strong communication links. Nevertheless, it appears that they have very similar preferences for sources, even though in the cluster plot for sources now (Fig. K) they are not closely linked.

The next grouping appears further down Table 5 at level 68, when 6 and 4 are linked. 4 is the supervisor with the strong links to the "bottom group" identified in the sociogram in Fig. M, and 6 is one of the staff with whom he has a strong tie (though they are not in the same section). It can be observed in Fig. K that their locations in terms of sources now are very dissimilar.

So far two separate clusters, each of two persons have been identified. All participants are from Group 1, three of them are in the "bottom group" and the fourth is the supervisor who has been shown to have strong ties with members of this group.

*** HIERARCHICAL CLUSTERS ***

Table 5 Hierarchical Clusters
of Staff. Sources Preferred No.1

LEVEL 72.0

10 5

UNGROUPED

1	24	28	25	29	6	4	13	2	17
15	23	3	22	11	7	14	19	18	16
9	21	30	26	8	12	27	20		

LEVEL 71.0

10 5

UNGROUPED

1	24	28	25	29	6	4	13	2	17
15	23	3	22	11	7	14	19	18	16
9	21	30	26	8	12	27	20		

LEVEL 70.0

10 5

UNGROUPED

1	24	28	25	29	6	4	13	2	17
15	23	3	22	11	7	14	19	18	16
9	21	30	26	8	12	27	20		

LEVEL 69.0

10 5

UNGROUPED

1	24	28	25	29	6	4	13	2	17
15	23	3	22	11	7	14	19	18	16
9	21	30	26	8	12	27	20		

LEVEL 68.0

6 4

10 5

UNGROUPED

1	24	28	25	29	13	2	17	15	23
3	22	11	7	14	19	18	16	9	21
30	26	8	12	27	20				

Table 6 Hierarchical Cluster
of Staff. Sources Preferred
No.2

LEVEL 63.0

6- 4 13 10 5 2

19 18

UNGROUPED

1 24 28 25 29 17 15 23 3 22
11 7 14 16 9 21 30 26 8 12
27 20

LEVEL 62.0

6 4 13 10 5 2

19 18

UNGROUPED

1 24 28 25 29 17 15 23 3 22
11 7 14 16 9 21 30 26 8 12
27 20

LEVEL 61.0

29 6 4 13 10 5 2

19 18

UNGROUPED

1 24 28 25 17 15 23 3 22 11
7 14 16 9 21 30 26 8 12 27
20

LEVEL 60.0

29 6 4 13 10 5 2

19 18

UNGROUPED

1 24 28 25 17 15 23 3 22 11
7 14 16 9 21 30 26 8 12 27
20

LEVEL 59.0

29 6 4 13 10 5 2

19 18

UNGROUPED

1 24 28 25 17 15 23 3 22 11
7 14 16 9 21 30 26 8 12 27
20

At level 63 the two groups merge, and the four individuals are joined by two others, 13 and 2, who are the two managers in Group 1. Thus this cluster now has both managers, one supervisor and three staff members of Group 1, or three people from the "top group" and three from the "bottom group".

Two interesting points about this are firstly, all are from the same organisation, indicating that a commonality of interest in particular sources seems to be present. That is, people in this group seem to have similar perceptions about the sources they would like to be using. Secondly, the cluster is composed of people from all three levels, in marked distinction to the clustering in respect of sources now, as illustrated in Table K. Thus this is the first indication that status may not be such a major factor in the preference for sources as it is for use of sources.

The second cluster to appear at level 63 consists of a partner (18) and a secretary (19) from Group 2. These two individuals were widely separated in the cluster plot for sources now (Fig. K) and examination of their network data shows that all links are agreed to be in the little (2) and some (3) range. This result tends to reinforce the comments made above: despite apparently widely differing source contact practices, only weak links in the three communication networks, and wide differences in education, status, tenure and job characteristics (Fig. G), these two people seem to share closely corresponding views of the

sources they should be contacting.

At level 61 (Table 6) the law clerk from Group 2 joins the six people from Group 1, then no further changes are recorded until level 57 (Table 7).

Table 7. Hierarchical Clusters
of Staff. Sources preferred
No. 3

LEVEL 57.0

24	28	25							
29	6	4	13	10	5	2	17	15	23
19	18								
UNGROUPED									
1	3	22	11	7	14	16	9	21	30
26	8	12	27	20					

LEVEL 56.0

24	28	25							
29	6	4	13	10	5	2	17	15	23
19	18								
UNGROUPED									
1	3	22	11	7	14	16	9	21	30
26	8	12	27	20					

LEVEL 55.0

24	28	25							
29	6	4	13	10	5	2	17	15	23
3									
19	18								
30	26								
UNGROUPED									
1	22	11	7	14	16	9	21	8	12
27	20								

LEVEL 54.0

24	28	25							
29	6	4	13	10	5	2	17	15	23
3									
19	18								
30	26								
UNGROUPED									
1	22	11	7	14	16	9	21	8	12
27	20								

LEVEL 53.0

24	28	25							
29	6	4	13	10	5	2	17	15	23
3									
19	18								
30	26								
UNGROUPED									
1	22	11	7	14	16	9	21	8	12
27	20								

Level 57 shows three clusters:

1. A new cluster of three staff solicitors (24, 25 and 28);
2. A cluster of ten individuals: from Group 1, both managers, one supervisor and three staff members, and from Group 2, the senior partner and one other partner, one staff solicitor and the law clerk, and
3. A partner (18) and secretary (19) as before.

Thus the second cluster is an equal balance of senior and non-senior people: but it is noteworthy that five of the ten senior people in Groups 1 and 2 have clustered here, (including four of the six most senior people).

Implications of the Clustering Process

There are several implications of the clustering to this point. Firstly, there seems to be some evidence that in terms of their preferences for source use, participants are clustering by organisation (eg. the first and third clusters at level 57). Secondly, there is some indication that staff are clustering by job type (eg. three staff solicitors at level 57). Thirdly, staff also appear to be clustering in terms of status (the cluster of ten holds four out of the six most senior individuals).

These three implications (clustering by organisation, job type and status) could also be derived from the groupings in the sources now plot in Fig. K. What makes the analysis of

sources preferred much more complex than the analysis of sources now is the impact of a fourth factor which did not seem to be present in the latter analysis, and that is the "level-spanning" factor discussed above, that people from a variety of levels seem to be expressing an interest in similar sources.

By level 53, at the bottom of Table 7 four clusters have emerged, containing 18 of the 30 participants: the three staff solicitors remain, as do the partner and secretary, and there is a new cluster comprising a staff solicitor and the typist from Group 2. The large cluster has now expanded from 10 to 11 persons, having added (3), a "bottom group" member from Group 1.

Similar patterns of clustering by organisations, job type and status, but modified by "level-spanning" may be observed in the remaining levels. All participants were grouped by level 29.

In Fig. P a dendrogram sums up the major relationships observed among staff.

Fig. P. Dendrogram Showing Relationships Among Staff. Sources Preferred.

** DENDROGRAM ***

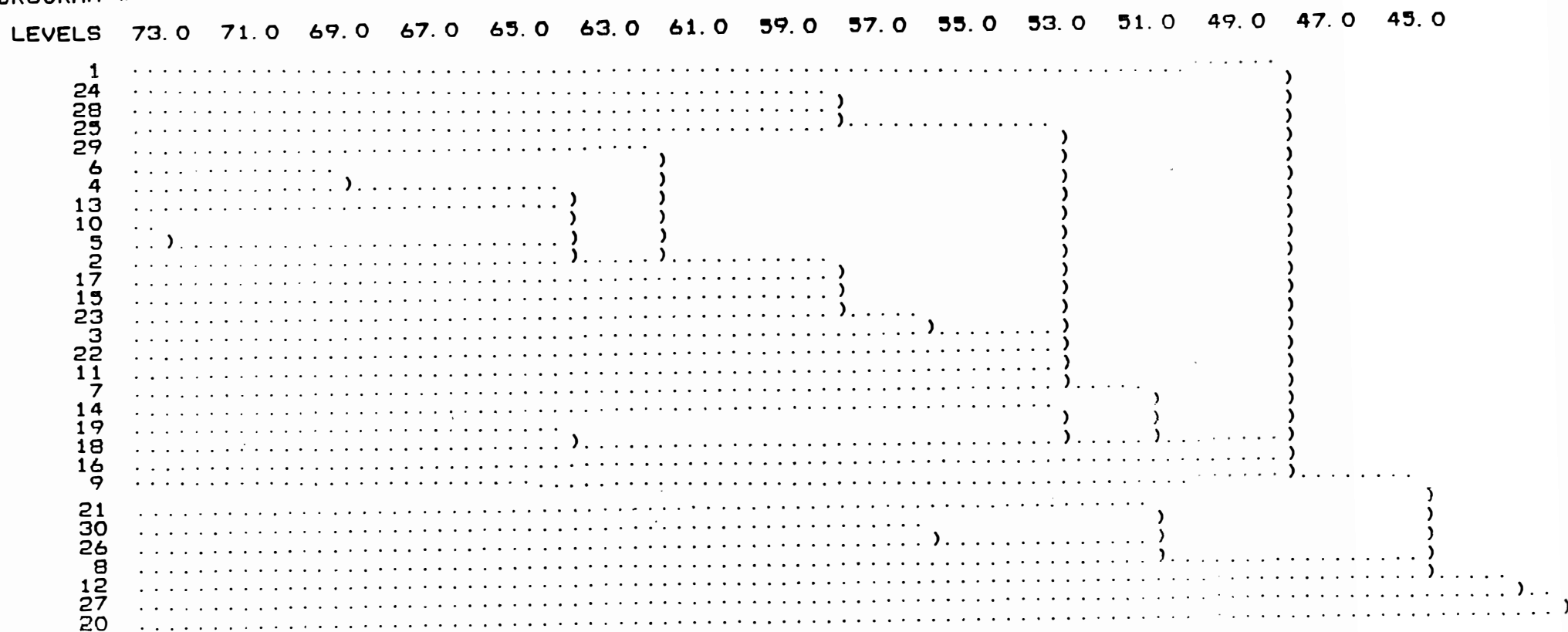
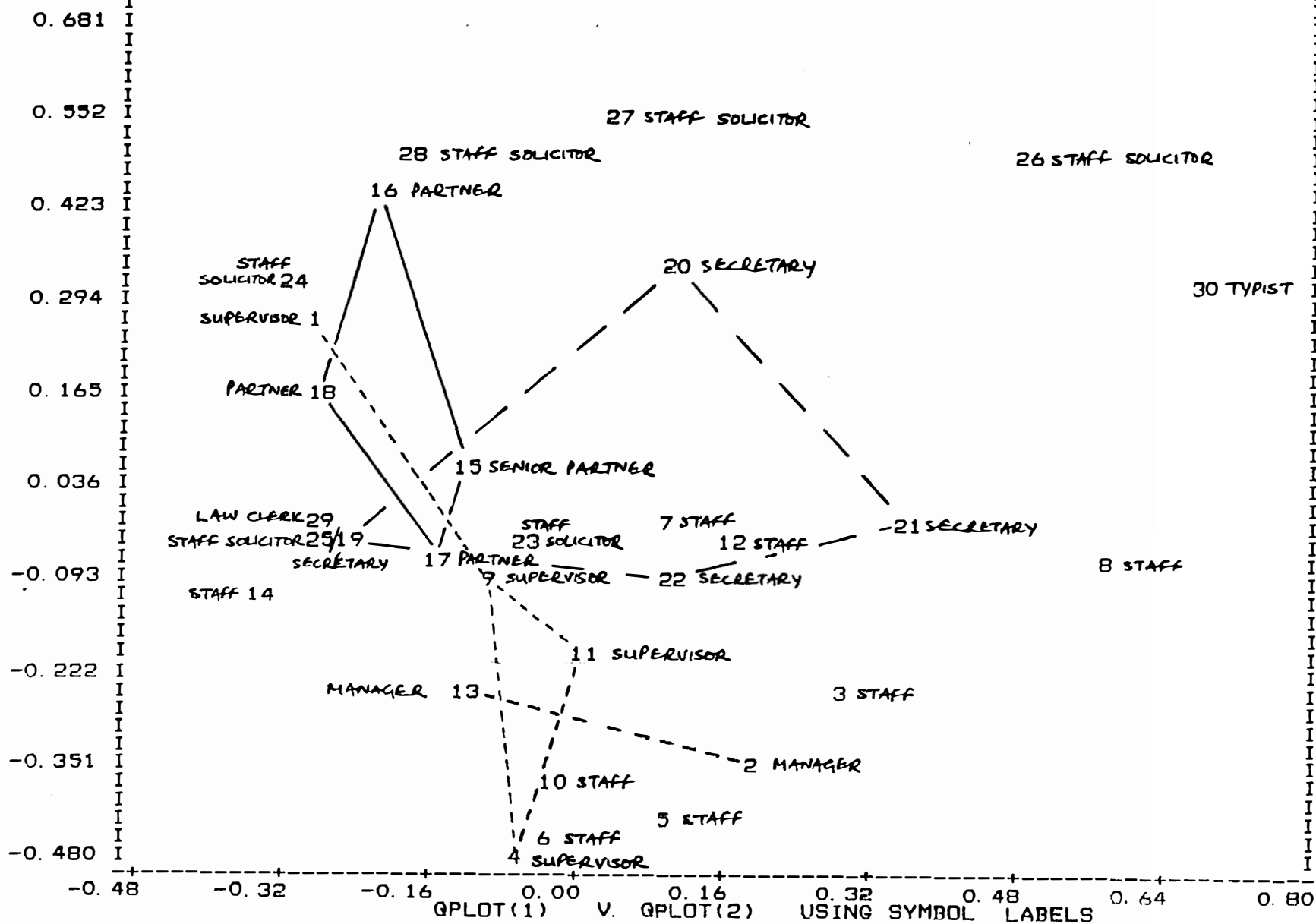


Fig. Q. Cluster Plot of Staff. Sources Preferred



Principles Suggested by the Clustering

Fig. Q confirms and provides more evidence of the principles of clustering detected so far: principles of organisation, job type, status and level spanning. The participants cannot be neatly grouped (as in Fig. K), as they are distributed across most of the plot, rather than in discrete clusters. Level-spanning is seen to be operating at all points across the plot.

Nevertheless, as is indicated by the lines drawn to connect the participants, relationships can be traced on the grounds of organisation, job type and status.

Of the ten people who appear highest in the plot, nine are from Group 2. Of the eleven people located lowest in the plot, ten are from Group 1. Thus the principle of differentiation by organisation is quite strongly supported.

Further, this principle of clustering by organisation is much more clearly evident for sources preferred (Fig. Q) than for sources now (Fig. K). There is some evidence in Fig. K that staff were clustering by organisation, but the clustering seemed much more influenced by status. Here in Fig. Q, clustering by status appears, as discussed below, but it exists within the context of organisational grouping.

In comparing Group 1 and Group 2, then, it is interesting to note that the participants show only a minor tendency when using sources now, to divide on organisational grounds, but

a much more marked tendency to do so in terms of their preferred use of sources (present use is similar, preferred use is different).

Turning next to status issues, clustering by organisational rank can be readily discerned in Fig.Q. The tightest group seems to be that of the four partners, three of whom seem to have quite similar ideas on their preferred use of sources. The two managers from Group 1 are fairly close to each other, and their link impinges upon a cluster of three of the four supervisors.

In terms of the influence of job type, the four secretaries from Group 2 dominate the middle of the plot, being linked in a loose but discernible pattern.

Organisations, Status, Job Type and Level-Spanning

Taking an overview of Fig. Q, it appears then that the primary influences operating on cluster formation seem to be participants' organisations, their status within those organisations, to some extent their job type, and lastly the effect of level-spanning.

In comparing Fig. K, (sources now) with Fig. Q, (sources preferred) it could be said that the primary influence on sources now seems to be status. Status continues to be an influence on sources preferred, but additional influences are the effects of participants' organisations, job type and also level-spanning, a preference by some (but not all)

lower-status participants for sources similar to those preferred by higher-status people.

Clustering the Sources

Next the sources are analysed again, this time in terms of their preferred dimension. Similarly to the results shown in Table 3, books and journals are linked first, this time at level 68, rather than 58 as for sources now. This implies that participants tend to discriminate more between these sources in terms of their actual usage than their preferred usage.

TABLE 8
Hierarchical Clusters of Sources Preferred

LEVEL	59.0																							
10	5																							
14	15																							
UNGROUPED																								
1	2	4	12	11	19	8	16	6	9															
3	7	13	18	17																				
LEVEL	58.0																							
10	5																							
14	15																							
UNGROUPED																								
1	2	4	12	11	19	8	16	6	9															
3	7	13	18	17																				
LEVEL	57.0																							
10	5																							
14	15																							
UNGROUPED																								
1	2	4	12	11	19	8	16	6	9															
3	7	13	18	17																				
LEVEL	56.0																							
12	10	5																						
14	15																							
3	7																							
UNGROUPED																								
1	2	4	11	19	8	16	6	9	13															
18	17																							
LEVEL	53.0																							
2	4	12	10	5																				
11	19																							
14	15	8																						
3	7																							
UNGROUPED																								
1	16	6	9	13	18	17																		

Weaker Groupings

No new clusters appear until level 59, when memos and meetings are linked. Both sources are internal, and both are frequently used methods of both vertical and lateral communication within organisations. Other than this, it is difficult to determine other common factors.

At level 56 newsletters joins memos and meetings, books and journals remain, and a new cluster appears of people from other units and the grapevine. Two clusters are mainly print, and one is interpersonal.

Near the base of Table 8 there are now four clusters, comprising

1. Coworkers, superior, newsletters, memos and meetings
2. People from other units and the grapevine
3. Books, journals and contacts outside
4. Letters and news media

The first are all internal sources, and are likely to be more frequently used; the second consists of two interpersonal (internal) sources; the third is a mixture of print and interpersonal, and these are likely to be lesser-used; and the fourth consists of two external, print media.

Comparisons between Table 8 (prefer) and Tables 3 and 4 (now) suggest that there are differences in the way those participants see sources now and preferred: these can be

seen in the comparison of Figs. O (sources now) and S
(sources preferred).

Fig. R. Dendrogram Showing Relationships Among Sources Preferred

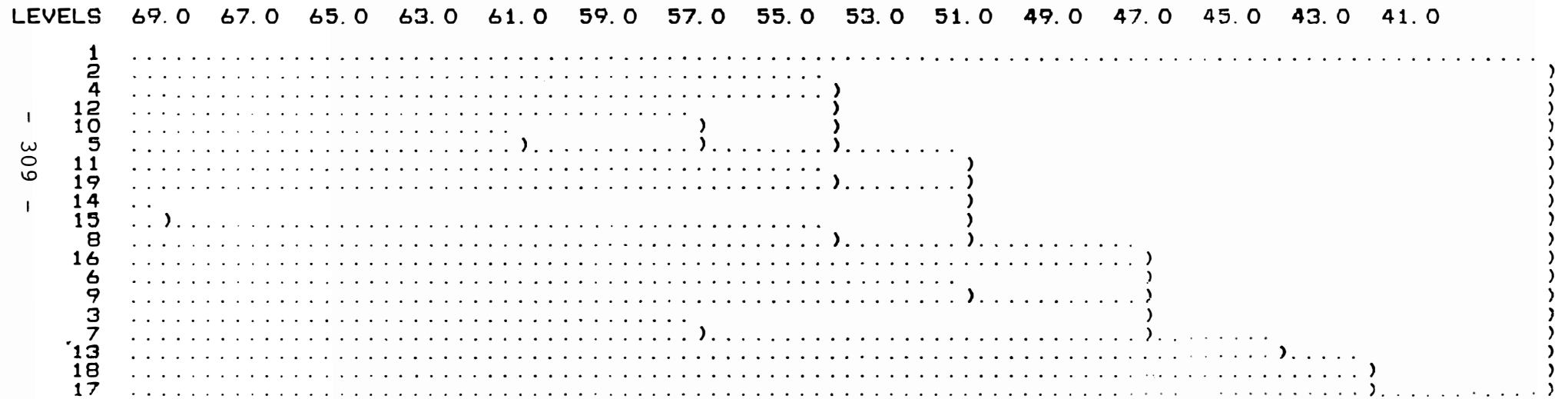
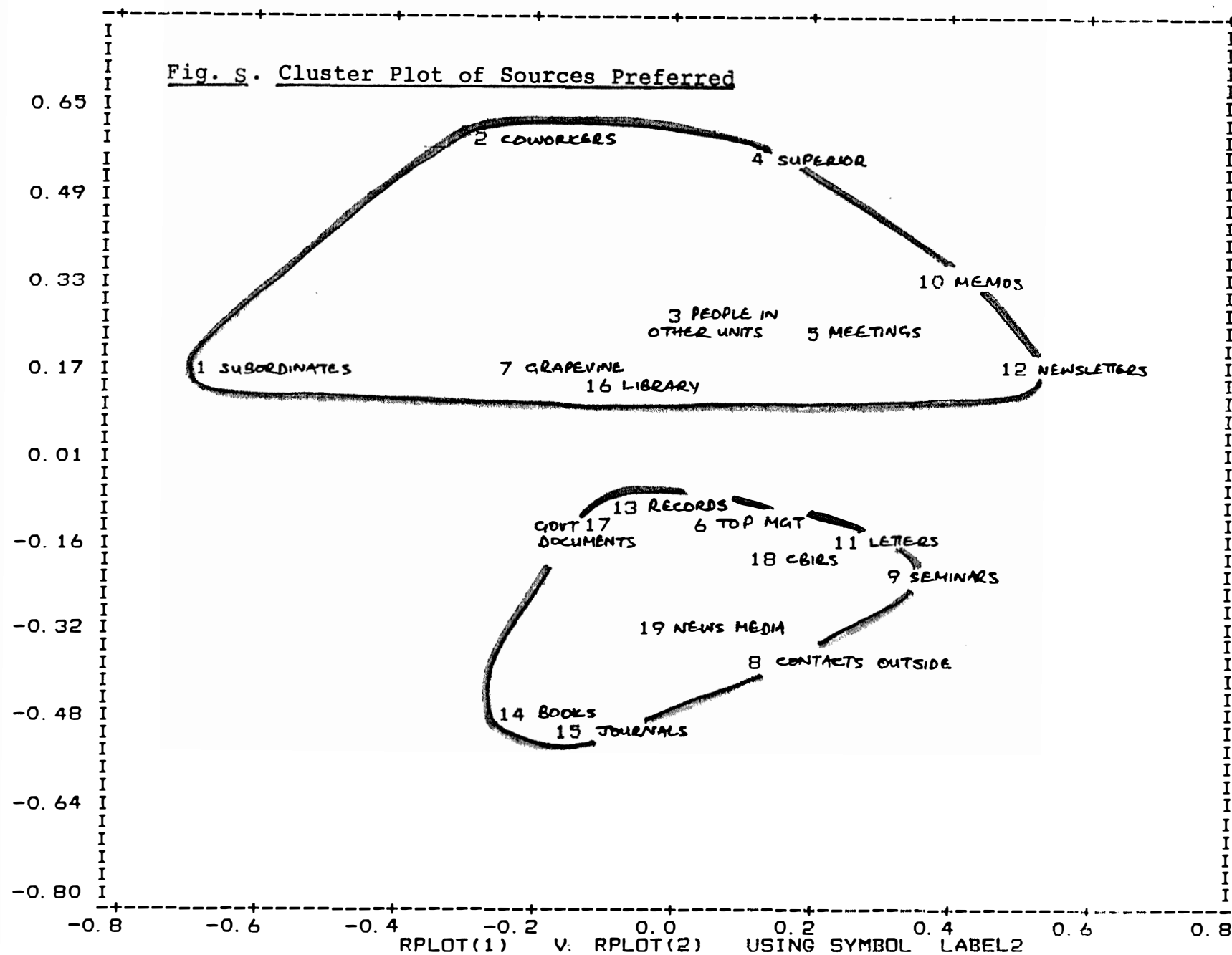


Fig. 8. Cluster Plot of Sources Preferred



Differences Between Sources Now and Preferred

The most obvious difference between the two plots (Figs. 0 and S) consists in the distinctive tight clustering of (mainly print) sources in the lower half of the plot. The trend which was identified in its beginning stages in the discussion following Fig. 0 has here intensified, and the incipient cluster has contracted very noticeably.

In the upper half of the plot the mainly interpersonal sources have also shrunk into a slightly tighter cluster, though not nearly so markedly as the print sources below.

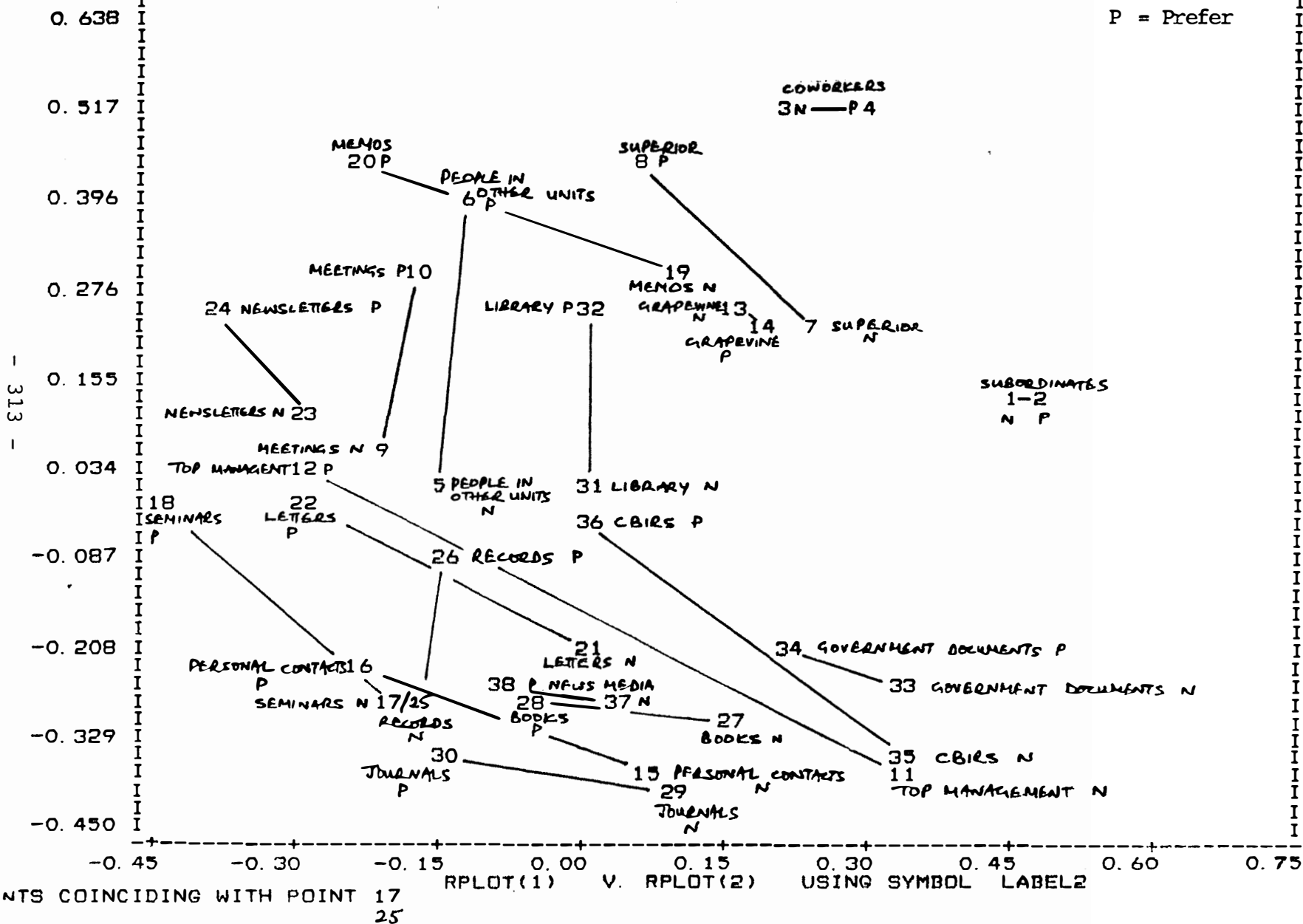
The effect of these changes is the creation of an obvious distinction between the two clusters in Fig. S. Taking an overview, it may be said that participants view the lesser-used (print) sources in a much more unified way than they do the more highly used (mainly interpersonal) sources when they are considering what sources they prefer.

Further, both print and interpersonal sources are seen in a more unified way when considered in their prefer dimension than in their now dimension. Although this is only an early stage of the analysis, it may be speculated that what these results imply in practical terms is that there appear to be fairly wide and distinctive differences among participants in respect of their use of information sources now. Notwithstanding this, nothing like the same differences exist among participants in respect of their preferred source use.

Another perspective was provided on these matters by running the Genstat CPL program a third time, this time including the 30 participants now and prefer data in one run.

Fig. T. Cluster Plot of Sources Now and Preferred Combined

N = Now
P = Prefer



In Fig. T each source now appears twice, once now and once preferred. This provides a further perspective on what participants see as the relationships between these dimensions and among sources.

Usually the prefer location appears to the left of the now location - but there are some exceptions (grapevine, subordinates, coworkers). If it is assumed that most people get less information than they would like from the majority of sources, then this result may signal that some people are presently getting more information from these sources than they would like.

A number of sources are widely separated in their now and prefer dimensions: this is especially the case with top management, CBIRS, and to a lesser extent, people in other units, letters from outside the organisation, memos, seminars and personal contacts outside the organisation. It may be that these sources will appear in later analyses as the ones with the highest discrepancies between now and prefer.

Other sources with only a short distance between now and prefer (e.g. coworkers) may be the ones with which participants are currently most satisfied.

This concludes the in-depth examination of the responses given by the 30 individuals in the two pilot study organisations. So far the discussion has assessed how these

participants reacted to questions of present and preferred source use, and how the processes of communication network analysis and cluster analysis may be employed in an exploratory survey of source use.

The next stage is to examine the responses given by the total sample of 318 participants, and as a first step in exploring the data, a simple technique of ranking sources from highest to lowest mean score is employed.

The Rankings of Sources: All Participants

In this next section mean scores for all sources are compared. Sources are ranked from highest to lowest mean scores in order of most to least use. They are ranked in their now and prefer dimensions, then subsequently ranked from greatest to least discrepancy.

Table 9 The Sources From Which All Participants Say They
Receive Information Now N = 318

<u>Ranking</u>	<u>Source</u>	<u>Mean Score</u>
1 =	Coworkers	3.6
1 =	Immediate Superior	3.6
1 =	Memos or Reports Within The Organisation	3.6
4 =	Subordinates	3.5
5 =	In-House Newsletters	3.4
5 =	The Grapevine	3.4
7 =	Department Meetings	3.0
7 =	Organisational Records	3.0
9	People From Other Units	2.9
10	News Media	2.7
11=	Letters from Outside The Organisation	2.6
11=	Computer-based Information Retrieval Systems	2.6
13=	Top Management	2.5
13=	Contacts Outside The Organisation	2.5
13=	Books Not In an Organised Library	2.5
13=	Organised Library	2.5
17=	Seminars, Courses, Workshops	2.4
17=	Journals etc. Not In An Organised Library	2.4
17=	Government Documents	2.4

1	2	3	4	5
NEVER	RARELY	SOMETIMES	OFTEN	VERY OFTEN

(An equals sign (=) denotes instances where sources had equal (or almost equal) mean scores.)

TABLE 9

DISCUSSION

Heading the top of the Receive Now list are three sources ranked equally: Coworkers, Immediate Superior and Memos Or Reports Within The Organisation. As shown in the Literature Review, the first two of these have been identified by earlier research as important, close, interpersonal sources of information. Memos, on the other hand, have not previously been identified as a principal source in the organisational communication literature.

The next three sources are grouped close to the top ranking ones.

Like the first three they consist of two interpersonal sources (Subordinates and The Grapevine) and one print source (In-House Newsletters).

The range of mean scores for the top six sources is from 3.4 to 3.6: in other words there is little difference among them in terms of frequency of use. Next there is a gap apparent between this group of six sources and the following two, Department Meetings and Organisational Records, both of which have means of 3.0. 3.0 equates to "sometimes" as a measure of frequency. Sources ranked at "less than sometimes" are probably not of major interest in the context of this study.

Of the top eight sources out of nineteen, five are

interpersonal and three are print or written. The ninth source is People from Other Units: looking at the first nine sources as a group two thirds are interpersonal and one third are print. Thus, taking an overview of source use, these knowledge workers seem to be making fairly frequent use of a broad spectrum of information sources, which are predominantly interpersonal, but with a small grouping of print sources as well.

One unifying characteristic of the top group of sources is their closeness to respondents. Memos, reports and newsletters normally arrive on one's desk; co-workers, immediate superior and subordinates are, more often than not, fairly near by. Information via the grapevine or department meetings is usually transmitted face to face. On the other hand, organisational records (in seventh equal place) may or may not be close at hand, and people from other departments (ninth place) usually are not near by. Overall, however, this group of sources stands out as being available at hand.

The ratio of interpersonal and print sources is of course reversed in the lower half of the table. Of the lowest five sources, only one is interpersonal (Seminars etc.) Of the lowest ten sources three are interpersonal.

The factor of closeness to respondents is more apparent in respect of interpersonal sources than of print ones. All three of the interpersonal sources among the lowest ten

sources are not normally near at hand: top management, contacts outside the organisation, seminars, courses and workshops. By way of contrast, some of the print sources may well be close at hand: examples are journals and books not in an organised library, and letters from outside the organisation.

Table 10 The Sources From Which All Participants Say They Would Like To Receive Information N = 318

<u>Ranking</u>	<u>Source</u>	<u>Mean</u>
1	Immediate Superior	4.2
2	Coworkers	4.0
3	Subordinates	3.9
4	Memos Or Reports Within the Organisation	3.8
5	Department Meetings	3.7
6=	People from Other Units	3.6
6=	In-House Newsletters	3.6
8	Top Management	3.5
9=	Organisational Records	3.4
9=	Computer-Based Information Retrieval Systems	3.4
11	Seminars, Courses, Workshops	3.3
12=	Letters From Outside The Organisation	3.2
12=	Organised Library	3.2
14	Journals Not In An Organised Library	3.1
15=	The Grapevine	3.0
15=	Books Not In An Organised Library	3.0
15=	Government Documents	3.0
15=	News Media	3.0
19	Contacts Outside The Organisation	2.7

1	2	3	4	5
NEVER	RARELY	SOMETIMES	OFTEN	VERY OFTEN

Table 10

DISCUSSION

The range of scores changes from the first to the second table, from 2.4 to 3.6, to 2.7 to 4.2. In the second, participants say that for all but the lowest source they would like contact at least "sometimes."

In the first four places in each table the same sources are seen, though in a different order. Immediate superior heads the list in both instances, indicating the perceived importance of the person to whom one reports. The ratio of personal to print sources of information changes only slightly: of the top eight sources six are interpersonal, up from five in table 9.

Table 11 Discrepancies Between Information Received Now
And Information Preferred, All Participants N= 318

<u>Ranking</u>	<u>Source</u>	<u>Discrepancy</u>
1	Top Management	1.0
2	Seminars, Courses, Workshops	0.9
3	Computer-Based Information Retrieval Systems	0.8
4=	People From Other Units	0.7
4=	Department Meetings	0.7
4=	Journals Not In An Organised Library	0.7
4=	Organised Library	0.7
8=	Immediate Superior	0.6
8=	Letters From Outside The Organisation	0.6
8=	Government Documents	0.6
11	Books Not In An Organised Library	0.5
12=	Subordinates	0.4
12=	Coworkers	0.4
12=	Organisational Records	0.4
15	News Media	0.3
16=	Contacts Outside The Organisation	0.2
16=	In-House Newsletters	0.2
16=	Memos or Reports Within The Organisation	0.2
19	The Grapevine	-0.4

Table 11

DISCUSSION

After examining the discrepancy figures from a range of organisations and a variety of status levels within them, the conclusion was reached that a discrepancy of 0.4 for a source may be regarded as "normal". In other words it seems that people habitually seem to overstate their wish for information, and to some extent a discrepancy of 0.4 may be seen as a kind of equilibrium between information received and wanted.

There are several exceptions: people who already get much information from some sources (sometimes newsletters) do not ask for more; one or two sources (and in particular the grapevine) show a "negative discrepancy" (where information received now is greater than information wanted); and people (often in top management) who already appear to get a lot of information from many sources often show lower discrepancies.

Also, where people receive little information from sources, and are largely indifferent to them (e.g. contacts outside the organisation), discrepancies tend to be low. Further, it was sometimes found that when participants were discussing a source they disliked, or were afraid of (e.g. computer-based information retrieval systems) they tended not to ask for more information than they were presently getting.

Nonetheless, notwithstanding these exceptions, it seems that the figure of 0.4 represents at least a useful cut-off point

at which it may be assumed that the gap between information received and sought is no longer very crucial. In the last section of this chapter (Uncertainty and the Discrepancy Approach) the 0.4 figure is discussed further.

From these observations it appears that more ambiguity surrounds the low discrepancies than the higher ones. Taking the lowest five sources in table 3 as examples, interview data led the writer to believe that some participants were either hostile or indifferent to the news media, made little use of contacts outside the organisation, sometimes felt overloaded with information from in-house newsletters and memos, and disliked the grapevine (or else disliked admitting they used the grapevine).

Some of these issues will be clarified in this and the following chapter, and meantime the level of 0.4 serves as an appropriate point to begin the discussion of the details of the discrepancy table.

The source with the highest discrepancy is top management. It is noteworthy that participants' expectations of information from this source do not seem to be excessive: in table 10 top management are rated at midway between sometimes and often; the discrepancy is therefore due to the source's relatively low ranking in table 9, half way between rarely and sometimes. Seminars, courses and workshops occupies second place in this table; participants receive slightly less information from this source now than they do

from top management and also want a little less. Through this discrepancy people seem to be saying that they would like more opportunities to receive training in their work.

In third place appears computer-based information retrieval systems. As mentioned in the Definitions section above, use of this source varied widely among organisations: some few made constant use of such systems, others made no use of them, and other used them only infrequently. Overall, however, the discrepancy is of a magnitude sufficient to suggest that the majority of participants are favourably inclined towards this source, and appreciate that it can serve as a useful means of obtaining information.

There are four sources jointly occupying fourth place in this table: people from other units, department meetings, journals not in an organised library, and organised library facilities. Two are interpersonal and two are print based sources. Of the seven sources with the highest discrepancies, four are interpersonal and three are print.

Of the eleven sources above the cut-off point of 0.4 discussed earlier, five are interpersonal and six are print. Examining these eleven sources as a group, the top two are interpersonal, and of the bottom four three are print. Thus although participants are concerned about lack of information from both interpersonal and print sources, the former are of slightly greater concern than the latter.

The four sources in fourth place are people from other units, department meetings, journals not in an organised library and organised library facilities. In respect of the first of these participants appear to be saying that they would prefer better links with people who work outside their immediate work section, thereby suggesting a consciousness of the benefits of well developed communication links among organisational subsections.

Department meetings are next, and their rating as an information source now is not high, being just "sometimes." The discrepancy of 0.7 implies a measure of dissatisfaction with this source.

From the discrepancies for organised library facilities and journals not in an organised library it may be understood that participants are interested in access to more structured information sources being improved. It is interesting that included here are both formal, organised means of access to information (libraries), and journals not in a library, the latter being a less well-organised, but probably more accessible source.

Next, it is useful to look at the sources which took highest place in the information now list, table 9. Top equal were co-workers, immediate superior and memos, and next came subordinates, in-house newsletters and the grapevine. All of these major sources show low discrepancies in table 11, with the exception of immediate superior, which with a

discrepancy of 0.6 appears as an area of concern for some staff.

The discrepancy for the grapevine also stands out; while all other sources are located within one decimal point of the next source on the list, the grapevine is six decimal points from the nearest other source, suggesting that participants have quite a different attitude to this source than they do to the rest. Furthermore, the grapevine is the only source showing a negative discrepancy, i.e. where the mean of the information received now is greater than the mean of information wanted. Interview data suggested a certain embarrassment that the grapevine exists: it seemed slightly disreputable in some participants' minds. A few people in their interviews expressed both surprise and pleasure that a formal survey of information sources was taking account of the grapevine. Other staff appeared to have reservations about admitting to use of the grapevine, and for some of these staff the confidential nature of the information they handled seemed to be an important issue.

The conclusion reached was that participants were saying, essentially, that the reason they get more information than they want from the grapevine is that although they need that information, other sources which they would prefer are not supplying it. Where there is a dearth of information the grapevine may well supply it, but staff would rather get it from elsewhere.

The other sources high in table 9 - co-workers, subordinates, memos and newsletters - all had low discrepancies, the interpersonal sources with 0.4 and the print sources with 0.2. The discrepancy for the print sources is so low that it suggests that some participants are in fact overloaded with information from these sources. Subsequent analyses of the relevant data may clarify this further.

Table 12 Ranking of Information Sources By Size of
Standard Deviation. Now Receive Scores, All
Participants. N = 318

<u>Ranking</u>	<u>Source</u>	<u>S. D.</u>
1	Computer-Based Information Retrieval Systems	1.5
2	Organised Library	1.3
3	Government Documents	1.2
4=	Organisational Records	1.1
4=	Books Not In Organised Library	1.1
4=	Journals Not In Organised Library	1.1
4=	News Media	1.1
8=	Department Meetings	1.0
8=	Top Management	1.0
8=	Contacts Outside The Organisation	1.0
8=	Letters From Outside The Organisation	1.0
8=	In-House Newsletters	1.0
13=	Subordinates	0.9
13=	People From Other Units	0.9
13=	Immediate Superior	0.9
13=	The Grapevine	0.9
13=	Seminars, Courses, Workshops	0.9
13=	Memos or Reports Within The Organisation	0.9
19	Coworkers	0.8

Table 12

DISCUSSION

The range of standard deviations for all sources now is from 1.5 for CBIRS to 0.8 for coworkers. The first noteworthy point arising from table 12 is that the seven sources ranking highest are all print. Of the seven sources at the bottom, all but one (memos) are interpersonal. From this it may be inferred that participants are reporting a broad variety of practice in their contact with most print sources, and their experience with interpersonal information sources tends to be more universal. In other words, even though organisations may have widely different practice in respect of their use of print sources, use of interpersonal sources will be a predictable feature across organisations.

Coworkers has the smallest standard deviation, suggesting the pervasiveness of this source: other interpersonal sources which were earlier seen as near the top of table 9 are also nearby on this table; included are immediate superior and subordinates.

CBIRS heads the table: this reflects the comment made earlier that some organisation make very extensive use of this source and others make none.

Second in table 12 is organised library; again access to this source seems to vary widely among participants, with some people making much use of this source and others making

very little. Use of this source seems to be heavily dependent on the type of work one performs (among other factors): in the accounting and legal firms surveyed, for example, the professional staff made extensive use of organised library facilities while the secretarial staff made none at all. There were similar findings in regard to the source third on the list, government documents.

The only print source near the bottom of table 12 is memos or reports within the organisation. Perhaps this reflects the pervasiveness of this information source among knowledge workers; also, in a sense, it may be said that memos are the most "interpersonal" of all the print sources. After all, a memo is normally written to just one other person (or perhaps to one person as a leader of a group), and as such it is a means of communication quite unlike newsletters, news media, library facilities etc. Sending a message by memo allows the sender to personalise it, having regard to the receiver's needs, interests and abilities, in much the same way that the sender of interpersonal spoken messages has opportunities to ensure that a recipient understands the information being sent.

The only other print source which can be personalised similarly is letters from outside the organisation. There are, however, two key differences between letters and memos: the former is an external source, and the implications of the evidence so far are that knowledge workers obtain the bulk of their information from internal rather than external

sources. Secondly, one would expect that people writing from outside the organisation normally would not know the recipients of their messages as well as would people inside the organisation. The special place of memos is implicit in its high standing in table 9 (top equal) and in table 10 (4th place).

Table 13 Ranking of Information Sources By Size Of
Standard Deviation. Should Receive Scores N= 318

<u>Ranking</u>	<u>Source</u>	<u>S.D.</u>	<u>Change</u>
1=	Contacts Outside The Organisation	1.2	+ 0.2
1=	Computer-Based Information Retrieval Systems	1.2	- 0.3
3=	Journals Not In Organised Library	1.1	0
3=	Organised Library	1.1	- 0.2
3=	Government Documents	1.1	- 0.1
3=	News Media	1.1	0
7=	Organisational Records	1.0	- 0.1
7=	Books Not In An Organised Library	1.0	- 0.1
7=	The Grapevine	1.0	+ 0.1
10=	Letters From Outside The Organisation.	0.9	- 0.1
10=	Department Meetings	0.9	- 0.1
10=	Top Management	0.9	- 0.1
10=	Seminars, Courses, Workshops	0.9	0
14=	In-House Newsletters	0.8	- 0.2
14=	Subordinates	0.8	- 0.1
14=	People From Other Units	0.8	- 0.1
17=	Memos Or Reports Within The Organisation	0.7	- 0.2
17=	Coworkers	0.7	- 0.1
17=	Immediate Superior	0.7	- 0.2

Note: The column headed Change results from subtracting the standard deviation of each source now from the s.d. of each source prefer. The intention of this procedure is to display changes in participants' responses in respect of sources now and prefer.

Table 13

DISCUSSION

The orderly pattern apparent in table 12, of print sources with the largest standard deviations and interpersonal sources with the smallest, becomes a little less tidy in table 13, but survives mainly intact. Of the seven sources highest on the list, now six are print; five of the seven sources at the bottom are interpersonal.

In table 13 standard deviations range from a maximum of 1.2 (contacts outside the organisation and computer-based information retrieval system) to a minimum of 0.7 (memos, co-workers and immediate superior).

When the standard deviations for each source in its now and should dimensions are compared a pattern emerges in which most sources' standard deviations reduce in extent from now to should. Fourteen sources reduce in this way, three remain the same (journals not in organised library, news media, and seminars, courses and workshops), and two increase in magnitude (contacts outside the organisation and the grapevine).

In other words, participants' responses are generally closer together in respect of the frequency with which they would like to use sources, than they are in regard to their present use of sources. Most of the changes are small, inhibiting reading too much into the changed pattern. Nevertheless it should be noted that the pattern exists.

The two sources which show changes against the trend, with standard deviations increasing rather than reducing are contacts outside the organisation and the grapevine. Some attention will be given to both these sources in later discussion.

The largest change is for computer-based information retrieval systems (-0.3). While it is clear that participants are not all convinced that this source is desirable for them, their responses are nonetheless converging into a more unified group.

There are four sources which reduce by 0.2 (organised library, in-house newsletters, memos and immediate superior). Two of them are interesting in that they are at the bottom of table 13, with the smallest standard deviations - memos and immediate superior. Both sources are at the top of table 9 and their reduced standard deviations indicate participants' recognition of their importance as information sources.

Now that an overview had been obtained of source use across all participants, and given that status had been strongly indicated as a major factor in staff responses, it was decided next to examine people's responses level by level, in just the same format as used above. In this way specific investigations could be made of each of the four levels of nonsupervisory staff, first-line supervisors, middle and top

managers. Further, each level could be compared with the others to enable a better insight into any ways in which they seemed to be characteristically different.

Table 14. The Source From Which Nonsupervisory Staff Say They Presently Receive Information

Ranking	Source	Mean Score	Compared With Total Sample Mean	
1 =	Immediate Superior	3.6	0	
1 =	Coworkers	3.6	0	
3 =	Memos Etc From Within the Organisation	3.4	-0.2	
3 =	In-House Newsletters	3.4	0	
5	Grapevine	3.3	-0.1	
6	Subordinates	2.9	-0.6	
7	Organisational Records	2.8	-0.2	
8=	People From Other Units	2.7	-0.2	
8 =	Department Meetings	2.7	-0.3	
8 =	Computer-Based Information Retrieval Systems	2.7	+0.1	
11	News Media	2.6	-0.1	
12	Letters From Outside The Organisation	2.5	-0.1	
13	Personal Contacts Outside The Organisation	2.4	-0.1	
14	Books Not In an Organised Library	2.3	-0.2	
15	Top Management	2.2	-0.3	
15 =	Journals Not In An Organised Library	2.2	-0.2	
15 =	Organised Library Facilities	2.2	-0.3	
18 =	Seminars, Courses, Workshops	2.1	-0.3	
18 =	Government Documents	2.1	-0.3	
		N = 164	N = 318	
1 NEVER	2 RARELY	3 SOMETIMES	4 OFTEN	5 VERY OFTEN

Table 14: Nonsupervisory Staff. Discussion

This discussion attempts to identify and explore what appear to be the major differences among each of the four levels of staff - top management, middle management, supervisors and nonsupervisory staff - and the aggregated mean scores for all participants surveyed. The purpose of this exercise is to establish some basic findings about each level of staff and to determine what the principal points of difference seem to be.

Nonsupervisory staff make up more than half of the total group surveyed, so it may be expected that they will have had a major influence on the mean scores considered so far in tables 9 to 13.

Certainly there are no very major differences between tables 9 and 14, though a few points are worth noting.

Firstly, the mean scores for the sources lowest in table 14 are lower than in table 9 : the nonsupervisory staff have six sources with mean scores below anything on table 9.

Secondly, a pattern exists whereby the mean scores for the nonsupervisory staff are generally less than the mean scores for the total sample. Yet some sources are against this trend: mean scores are the same for immediate superior, co-workers and in-house newsletters, and the nonsupervisory staff report a slightly higher frequency of use of computer-

based i. r. systems.

Looking at the major instances where nonsupervisory staff report lower mean scores than the whole sample, we see the categories of subordinates (-0.6), department meetings, top management, library, seminars and government documents (all -0.3) and memos, organisational records, people from other units and books and journals not in an organised library (all -0.2).

Following the discussion at the beginning of this Chapter, it is clear that some "nonsupervisory" staff do in fact supervise other people at times - yet they would not be expected to rank subordinates as a very major source. Hence it is not surprising to find that the mean score for the source subordinates drops 0.6 points : if there is a surprise it is that this source remains as high as it does at 2.9.

Of the ten other sources with noticeably lower means, four are interpersonal sources and six are print, thus suggesting that although this group of participants receive, on average, less information than the rest, the balance of sources which they use remains fairly comparable.

Table 15 The Sources From Which Nonsupervisory Staff Would Like To Receive Information

Ranking	Source	Mean Score	Compared With Total Sample Mean	
1	Immediate Superior	4.2	0	
2	Co-Workers	3.9	-0.1	
3	Memos Etc From Within The Organisation	3.8	0	
4 =	Department Meetings	3.6	-0.1	
4 =	In-House Newsletters	3.6	0	
6	People From Other Units	3.5	-0.1	
7 =	Subordinates	3.4	-0.5	
7 =	Top Management	3.4	-0.1	
7 =	Organisational Records	3.4	0	
7 =	Computer-Based I.R. System	3.4	0	
11	Seminars, Courses, Workshops	3.2	-0.1	
12	Letters From Outside The Organisation	3.1	-0.1	
13 =	Grapevine	3.0	0	
13 =	Books Not In An Organised Library	3.0	0	
13 =	Journals Not In An Organised Library	3.0	-0.1	
13 =	Organised Library	3.0	-0.2	
17 =	Government Documents	2.9	-0.1	
17 =	News Media	2.9	-0.1	
19	Personal Contacts Outside The Organisation	2.7	0	
		N = 164	N = 318	
1 NEVER	2 RARELY	3 SOMETIMES	4 OFTEN	5 VERY OFTEN

Table 15: Nonsupervisory Staff

Discussion

Just as the mean scores in table 14 are mainly lower than the average, likewise in table 15. Eight means remain the same as in table 10; the other eleven are lower (mainly however by small amounts). The largest drop is for subordinates (which might be expected); of the other ten, five are interpersonal and five are print. Thus these reduced expectations seem to apply to both interpersonal and print sources.

Although it is too early in the analysis to come to any very definite conclusions, it appears from this that people who get less information, overall want less.

Table 16. Nonsupervisory Staff
Discrepancies Between Information Received Now
And Information Preferred

Ranking	Source	Compared With Total Sample Discre- pancy.	
		Discrepancy	
1	Top Management	1.2	+0.2
2	Seminars, Courses, Workshops	1.1	+0.2
3	Department Meetings	0.9	+0.2
4 =	People From Other Units	0.8	+0.1
4 =	Journals Not In An Organised Library	0.8	+0.1
4 =	Organised Library Facilities	0.8	+0.1
4 =	Government Documents	0.8	+0.2
8 =	Books Not In An Organised Library	0.7	+0.2
8 =	Computer-Based Information Retrieval System	0.7	-0.1
10 =	Immediate Superior	0.6	0
10 =	Letters From Outside The Organisation	0.6	0
10 =	Organisational Records	0.6	+0.2
13	Subordinates	0.5	+0.1
14	Memos From Within The Organisation	0.4	+0.2
15 =	Coworkers	0.3	-0.1
15 =	Personal Contacts Outside The Organisation	0.3	+0.1
15 =	News Media	0.3	0
18	In-House Newsletters	0.2	0
19	Grapevine	-0.3	+0.1
		N = 164	N = 318

Table 16: Nonsupervisory Staff Discussion

Comparing discrepancies for the nonsupervisory staff with those for the total sample, there is a pattern of higher discrepancies in 12 instances, the same in 4 instances and reduced discrepancies in 2 cases. In the case of the grapevine staff have a negative discrepancy of -0.3 as compared to the population -0.4.

The reduced discrepancies are for computer based information retrieval systems (CBIRS) and coworkers, suggesting that nonsupervisory staff receive an amount of information closer to their wants from these two sources than do other people. The discrepancy for CBIRS is still quite large however at 0.7.

Nonsupervisory staff show a discrepancy of 0.2 higher than the total sample in respect of seven sources - top management, seminars, meetings, government documents, books, organisational records and memos. In other words these comprise the sources from which this group of staff either receive less or want more information (or both) than do other groups. Three of these sources are interpersonal and four are print. When these seven sources are compared with the top seven sources from which the same group presently receive information (table 14) two sources, memos and organisational records, appear in both lists.

Memos and organisational records, together with in-house

newsletters, are the top print sources from which this group of staff receive their information, and it therefore may be of concern that, relative to the whole sample, nonsupervisory staff are recording higher discrepancies for two of their top print sources.

The three items highest in table 16 deserve some attention: all three are interpersonal sources and all show a discrepancy of 0.2 higher than the total sample discrepancy. Probably the highest ranking of top management would occasion no surprise; hierarchical levels normally create impediments to information flow. The discrepancy for seminars implies that nonsupervisory staff feel their training needs are not being well met. Of the three sources, perhaps department meetings is the one where the discrepancy could most easily be reduced.

Other noteworthy aspects of table 16 include the place of co-workers and in-house newsletters : both are high in table 14 (first equal and third equal place respectively), and both have low discrepancies. The discrepancy for coworkers is slightly lower here than for the entire sample.

An overview of table 16 suggests a pattern of slightly higher discrepancies, more or less across the board. Although it was noted in the discussion of table 15 that people who get less want less, nevertheless their discrepancies are still greater than the total sample's discrepancies.

Table 17. The Sources From Which First Line Supervisors Say They Presently Receive Information

They Presently Receive Information			Compared With Total Sample Mean	
Ranking	Source	Mean Score		
1	Immediate Superior	3.9	+0.3	
2 =	Coworkers	3.8	+0.2	
2 =	Memos etc From Within The Organisation	3.8	+0.2	
4	In-House Newsletters	3.6	+0.2	
5	Subordinates	3.5	0	
6	Department Meetings	3.4	+0.4	
7 =	Grapevine	3.3	-0.1	
7 =	Organisational Records	3.3	+0.3	
9	People From Other Units	3.1	+0.2	
10	Computer-Based I.R. Systems	2.9	+0.3	
11	News Media	2.8	+0.1	
12 =	Journals etc. Not In An Organised Library	2.7	+0.3	
12 =	Organised Library Facilities	2.7	+0.2	
12 =	Seminars, Courses, Workshops	2.7	+0.3	
12 =	Government Documents	2.7	+0.3	
16	Letters From Outside The Organisation	2.6	0	
17 =	Top Management	2.5	0	
17 =	Personal Contacts Outside The Organisation	2.5	0	
17 =	Books Not In An Organised Library	2.5	0	
		N = 60	N = 318	
1	2	3	4	5
NEVER	RARELY	SOMETIMES	OFTEN	VERY OFTEN

The relative ordering of sources remains close to what was observed in table 9, with few major differences in rank ordering. Some sources stand out in this respect, though: journals and seminars rise to 12th equal place from 17th equal, letters from outside drop to 16th place from 11th equal, and the lowest three sources, top management, personal contacts outside and books all fall from 13th equal place to 17th equal.

From this it is noteworthy that external information sources (letters from outside and personal contacts outside) both reduce in importance for this group. Also, although books fall, journals rise, suggesting that supervisors have information needs for very up to date information, to some extent greater than the sample as a whole.

Comparing the mean scores for this group with those for the total sample, it seems that overall, supervisors make more use of more sources. The only source showing a reduced usage is the grapevine (0.1 less than the total sample). This would seem to be in line with the earlier observation that increased use of the grapevine appears to be associated with a lack of information from other, more formal sources of information. If, as it seems, supervisors have better access to a variety of information sources, then presumably their dependence on the grapevine diminishes.

Another factor which may operate here is the effect of promotion. As staff move into their first supervisory role, they often find that their relationships with their co-workers undergo change towards greater formality. This could have the effect of denying supervisors access to the grapevine, requiring them to develop their access to more formal sources.

Of the 19 sources listed, 13 show a mean score larger than the entire sample's, one is lower (grapevine), and for five others there is no change (subordinates, letters, top management, personal contacts outside and books).

The largest differences between supervisors' and the whole sample's mean scores are for meetings (+0.4) and immediate superior, organisational records, CBIRS, journals, seminars and government documents (all + 0.3).

Interesting differences emerge when some comparisons are drawn between supervisors' and nonsupervisory staff responses. The two groups have very different attitudes to meetings, for example, with the former rating meetings at 3.4 and the latter at 2.7. At this stage it is difficult to see why the difference between the two groups is so large, and further investigations are needed here.

Organisational records emerges as another area of divergence: supervisors say 3.3, nonsupervisory people say

2.8. The use of people from other units is also different, with the former group on 3.1 and the latter on 2.7.

Supervisors make more use of journals and organised libraries (both 2.7 as compared to 2.2), and their access to seminars is higher (2.7 as to 2.1).

Overall, the picture that emerges from table 17 is of a fairly major shift in information source use. It appears that as staff make the transition from nonsupervisory to first line supervisor level they learn to obtain more information from more sources. Meetings in particular become more important, as does access to organisational records. Formal information sources such as journals and library facilities are used more and the grapevine becomes less important, whether through "push" factors of distancing from other staff, or "pull" factors such as the increased availability of preferred other sources.

Further, the focus seems to be especially on internal rather than external information sources.

Table 18. The Sources From Which First Line Supervisors Would Like To Receive Information

Ranking	Source	Mean Score	Compared With Total Sample Mean	
1	Immediate Superior	4.4	+0.2	
2	Coworkers	4.1	+0.1	
3	Memos Etc From Within The Organisation	3.9	+0.1	
4	Subordinates	3.8	-0.1	
5 =	Department Meetings	3.7	0	
5 =	In-House Newsletters	3.7	+0.1	
7	People From Other Units	3.6	0	
8 =	Top Management	3.5	0	
8 =	Organisational Records	3.5	+0.1	
8 =	Computer-Based Information Retrieval Systems	3.5	+0.1	
11	Seminars, Courses, Workshops	3.3	0	
12 =	Journals Not In An Organised Library	3.1	-0.1	
12 =	Organised Library Facilities	3.1	-0.1	
14 =	Letters From Outside The Organisation	3.0	-0.2	
14 =	Government Documents	3.0	0	
16 =	Grapevine	2.8	-0.2	
16 =	Books Not In An Organised Library	2.8	-0.2	
16 =	News Media	2.8	-0.2	
19	Personal Contacts Outside The Organisation	2.5	-0.2	
		N = 60	N = 318	
1 NEVER	2 RARELY	3 SOMETIMES	4 OFTEN	5 VERY OFTEN

Table 18: Supervisors Discussion

Table 18 shows six instances where supervisors' means are larger than the total sample's, eight instances where they are less, and five cases where they stay the same. All but one of the larger differences (0.2 as opposed to 0.1) are towards a reduced mean desired by supervisors. In all there are five sources for which supervisors' means are smaller to an extent of 0.2 than the total sample's: letters from outside, the grapevine, books, news media and personal contacts outside.

These reduced means may support the contention above that supervisors are especially interested in internal sources as opposed to external ones: of the five sources above three are, by definition, external (letters, news media, personal contacts outside) and one other (books) may be regarded as both internal and external.

Another pattern to emerge from table 18 concerns the sources respectively above and below the "mid-way" point. Of the lower group (nine sources) seven are in the direction of a reduced mean and two stay the same: of the top group (ten sources) six are in the direction of an increased mean, three stay the same, and one mean is reduced.

This pattern implies a "focusing effect" (which did not appear in respect of nonsupervisory staff, for example). Supervisors appear to have a different attitude towards

their top sources than to their less important ones, saying, in effect, that they want more information from the former group and less from the latter group than do the sample as a whole.

Table 19. First-Line Supervisors
Discrepancies Between Information Received Now And
Information Preferred

Ranking	Source	Discrepancy	Compared With Total Sample Discrepancy
1	Top Management	1.0	0
2 =	Seminars, Courses, Workshops	0.6	-0.3
2 =	Computer-Based Information Retrieval Systems	0.6	-0.2
4 =	People From Other Units	0.5	-0.2
4 =	Immediate Superior	0.5	-0.1
6 =	Letters From Outside the Organisation	0.4	-0.2
6 =	Journals Not In Organised Library	0.4	-0.3
6 =	Organised Library Facilities	0.4	-0.3
9 =	Subordinates	0.3	-0.1
9 =	Coworkers	0.3	-0.1
9 =	Department Meetings	0.3	-0.4
9 =	Books Not In Organised Library	0.3	-0.2
9 =	Government Documents	0.3	-0.3
14	Organisation Records	0.2	-0.2
15 =	Memos From Within The Organisation	0.1	-0.1
15 =	In-House Newsletters	0.1	-0.1
17 =	Personal Contacts Outside The Organisation	0	-0.2
17 =	News Media	0	-0.3
19	Grapevine	-0.5	-0.1
		N = 60	N = 318

Table 19: Supervisors Discussion

In table 17, from 13 of their 19 sources supervisors received more information than the total sample as a whole. In table 18, supervisors wanted less information from their less important sources. The effect of these two trends shows up in table 19 where 17 sources show a discrepancy reduced from the total sample's and one remains the same (top management). The grapevine discrepancy changes from -0.4 for the whole sample to -0.5 for the supervisors.

The largest difference from the entire sample discrepancy is for meetings: the supervisors' discrepancy is 0.3 and the total sample is 0.7. The discrepancy for the nonsupervisory staff is larger still at 0.9, thus there is a radical difference in this regard between nonsupervisory staff and first-line supervisors. Meetings comprise the third highest discrepancy for non-supervisory people, while supervisors rank them at ninth equal; at 0.3 their discrepancy falls below the cut-off point discussed earlier of 0.4.

Further investigations are needed to explore more aspects of this finding: meantime it may be noted as a major difference between these two levels.

Of the 19 discrepancies in table 19 only five fall above the cut-off point of 0.4: they are top management, seminars, courses, etc., computer-based information retrieval systems, people from other units and immediate superior. By way of contrast, 13 of the nonsupervisory staff's discrepancies are

0.5 or greater.

Only top management stands out for this group as an information source which is seriously deficient. Supervisors rate this source's discrepancy at 1.0, which is the same as the total sample average, and also this constitutes the only instance in which the supervisors' discrepancy is not lower than the whole sample's.

Equal in second place are seminars and computer-based systems; at 0.6 they are worth noting as discrepancies, but do not qualify as major deficiencies for this group as a whole.

Table 20: The Sources From Which Middle Managers Say They Presently Receive Information

Ranking	Source	Mean Score	Compared With Total Sample Mean	
1	Subordinates	3.7	+0.2	
2 =	Coworkers	3.6	0	
2 =	Grapevine	3.6	+0.2	
2 =	Memos Etc From Within The Organisation	3.6	0	
5	Immediate Superior	3.5	-0.1	
6 =	Department Meetings	3.3	+0.3	
6 =	In-House Newsletters	3.3	-0.1	
8	Top Management	3.1	+0.6	
9 =	People From Other Units	3.0	+0.1	
9 =	Organisational Records	3.0	0	
11 =	Organised Library Facilities	2.9	+0.4	
11 =	News Media	2.9	+0.2	
13 =	Letters From Outside The Organisation	2.8	+0.2	
13 =	Books Not In An Organised Library	2.8	+0.3	
15	Government Documents	2.7	+0.3	
16 =	Personal Contacts Outside The Organisation	2.6	+0.1	
16 =	Seminars, Courses, Workshops, etc	2.6	+0.2	
16 =	Journals Not In An Organised Library	2.6	+0.2	
19	Computer-Based Information Retrieval Systems	2.3	-0.3	
		N = 78	N = 318	
1 NEVER	2 RARELY	3 SOMETIMES	4 OFTEN	5 VERY OFTEN

Table 20: Middle Managers Discussion

The first notable result is the ranking of subordinates as the first information source. This is an interesting finding, especially when compared to the results of the next two levels down (first-line supervisors and nonsupervisory staff) where in both instances immediate superior takes top ranking. By way of contrast in table 20, immediate superior is in fifth place (after subordinates, coworkers, grapevine and memos). This prominence of subordinates sets middle managers apart from the levels so far considered.

The next noteworthy development in table 20 is the promotion of the grapevine in the ranking, up to second equal place from fifth for nonsupervisory staff and seventh equal for supervisors. If one accepts the proposition advanced earlier that use of the grapevine is associated with a lack of access to more formal information sources, then middle managers' high use of the grapevine suggests their use of formal sources is deficient in some way.

Comparisons of the results for middle managers and supervisors yield several observations. The highest mean score for middle managers is 3.7 : supervisors have three means slightly above this, two at 3.8 and one at 3.9.

There are eight sources for which middle managers show higher mean scores than do supervisors: subordinates (+0.2), the grapevine (+0.3), top management (+0.6),

organised library facilities (+0.2), news media (+0.1), letters from outside the organisation (+0.2), books (+0.3) and personal contacts outside (+0.1). It is noteworthy that all three of the external sources are included here, indicating that middle managers may be more oriented to events outside the organisation than are supervisors.

Of these eight sources, six are among the bottom nine sources listed by supervisors (table 17) and nonsupervisory staff (table 14). This suggests that middle managers have a pattern of source use different in some respects from either of the other two levels: these six sources are mainly print (library, news media, letters and books) and external (news media, letters and personal contacts outside).

This line of argument cannot be taken too far, however: when one compares the sources which the three levels say they use "more than sometimes", middle managers share seven of their eight sources in common with supervisors, and five of their eight with nonsupervisory staff.

Supervisors have higher means than middle managers in respect of ten sources: coworkers (+0.2), memos (+0.2), immediate superior (+0.4), department meetings (+0.1), in-house newsletters (+0.3), people from other units (+0.1), organisational records (+0.3), computer-based information retrieval systems (+0.6), journals (+0.1) and seminars etc (+0.1).

A comparison of middle managers with the whole sample means produces a few points worth noting: the former group have higher means than the total sample for 13 of their 19 sources, three means are the same as the total sample's (co-workers, memos, organisational records) and three means are below (superior, in-house newsletters and computer-based information retrieval systems). CBIRS is at the bottom of the middle managers' ranking: at 2.3 it is well separated from the next lowest source at 2.6.

Table 21. The Sources From Which Middle Managers Would Like To Receive Information

Ranking	Source	Mean Score	Compared With Total Sample Mean	
1 =	Subordinates	4.1	+0.2	
1 =	Coworkers	4.1	+0.1	
1 =	Immediate Superior	4.1	-0.1	
4 =	Department Meetings	3.9	+0.2	
4 =	Top Management	3.9	+0.4	
4 =	Memos Etc From Within The Organisation	3.9	+0.1	
7	People From Other Units	3.7	+0.1	
8	Organised Library Facilities	3.6	+0.4	
9 =	Letters From Outside The Organisation	3.5	+0.3	
9 =	In-House Newsletters	3.5	-0.1	
9 =	Computer-Based Information Retrieval Systems	3.5	+0.1	
12 =	Seminars, Courses, Workshops	3.4	+0.1	
12 =	Organisational Records	3.4	0	
14 =	Books Not In An Organised Library	3.3	+0.3	
14 =	Journals Not In An Organised Library	3.3	+0.2	
16	News Media	3.2	+0.2	
17 =	Grapevine	3.1	+0.1	
17 =	Government Documents	3.1	+0.1	
19	Personal Contacts Outside The Organisation	2.9	+0.2	
		N = 78	N = 318	
1	2	3	4	5
NEVER	RARELY	SOMETIMES	OFTEN	VERY OFTEN

Table 21: Middle Managers

Discussion

Top equal place is shared by three interpersonal sources (subordinates, co-workers and superior) from whom middle managers say they want information "more than often".

A strong similarity between this group and ones considered earlier can be observed when the top sources are examined: of their first six sources middle managers share five in common with supervisors and four in common with nonsupervisory staff.

Supervisors and nonsupervisory staff have two print sources (memos and newsletters) in their top six sources; middle managers have only one print source (memos) in their top six, with newsletters falling to ninth equal place. It seems that as a person progresses from supervisor to middle manager the importance of newsletters diminishes and the importance of letters from outside increases, as the table below illustrates:

	Newsletters	Letters etc
Middle managers	9=	9=
Supervisors	5=	14=
Nonsupervisory staff	3=	12

(N. B. An equals sign (=) denotes that that source was equally

ranked, e.g., 9th equal, 5th equal etc.)

It is interesting to note that the nonsupervisory group rate newsletters even higher than do supervisors, but they are also more attuned to letters from outside. (Earlier discussion noted that there seem to be two groups of nonsupervisory staff, the larger one of which has little contact outside, and the smaller has a lot of such contact.)

When comparisons are drawn between middle managers and the entire sample of the study a clear trend is evident whereby this group wishes to have more information from virtually every source. From 16 sources middle managers want more than the total sample does, from one (organisational records) they want the same, and from two (immediate superior and in-house newsletters) they want less.

This seems to be a generalised "want more" reaction, and as such is different from what is apparently a more selective response on the part of the supervisors who, as pointed out in the discussion above, want relatively more from their most used sources, and want relatively less from their less used sources.

It may be noted that the place of the grapevine in table 21, at 17th equal ranking, is down from 2nd equal place in table 20. From this it is inferred that middle managers are using the grapevine less because they want to than because other, more formal sources are not available.

The major external sources of letters and personal contacts outside, move in opposite directions in table 21. The two sources were lying quite close together in table 20, in 13th equal and 16th equal places respectively. In table 21, letters moves upwards to ninth equal place while personal contacts outside, drops to bottom ranking in 19th position.

This suggests an attitude towards external sources which may be distinctively different from that towards internal sources. The top internal sources in table 21 are all interpersonal, with the print internal sources being relegated down the table. The significance of the rise for letters and the drop for personal contacts may be that they signal a preference for print over interpersonal means of obtaining external information, in contrast to the preference for internal sources. This needs to be explored further however.

When middle managers' results are compared with the whole sample, there are several major differences. This group wants more information (+0.4) from top management and organised library facilities. One would expect a closer linking with top management than that shown by other levels (and table 20 supports this expectation) since middle managers are closer to top management in the organisational hierarchy.

The result for organised library facilities (8th place)

implies an interest in more structured means of obtaining information, and it is noteworthy that books and journals not in a library are well separate from libraries, in 14th equal place. This is in contrast to the responses of supervisors, who link journals and libraries together in 12th equal place (with books in 16th equal), and to nonsupervisory staff who rank all three sources together in 13th equal place.

Table 22. Middle Managers
Discrepancies Between Information Received Now
And Information Preferred

Ranking	Source	Discrepancy	Compared With Total Sample Discrepancy
1	Computer-Based Information Retrieval Systems	1.2	+0.4
2 =	Top Management	0.8	-0.2
2 =	Seminars, Courses, Workshops	0.8	-0.1
4 =	People From Other Units	0.7	0
4 =	Letters From Outside The Organisation	0.7	+0.1
4 =	Journals Not In Organised Library	0.7	0
4 =	Organised Library Facilities	0.7	0
8 =	Immediate Superior	0.6	0
8 =	Department Meetings	0.6	-0.1
10 =	Coworkers	0.5	+0.1
10 =	Books Not In Organised Library	0.5	0
12 =	Subordinates	0.4	0
12 =	Organisational Records	0.4	0
12 =	Government Documents	0.4	-0.2
15 =	Personal Contacts Outside The Organisation	0.3	+0.1
15 =	Memos Etc From Within The Organisation	0.3	+0.1
15 =	News Media	0.3	0
18	In-House Newsletters	0.2	0
19	Grapevine	-0.5	-0.1
		N = 78	N = 318

Top of the list is computer-based information retrieval systems (CBIRS) with a discrepancy of 1.2, well ahead of the next discrepancies at 0.8. CBIRS stands out as the one source from which middle managers obtain very considerably less information than they want. The first three discrepancies in table 22 are the same as for the total sample as a whole (table 11) and for supervisors (table 19): middle managers share two of their three top discrepancies with nonsupervisory staff.

When compared with entire sample discrepancies, there are five sources with increased discrepancies, five with reduced discrepancies (with four out of these five interpersonal) and nine are the same. Most of the differences are small (+ or - 0.1 or 0.2), with only CBIRS being greater than 0.2. Both the total sample and the middle management group have 11 sources out of 19 with a discrepancy above the cut-off point of 0.4. Overall, then, the middle management group shows little change from the whole sample in this regard.

More differences are apparent when one compares this group's discrepancies with those of supervisors. Of their 19 discrepancies 11 of the middle managers' are greater than the cut-off point of 0.4, but only 5 of the supervisors' discrepancies are 0.5 or higher. This suggests a dissatisfaction with information supply at middle management level which does not seem to apply among supervisors. Supervisors have only one source with a discrepancy greater

than 0.6 (top management); middle managers have seven (CBIRS, top management, seminars, people from other units, letters, journals and library).

It is interesting that top management remains as a major discrepancy for this group, despite their closeness to top management in terms of organisational structure: at 0.8 middle management's discrepancy is only 0.2 less than supervisors (1.0) and 0.4 less than nonsupervisory staff (1.2). At least in comparison with supervisors, middle managers do not appear to have developed very satisfactory means of obtaining information. Although it might have been assumed that as a person moved up the organisational hierarchy access to information would become easier rather than harder, the comparison between supervisors and middle managers seems to suggest the opposite. Further discussion on why this group of middle managers featured these somewhat unusual results, when compared for example with supervisors, appears in Chapter 6, Conclusions.

Table 23. The Sources From Which Top Management Staff Say They Presently Receive Information

Ranking	Source	Mean Score	Compared With Total Sample Mean	
1	Subordinates	4.1	+0.6	
2	Memos Etc From Within The Organisation	3.9	+0.3	
3 =	Coworkers	3.8	+0.2	
3 =	Top Management	3.8	+1.3	
5 =	Immediate Superior	3.7	+0.1	
5 =	Department Meetings	3.7	+0.7	
5 =	Organisational Records	3.7	+0.7	
8	In-House Newsletters	3.6	+0.2	
9	Letters From Outside The Organisation	3.4	+0.8	
10 =	People From Other Units	3.2	+0.3	
10 =	Grapevine	3.2	-0.2	
10 =	Personal Contacts Outside The Organisation	3.2	+0.7	
13	Journals Not In An Organised Library	3.1	+0.7	
14	Government Documents	3.0	+0.6	
15 =	Computer-Based Information Retrieval Systems	2.9	+0.3	
15 =	News Media	2.9	+0.2	
15 =	Books Not In Organised Library	2.9	+0.4	
18	Seminars, Courses, Workshops	2.8	+0.4	
19	Organised Library Facilities	2.3	-0.2	
		N = 16	N =318	
1 NEVER	2 RARELY	3 SOMETIMES	4 OFTEN	5 VERY OFTEN

Table 23: Top Management Discussion

Interpretation of the next three tables has to proceed cautiously because of the low number of participants involved. Only 16 people are included in the top management category, and only 8 of the 17 organisations are represented.

The first impression table 23 gives is that top management staff are heavy users of information from a variety of sources. Mean scores are "more than sometimes" for 13 of the 19 sources, in contrast to 6 for the total sample, 5 for nonsupervisory staff, 9 for supervisors and 8 for middle managers.

Like middle managers, this group list subordinates as their top source. Comparing the four status levels so far considered shows an interesting balance: the two top levels say subordinates are their most frequent information source, while the two lower levels say their immediate superiors are their most frequent source.

Memos are next in the ranking: a similar high placement for memos also occurs with the other three status levels. Equal in third place are coworkers and top management, and broadly speaking, with some exceptions, these are the same people. The prominent placing of top management introduces the first major difference in the now receive listings: as seen earlier, other ranks put top management much further down

their respective lists.

In fifth equal place are immediate superior, department meetings and organisational records. Middle managers also put immediate superior in fifth place, and this result suggests that the two top levels have more discretion in the information they employ in their work, since one's superior no longer seems to play such a major role.

Organisational records in 5th equal place are ranked slightly higher for this group than for others: they are in 9th equal, 7th equal and 7th places for middle managers, supervisors and nonsupervisory staff respectively.

The two major external sources (letters and personal contacts outside) are in ninth and tenth equal place, and both these sources show gains when compared with the other supervisory levels.

	Letters	Personal Contacts
Top managers	9	10=
Middle managers	13=	16=
Supervisors	16	17=
Nonsupervisory	12	13

Note that the nonsupervisory staff rank these external sources higher than either of the next two supervisory levels above them, lending support to the idea discussed

earlier that contact with the organisation's environment takes place primarily at the top and bottom of the organisation.

The balance of interpersonal and print sources in the nine or ten most used group stays fairly constant for this level, with roughly the same proportion of interpersonal and print as evident elsewhere.

Comparing mean scores in table 23 with the entire sample, two (the grapevine and organised library facilities) are smaller than the total sample's, and the rest are larger. The top management mean score for the grapevine is 3.2, middle management's 3.6, supervisors' 3.3 and nonsupervisory staff 3.3 also. Middle management seem to stand out as the most frequent users of the grapevine, and top management's relatively less frequent use also seems to be associated with their better access to other sources.

The low use made of organised libraries by top management staff seems unusual: perhaps where there is good access to libraries the task of obtaining information from them would be delegated to more junior staff. This might explain the very low ranking (19th) in table 23.

Looking next at instances where mean scores are greater than the whole sample's, the largest differences are for:

Top management (+ 1.3)

Letters from outside (+ 0.8)

Meetings

Organisational records

Personal contacts outside

Journals (all + 0.7)

Of these, top management is predictable enough, and letters and personal contacts have already been discussed. This leaves meetings, records and journals: also included may be subordinates and government documents, both of which are 0.6 above the total sample mean. Basically it seems that top management have access to more information from a wide range of sources.

**Table 24. The Sources From Which Top Management Staff
Would Like To Receive Information**

Ranking	Source	Mean Score	Compared With Total Sample Mean	
1 =	Subordinates	4.3	+0.4	
1 =	Coworkers	4.3	+0.3	
3 =	Top Management	4.1	+0.6	
3 =	Memos Etc From Within The Organisation	4.1	+0.3	
5	Immediate Superior	4.0	-0.2	
6 =	People From Other Units	3.9	+0.3	
6 =	Department Meetings	3.9	+0.2	
6 =	Organisational Records	3.9	+0.5	
9	In-House Newsletters	3.8	+0.2	
10 =	Personal Contacts Outside The Organisation	3.6	+0.2	
10 =	Computer-Based Information Retrieval System	3.6	+0.2	
12 =	Grapevine	3.3	+0.3	
12 =	Journals Not In An Organised Library	3.3	+0.2	
14 =	Seminars, Courses, Workshops	3.1	-0.2	
14 =	Letters From Outside The Organisation	3.1	-0.1	
14 =	Books Not In An Organised Library	3.1	+0.1	
14 =	News Media	3.1	+0.1	
18 =	Organised Library Facilities	3.0	-0.2	
18 =	Government Documents	3.0	0	
		N = 16	N = 318	
1 NEVER	2 RARELY	3 SOMETIMES	4 OFTEN	5 VERY OFTEN

Table 24: Top Management Discussion

The top sources in table 24 stay fairly similar to the sources other levels specified, with the exception, again, of top management, which appears in third equal place.

As with middle managers, subordinates and coworkers jointly take first place in the ranking. It is notable that of the five sources from which top management staff want information often or "more than often", four are interpersonal, and represented are the usual tight group of coworkers, superior and subordinates seen in earlier listings. Thus although top managers show various differences (such as an increased intake of information) the basic interpersonal sources which other levels use are the key ones here also.

Comparing tables 24, 21, 18 and 15, it seems as a general rule that as staff progress up the organisation their interest in sources broadens. Nonsupervisory staff means are normally less than the total sample means, supervisors' are balanced with some more, some less, middle managers' means are mainly a little greater than the total sample's. Top management staff have eight means at more than 0.2 larger than the total sample mean, while middle management have four.

In the discussion of table 15 it was suggested that people who get less information overall want less: the corollary

of this seems to be that those who get more want more.

The two principal external sources (letters and contacts outside) change in their ranking from table 23 to table 24:

Letters		Personal contacts	
Table 23	9	10=	(Information now)
Table 24	14=	10=	(Information preferred)

(N.B. An equals sign (=) denotes that that source was equally ranked, e.g. 10th equal, 14th equal etc.)

The rating for personal contacts remains unchanged across the tables, implying that staff are getting close to the amount of information they want from this source. This implication is supported by the low discrepancy (0.4) for personal contacts in table 25.

In contrast, letters drops to 14th equal place in the preferred ranking from 9th in the now ranking. More information on why this should happen may be obtained from the discrepancies listing in table 25: there, letters is lowest in the table, and also stands out in that it is the only source featuring a negative discrepancy (-0.3). From this it seems that the top management group is signalling that they are overloaded with information from this source and would rather the amount was reduced.

Earlier it was noted that the top and bottom levels of the

organisation are the most likely to be in contact with the environment.

Letters	Now	Would Like
Top managers	9	14=
Middle managers	13=	9=
Supervisors	16	14=
Nonsupervisory	12	12

It may be observed that the middle two organisational levels are the two lowest in the receive now column, and are the only ones with an apparent urge to increase the frequency of their contact by letter with people outside. The bottom level appears to have a measure of equilibrium in that letters now are on the same ranking as letters preferred, while as indicated previously, the top level seems to be overloaded with information from this source.

Table 25. Top Management Staff Discrepancies Between
Information Received Now and Information Preferred

Ranking	Source	Discrepancy	Compared With Total Sample Discrepancy
1 =	People From Other Units	0.7	0
1 =	Organised Library Facilities	0.7	0
1 =	Computer-Based Information Retrieval Systems	0.7	-0.1
4	Co-Workers	0.5	+0.1
5	Personal Contacts Outside The Organisation	0.4	+0.2
6 =	Immediate Superior	0.3	-0.3
6 =	Top Management	0.3	-0.7
6 =	Seminars, Courses, Workshops	0.3	-0.6
9 =	Subordinates	0.2	-0.2
9 =	Department Meetings	0.2	-0.5
9 =	Memos From Within The Organisation	0.2	0
9 =	In-House Newsletters	0.2	0
9 =	Organisational Records	0.2	-0.2
9 =	Books Not In An Organised Library	0.2	-0.3
9 =	Journals Not In An Organised Library	0.2	-0.5
9 =	News Media	0.2	-0.1
17	Grapevine	0.1	+0.5
18	Government Documents	0	-0.6
19	Letters From Outside The Organisation	-0.3	-0.9
		N = 16	N = 318

Table 25: Top Management Discussion

In terms of their discrepancies the top management group are the least like the other levels. Perhaps they have most in common with the supervisory group:

No. of discrepancies	over 0.4	Over 0.7
Top managers	4	0
Middle managers	11	3
Supervisors	5	1
Nonsupervisory	13	7

If low discrepancies are a measure of satisfaction with one's information, top management and supervisors are more satisfied than the rest.

The four important discrepancies registered by top management are people from other units (0.7), library (0.7), CBIRS (0.7) and coworkers (0.5).

The relatively high discrepancy for the library implies that the explanation above for this group's low use of the library (they have assistants) may not be entirely satisfactory. Low actual use may reflect difficulty of access, and further research is required here.

People from other units appears high on all four discrepancy tables (25, 22, 19 and 16); in fact in the latter three tables this source appears in 4th equal place each time.

This result points to a very widespread dissatisfaction with the state of intraorganisational communication, and it is interesting that such concern surfaces at all levels of organisational functioning.

Another concern in common is CBIRS: this source appears in the top two discrepancy rankings for all three supervisory ranks. Only for nonsupervisory staff does CBIRS move down the discrepancy listing, to 8th equal place (yet the nonsupervisory discrepancy is nonetheless high at 0.7). Although nonsupervisory staff are relatively less concerned about this source than are higher ranks, overall they do not get the access they would like.

Top management are a little more concerned about lack of information from their coworkers than is any other group, listing them as 4th highest discrepancy (0.5). Middle managers also have coworkers at 0.5, but in 10th equal place, while for the two lower groups coworkers do not register as an important discrepancy (both 0.3).

The grapevine seems to be regarded differently by this group. For the first time, the grapevine does not display a negative discrepancy, but has a positive discrepancy of 0.1. This result appears to support the earlier argument that the grapevine often is used more than wanted, in the absence of other, preferred sources. Top management staff seem to have good access to a variety of sources and do not use the grapevine more than they wish to. The very small

discrepancy suggests top management overall have achieved a good balance in the extent to which they use and want to use the grapevine.

Tables 14 to 25 and the accompanying discussion together shed a considerable amount of light on what appear to be some of the characteristic features of source use by status level.

One of the major limitations of the analysis to this point is its dependence on mean scores. Means are important as a measure of centrality, but one of their effects is to conceal both high and low parameters in the data. The examination of standard deviations, as seen above, is one relatively limited method of assessing the spread of scores, but rather more useful is the process employed below.

In the following section is discussed the use of crosstabulations of status and sources. By means of this, both the high scores and, where appropriate, the low ones can be assessed in respect of every source. In this way it is anticipated that, in line with the objectives of the study, the use of another analytical method will be tested, and further insights should be permitted into the nature of each status level's responses.

DISCUSSION OF CROSSTABULATIONS: STATUS AND SOURCES

1. The purpose of this analysis is to highlight what appear to be the most noteworthy points which emerge from a crosstabulation of status and sources. The joint frequency distribution of cases as defined by the categories of the variables status and sources are discussed here.

By status is meant participants' ranking in their organisation, and the categories are:

1. Nonsupervisory Staff
2. 1st Line Supervisor
3. Middle Management
4. Top Management

Sources refers to the interpersonal and print sources from which participants obtain their information: each source is defined in terms of the frequency with which people say they obtain information from them. The categories are:

1. Never
2. Rarely
3. Sometimes
4. Often
5. Very often

In interpreting the analysis produced at this stage only the display of the distribution of cases is used, being the count of the numbers involved and the percentages.

2. Status by Subordinates as a Source, Frequency of Use

Now

Of the 318 respondents only 170 report that they have subordinates. The effect of 148 missing observations is to skew the results to the extent that any useful observations would be difficult.

3. Status by Coworkers

Often and Very Often

Nonsupervisory	52.2%
Supervisors	66.6%
Middle managers	61.1%
Top managers	62.6%

This result shows a close similarity among supervisors, middle management and top management in respect of their receiving information often and very often from coworkers. There is a gap to the Nonsupervisory staff: the data in a sense fall into two groups, Nonsupervisory comprising one and Supervisors, Middle and Top Managers the other.

4. Status by Immediate Supervisor

When often and very often are totalled again, there is an unusual finding, whereby supervisors record higher frequencies than middle managers:

Nonsupervisory	57.4%
Supervisors	70.0%
Middle managers	53.3%
Top managers	66.7%

This finding implies that supervisors regard as very important the links between themselves and their

immediate supervisor. On a practical level the need is suggested for middle managers to keep the supervisors who report to them acquainted with matters of importance.

The close ties implied between supervisors and middle managers are not evident between middle and top management. It may be that Granovetter's approach is relevant here: briefly, the "strength of weak ties" argument suggests that apparently weak or infrequent ties between people may nevertheless be significant in terms of the quality or importance of the information that is passed. Thus, even though middle management say that the frequency of their contact with top managers is low, the ascribed importance of the information passed may be high.

6. Status by Department Meetings

Totalling often and very often scores produces the following:

Nonsupervisory	20.6%
Supervisors	49.2%
Middle managers	39.0%
Top managers	56.3%

The result suggests that meetings serve as a fairly important source of information for all levels above nonsupervisory. The other noteworthy point is that supervisors rank this source higher than do middle managers.

7. Status by Top Management

	Often and Very Often	Never and Rarely
Nonsupervisory	6.9%	65.7%
Supervisors	11.7%	51.6%
Middle managers	31.1%	28.4%
Top managers	57.2%	7.1%

"Top managers" are the only group citing top management as a very frequent source of information. In most instances, the individuals in the present survey who described themselves as top management would have had other "top management" people senior to them in some way. In other words the category "top management" does not necessarily refer to only one hierarchical level: there are a variety of organisational structures represented among the 17 organisations in the survey. The category of top management embraces a loose conglomeration of staff and line personnel of different, though all "top" levels. Thus, although in one way it may appear absurd to say that "57% of top managers receive information often or very often from top management", in practice, the range of possible communication relationships which respondents might have had in mind would be quite large.

The figures above are noteworthy for the very low frequency cited by nonsupervisory personnel, less than 7% of whom regard top management as a frequently used source of information. Supervisors, at 11.7%, are noticeably higher than the next level down, but this frequency is still low in absolute terms. There is a

considerable gap next to middle managers, 31.1% of whom say they have top management as a frequent information source. Though considerably in advance of supervisors in their rating, 31.1% in absolute terms is still quite low, showing top management being used less frequently than coworkers, immediate superior, department meetings, the grapevine, memos, letters or newsletters. (It may well be that memos etc. may be authorised by members of top management: in this crosstabulation only face to face contact is included.)

8. Status by the Grapevine

	<u>Often</u> and <u>Very Often</u>	<u>Never</u> and <u>Rarely</u>
Nonsupervisory	41.1%	17.8%
Supervisors	44.1%	17.0%
Middle managers	51.2%	12.8%
Top managers	25.1%	12.5%

Top management appear more isolated here than other levels (though as with other analyses above, the low absolute number of top management people renders any definite conclusions suspect). Middle managers head the often and very often list, in contrast to their ranking behind supervisors in respect of the frequency of their use of coworkers, people from other units, immediate superior and department meetings. It is interesting to note that 17.9% of middle managers say they get information from the grapevine very often in contrast to 6.3% of top managers, 8.5% of supervisors and 10.4% of nonsupervisory personnel. Sometimes it is suggested that the grapevine flourishes when use of

more formal information channels is restricted or unavailable, and this finding seems to add weight to that contention. So far, in respect of using as information sources, coworkers, people from other units, immediate superior and department meetings, middle managers seem to lag behind supervisors, and it may be that they are using the grapevine more than other people do to redress the imbalance, as already suggested earlier in this chapter.

9. Status by Contacts Outside the Organisation

	<u>Often and Very Often</u>	<u>Never and Rarely</u>
Nonsupervisory	18.8%	59.4%
Supervisors	15.3%	52.6%
Middle managers	16.9%	42.9%
Top managers	25.1%	12.5%

As might be expected, top managers have more frequent outside contact than do the other levels. Next in line, however, comes the nonsupervisor group, supporting the contention that the "lowest" levels of the organisation are relatively more in contact with the environment than are most higher levels.

The low amount of contact recorded by middle managers is of interest: even though their internal sources of information appear to be less well developed than supervisors', middle managers do not seem to have much better external contacts. Some interesting differences emerge when the aggregate figures for Never and Rarely are seen:

Nonsupervisory	59.4%
Supervisors	52.6%
Middle managers	42.9%
Top managers	12.5%

Top management is here shown as strongly externally oriented in contrast to all other levels. Least in contact with the environment is the nonsupervisory group, at nearly 60%; this finding adds support to the suggestion above that the nonsupervisory group is basically in two groups, in respect of this source: the larger group has very little contact with the organisation's environment, while a small minority (under 19%) have a lot of such contact. This finding thus offers useful clarification of the discussion of this topic following Table 24 above.

The top management group seem to stand out in terms of their use of this source: one implication arising is that senior managers may not realise relatively how little other levels use external sources, and how much they thereby depend on effective internal information sources. Good quality internal channels are required, not least to pass on to staff the information senior people have obtained from outside.

10. Status by Seminars, Courses and Workshops

This result is noteworthy for the low extent of contact recorded. Aggregate figures are:

	<u>Often and Very Often</u>	<u>Never and Rarely</u>
Nonsupervisory	7.6%	65.0%
Supervisors	15.0%	40.0%
Middle managers	13.0%	41.6%
Top managers	0%	18.8%

More particularly, the nonsupervisory personnel have considerably the least access to seminars, and this finding is perhaps not unexpected. More surprising are the figures of 40.0 and 41.6% of supervisors and middle managers in the rarely or never categories. These seem to be very substantial minorities of the two groups who have little or no access to this information source.

11. Status by Memos or Reports from Within the Organisation

	<u>Often and Very Often</u>
Nonsupervisory	49.1%
Supervisors	70.0%
Middle managers	50.0%
Top managers	81.3%

Clearly memos and reports of internal origin comprise a major information source for all levels. The especially unusual result is the low score recorded by middle managers. It appears strange that their reported usage of this source should be so far below that of supervisors. However, as seen earlier, similar results emerged in respect of several other sources as well. This confirms the trend seen developing, of supervisors having better access to a variety of information sources than do their supervisors at middle management level. Nevertheless the size of the

difference between the two results above is a surprise. Thirty per cent of supervisors say they receive memos rarely or sometimes, while nearly 50% of middle managers are in these categories.

12. Status by Letters from Outside the Organisation

The aggregated scores below show a pattern of increasing use by hierarchical level:

	<u>Often</u> and <u>Very Often</u>	<u>Never</u> and <u>Rarely</u>
Nonsupervisory	14.8%	56.4%
Supervisors	16.7%	45.0%
Middle managers	23.0%	37.2%
Top managers	31.3%	12.5%

It is noteworthy that no level has this as a very major source of information: of the two levels making most use of this source 56.3% of top managers say sometimes and 39.7% of middle managers also say they sometimes receive letters from outside.

The different use made of written and oral sources from outside the organisation is clarified to some extent when the findings above are compared with those for contacts outside the organisation (9 above). Middle managers have more outside contact by letter than they do face to face (23% to 16.9%) while for nonsupervisory staff the trend is the other way (14.8% to 18.8%). Top managers also make somewhat more use of letters (31.3%) than they do of interpersonal sources outside (25.1%).

13. Status by In-House Newsletters

The total of often and very often this time shows a much more even distribution:

Often and Very Often

Nonsupervisory	45.2%
Supervisors	57.7%
Middle managers	44.2%
Top managers	56.3%

In-House Newsletters as a source is unusual in that it serves as a fairly important information source for all levels, unlike most other sources where one or another level will make much more or much less use of them. It may well be that different levels look for different information from the same newsletter.

It is worth noting that supervisors once again employ this source more frequently than do middle managers.

14. Status by Organisational Records

Often and Very Often

Nonsupervisory	31.1%
Supervisors	46.5%
Middle managers	30.1%
Top managers	64.3%

Organisational records appears as a fairly important source in this result. Once again supervisors emerge as major users of information, accessing this source much more frequently than middle managers, and again it is difficult to account for this result.

It is also interesting to note that a fairly significant group of nonsupervisory personnel (31.1%) use records often or very often.

15. Status by Books Not In An Organised Library

	<u>Often</u> and <u>Very Often</u>	<u>Never</u> and <u>Rarely</u>
Nonsupervisory	16.4%	60.5%
Supervisors	17.9%	48.2%
Middle managers	24.7%	42.9%
Top managers	25.1%	43.8%

Looking first at the Often and Very Often scores, one sees a weak division into two groups comprising the higher two levels and the lower two. The higher two show a slightly greater propensity to frequent use of this source. Divisions between organisational levels become clearer in the Never and Rarely table: nonsupervisory people are separated from the three supervisory ranks. From the result it may be inferred that reliance on this source tends to increase as one progresses up the organisation.

16. Status by Journals Not in an Organised Library

	<u>Often</u> and <u>Very Often</u>	<u>Never</u> and <u>Rarely</u>
Nonsupervisory	14.5%	64.6%
Supervisors	16.9%	42.4%
Middle managers	24.7%	48.1%
Top managers	31.3%	31.3%

Results here are similar to the finding for books. Again two groups are apparent in the Often and Very Often categories, and the nonsupervisory people appear to be distinct from the rest in the Never and Rarely responses. Unlike the supervisory ranks, the majority of nonsupervisory staff never or rarely use books and journals not in an organised library. While supervisors do use these sources more than the level

below, their use is predominantly in the "sometimes" category rather than often or very often.

17. Status by Organised Library

	<u>Often and Very Often</u>	<u>Never and Rarely</u>
Nonsupervisory	21.7%	64.1%
Supervisors	30.9%	47.3%
Middle managers	28.6%	39.0%
Top managers	6.3%	50.1%

Here there is an overall increase in the Often and Very Often figures (especially among supervisors) but with the exception of top managers, who show an abrupt change from the two earlier results. Very likely the small number of top management people surveyed (16) has something to do with this finding. Also, as mentioned above, in some cases it is possible that where people have good access to organised library facilities a system will exist whereby more junior staff use the library on behalf of more senior people. Thus although top management staff may employ the information provided to them from a library, they would have no need to use the library first hand. This explanation however does not account for the high discrepancy accorded to libraries (relatively speaking) by top managers in Table 25.

Here supervisors feature higher on the often and very often list than do middle managers, thus reversing the trend of the previous two results. However it is noteworthy that a higher percentage of supervisors are

in the never and rarely categories than are middle managers.

18. Status by Government Documents

	<u>Often and Very Often</u>	<u>Never and Rarely</u>
Nonsupervisory	12.2%	68.6%
Supervisors	23.8%	49.1%
Middle managers	23.4%	46.8%
Top managers	31.3%	25.0%

Both the above tables suggest that the personnel here fall into three groups: top management; middle management and supervisors; and nonsupervisory staff. Within this framework there is a perceptible increase in use made of this source by hierarchical level.

19. Status by Computer-Based Information Retrieval Systems

Likewise with computer-based i.r. systems: some organisations were dependent on their access to such sources and made heavy use of them; others presently had no experience with such systems.

	<u>Often and Very Often</u>	<u>Never and Rarely</u>
Nonsupervisory	34.9%	50.0%
Supervisors	40.0%	41.8%
Middle managers	29.6%	64.8%
Top managers	25.1%	43.8%

Nevertheless it is still worth noting that supervisors are highest in the often and very often table and middle managers are highest in the never and rarely table. Also, all groups show a fairly large extent of non-use.

20. Status by News Media

	<u>Often</u> and <u>Very Often</u>	<u>Never</u> and <u>Rarely</u>
Nonsupervisory	21.5%	46.2%
Supervisors	25.9%	37.9%
Middle managers	29.0%	31.6%
Top managers	12.5%	18.8%

No group makes major use of this source, but all levels obtain information from the media to some extent. The predominant use of this source is perhaps best described in the sometimes column of the crosstabulation: nonsupervisory staff, supervisors and middle managers all had sometimes scores in the 32-39% range, while top managers give 68.8% as their sometimes score.

EDUCATION AND SOURCE USE

Following indications from the Literature Review that status and education are frequently highly correlated, it was decided next to try to assess the relationship between education and source use, by use of a straightforward breakdown procedure (similar to crosstabulations).

Writers such as Etzioni (1964) are quite explicit in the contention that:

"There is considerable evidence that persons who have only a high school education will be more frequently found in lower ranks and college-educated persons in the higher ones" (p.76).

Therefore such an approach seemed to be indicated, and it also appeared to be consistent with the exploratory and descriptive intent of the study.

In this breakdown of print sources by the variable Education will be featured the most prominent findings in respect of each source, plus an assessment of whether education seems to be associated with different use of print sources.

By Education is meant participants' highest achieved educational level, and the categories are:

	N =
1. Up to and with School Certificate (Up to SC))	76
2. University Entrance or higher school qualifications (UE+)	58
3. Some technical or university level study (Some TU)	74
4. A completed technical or univ. qualification (Complete TU)	96
5. Postgraduate work. (PG)	14
	318

It is noteworthy that more than half the respondents (58%) have some experience of tertiary education, while over a third (35%) have completed at least one tertiary qualification.

As in the discussion above on sources and status, Sources refers to the interpersonal and print sources from which participants obtain their information. Each source is defined in terms of the frequency with which people say they obtain information from them. The categories are:

1. Never
2. Rarely
3. Sometimes
4. Often
5. Very often

This discussion focusses mainly on the relationship between education and the frequency with which participants say they use sources now. Also some attention is paid to the relationship between education and the frequency with which participants would like to use sources. The latter may be helpful as a predictor of where source use would increase were preferred sources available.

Although the Literature Review revealed mixed findings about the relationship between education and source use, it appeared likely, overall, that participants with more education would use print sources more. Whether they would also want to use such sources more was not known, but again it was considered they probably would.

Given the mixed results from the literature concerning education and use of sources, the researcher adopted the opinion that more education is likely to be associated with greater use of some (especially print) sources. In instances below there is a comment to the effect of whether the researcher's opinion was or was not supported.

1. Education by Memos or Reports Within the Organisation

	Mean Now	Mean Preferred	Discrepancy
Up to SC	3.6	3.9	0.3
UE+	3.6	3.8	0.2
Some TU	3.7	3.9	0.2
Complete TU	3.4	3.7	0.3
PG	3.6	4.0	0.4

It is interesting to note that all educational levels

show a high frequency of use and preference for internal memos. It seems that this source is important for all knowledge workers regardless of their education. The opinion is not supported.

2. Education by Letters From Outside The Organisation

	Mean Now	Mean Preferred	Discrepancy
Up to SC	2.5	3.1	0.6
UE+	2.7	3.1	0.4
Some TU	2.6	3.2	0.6
Complete Tu	2.7	3.2	0.5
PG	3.1	3.4	0.3

A weak upward trend is evident in respect of preferred scores, with the greatest variation in means between the extremes of highest and lowest education. It is worth noting that the variation in means is greater for scores now than for scores preferred, suggesting that participants with less education are less satisfied with access to letters from outside than are more highly educated staff.

3. Education by In-House Newsletters

	Mean Now	Mean Preferred	Discrepancy
Up to SC	3.6	3.8	0.2
UE+	3.1	3.5	0.4
Some Tu	3.5	3.8	0.3
Complete Tu	3.3	3.5	0.2
PG	3.4	3.9	0.5

4. Education by Organisational Records

	Mean Now	Mean Preferred	Discrepancy
Up to SC	3.0	3.5	0.5
UE+	3.0	3.4	0.4
Some Tu	3.1	3.6	0.5
Complete Tu	2.9	3.3	0.4
PG	3.1	3.6	0.5

These two sources contrast: newsletters are important to all levels, with the least educated group receiving most information, while records are used about "sometimes" by all groups. The opinion is not supported.

5. Education by Books Not In An Organised Library

	Mean Now	Mean Preferred	Discrepancy
Up to SC	2.5	3.1	0.6
UE+	2.3	2.7	0.4
Some Tu	2.3	3.0	0.7
Complete Tu	2.7	3.2	0.5
PG	2.7	3.0	0.3

It is noteworthy that no level used this source as much as "sometimes". The levels using it most are those with most education; the finding provides some support for the opinion. While the two highest educational levels are clearly distinct from the next two levels down, the symmetry of the results is broken by the mean score for the group with the least education; no obvious reason accounts for this.

6. Education by Journals Not In An Organised Library.

	Mean Now	Mean Preferred	Discrepancy
Up to Sc	2.4	3.1	0.7
UE+	2.0	2.7	0.7
Some Tu	2.4	3.2	0.8
Complete Tu	2.7	3.3	0.6
PG	2.7	3.0	0.3

Again the two highest levels seem to be a little higher than the rest, supporting the viewpoint.

The size of discrepancies should be pointed out: the

four levels with less education show sizeable discrepancies, suggesting a major perceived deficiency in access to this source. For each of these levels the discrepancies recorded are higher than those for books, implying that staff access to journals is less satisfactory than to books.

7. Education by Organised Library Facilities

	Mean Now	Mean Preferred	Discrepancy
Up to SC	2.1	2.9	0.8
UE+	1.8	2.6	0.8
Some Tu	2.6	3.4	0.8
Complete Tu	2.8	3.4	0.6
PG	3.9	4.2	0.3

The PG group stands out from the rest as being the heaviest users of this source. The next two levels (some or complete technical/university study) are grouped together as more frequent users than the two lowest levels. The pattern of results in this instance then lends fairly good support to the opinion.

The discrepancies show the next interesting point: overall the discrepancies are the highest for any print source so far considered (except for PG results).

When results for these last three sources are compared several points stand out. Firstly, the PG group have a very marked preference for organised library facilities (both in terms of using and wanting to use), in contrast to the other four levels, who show no such preference. The result suggests that it is only when

staff have experienced some level of postgraduate study that they become highly oriented to the services an organised library can provide. Some caution must be expressed with this interpretation, however: only 14 individuals are in the PG group, and thus it is unwise to build too much on these findings.

8. Education by Government Documents

	Mean Now	Mean Preferred	Discrepancy
Up to SC	2.3	2.7	0.4
UE+	2.2	2.8	0.6
Some TU	2.5	3.2	0.7
Complete TU	2.4	3.0	0.6
PG	3.6	3.7	0.1

There is strong support for the opinion of the PG level, and little support for it at levels below. It appears from this result that the PG group are the only frequent users of this source.

9. Education by CBIRS

	Mean Now	Mean Preferred	Discrepancy
Up to SC	2.8	3.5	0.7
UE+	3.6	3.6	0
Some TU	2.5	3.6	1.1
Complete TU	2.1	3.2	1.1
PG	2.0	3.3	1.3

These results suggest that as participants' education increases, use of CBIRS is likely to decrease. It is noteworthy however that notwithstanding their level of current use, all participants would like to use CBIRS more frequently than sometimes. Nevertheless the two top levels wish to use this source somewhat less than do the three levels below them.

The range of discrepancies is extremely large in respect of this source: from 0 (which it may be assumed equates to an overload of information) to 1.3, representing a major perceived deficiency of such contact.

The heaviest users by a large margin are the UE+ group. One reason for this may be that the people who are being assigned to duties with the new technology which is coming into New Zealand workplaces with such rapidity are those who have shown their ability at high school, but have not at this stage developed their academic interests further.

10. Education by News Media

	Mean Now	Mean Preferred	Discrepancy
Up to SC	2.5	2.8	0.3
UE+	2.6	2.8	0.2
Some TU	2.7	3.0	0.3
Complete Tu	2.9	3.1	0.2
PG	3.5	3.9	0.4

Once again the PG group show differences from the rest, with more frequent use, and a greater preferred frequency. All discrepancies are low, with four out of five being less than 0.4, suggesting either that most people see a little more about their organisation in the media than they care to, or that the usual assumption made that there is a "normal discrepancy" of about 0.4 does not apply in the issue of news media.

Only the PG group record a present usage of greater than sometimes. The opinion is weakly supported.

CORRELATIONS AMONG STATUS, EDUCATION AND SOURCES

Now the study had progressed to the point where a basic framework of mean scores had been laid down in respect of participants' use of sources, and upon that had been constructed a more intensive study of the relationship between status and sources and education and sources. It seemed appropriate that the next step should be to explore some correlations among status, education and sources, firstly to make further findings about the apparent connections among status, education and source use and preference, and also to assess the suitability of different correlation coefficient methods for a study of this type.

Table 26 Comparison of correlation coefficients for status and the sources now and would like, using Pearson, Spearman and Partial Correlations,controlling for education.

		Status and Sources Now			Status and Sources Would Like		
		Pearson	Spearman	Partial Contr. Educat.	Pearson	Spearman	Partial Contr. Educat.
1.	Subordinates	0.3367 0.000	0.3102 0.001	0.3420 0.000	0.3378 0.000	0.2972 0.001	0.3262 0.000
2.	Co-workers	-	-	-	-	-	-
3.	Other units	0.1876 0.000	0.1893 0.001	0.1981 0.000	0.1319 0.010	0.1337 0.009	0.1520 0.004
4.	Immed. superior	-	-	-	-	-	-
5.	Meetings	0.2754 0.000	0.2828 0.001	0.2743 0.000	0.1668 0.002	0.1647 0.002	0.1732 0.001
6.	Top Management	0.4462 0.000	0.4227 0.001	0.4323 0.000	0.2532 0.000	0.2520 0.001	0.2553 0.000
7.	Grapevine	-	-	-	-	-	-
8.	Personal contacts	0.1690 0.001	0.1746 0.001	0.1198 0.017	0.1525 0.004	0.1330 0.010	0.1056 0.032
9.	Seminars	0.2782 0.000	0.3000 0.001	0.2621 0.000	0.0269 0.319	0.0052 0.462	0.0024 0.483
11.	Memos	0.1140 0.021	0.1173 0.018	0.1395 0.007	0.1050 0.031	0.0958 0.044	0.1203 0.016
12.	Letters	0.2303 0.000	0.2206 0.001	0.2128 0.000	0.1504 0.004	0.1279 0.011	0.1348 0.008
13.	Newsletters	-	-	-	-	-	-
14.	Records	0.1509 0.005	0.1537 0.004	0.1519 0.004	0.0752 0.098	0.0460 0.215	0.0859 0.071
15.	Books	0.1954 0.000	0.2079 0.001	0.1790 0.001	0.1125 0.026	0.0939 0.053	0.1021 0.040
16.	Journals	0.2342 0.000	0.2413 0.001	0.2109 0.000	0.1004 0.040	0.0838 0.072	0.0828 0.075
17.	Library	0.1757 0.001	0.2185 0.001	0.1182 0.021	0.1660 0.002	0.1498 0.005	0.1119 0.028
18.	Government Documents	0.2342 0.000	0.2504 0.001	0.2100 0.000	0.0891 0.060	0.0914 0.056	0.0587 0.154
19.	CBIRS	-	-	-	-	-	-
20.	News media	0.1314 0.011	0.1413 0.007	0.0928 0.053	0.1021 0.037	0.0912 0.056	0.0705 0.110

Probability levels are shown below correlation coefficients
Most n between 290 and 318. For exact n see tables in appendices

Spearman

Educat corr. = 0.2120
With N = 317
Status Sig. = 0.001

STATUS AND SOURCES

Table 26 compares correlation coefficients (and significance levels) for the variable status (i.e. ranking in the organisation) and the 19 sources of information, as produced by Pearson, Spearman and partial correlation procedures. The purpose of this process is to approach these correlations from different perspectives and by this means to explore some of the relationships that appear to exist.

The table is set out in eight columns. Column 1 gives the number of each source. It will be noted that there is no no. 10; in the questionnaire this referred to "other oral sources" and hence has here been deleted.

Column 2 shows the sources by name and columns 3, 4 and 5 give respectively Pearson, Spearman and partial correlation coefficients. In the case of partial, education is being controlled for. In each of columns 3-5, the correlation coefficient is shown, with the significance level immediately underneath. To improve the visual display of the table, the number of participants in each instance has been omitted; n may be found in the addenda to this research. Most n are between 290 and 318 : the only major exceptions to this are the correlations for subordinates, where those responding of course are people who have subordinates, and these number around 170.

The partial correlation in table 26 controls for education. In table 27, where the variable education is explored, the

partial correlation controls for status. The reason for this choice of control variable is that it was found that there was some degree of correlation between education and status : using Spearman the correlation = 0.212, n = 317, significance = 0.001.

Columns 3-5 show correlations for sources now; columns 6-8 display correlations for sources preferred. By this means comparisons may be made between what participants say is their present experience, and what they prefer. In this way the pattern of the other investigations discussed above is followed, but this time correlations and significance levels are compared.

In constructing table 26, it was decided to restrict attention to findings at the 0.1 and the 1 per cent significance levels. Use of the 5% significance level would have disclosed further relationships, but it was felt that the risk of type I errors was not justified, given the exploratory character of the investigation and the poorly defined nature of the field.

Thus most of the cells in table 26 show relationships significant at the 1 per cent level or less; the only exceptions to this are for sources where there is a major difference between now and preferred, where one side shows significance, the other side does not, but both levels have been included for comparative purposes. (An example of this occurs with source No. 9, seminars, which shows relatively

high correlations in the now columns (3-5), but low ones in the prefer columns (6-8).) Inspection of both significant and non-significant findings enables the reader to gain additional insight into how participants see this source.

The first noteworthy point to be observed in table 26 is the very large number of sources significant at the 1 per cent level or less in the now columns (14 out of 19) and the relatively small number in the prefer columns (7 out of 19). This result reinforces findings discussed above, that information from diverse sources becomes more vital as one advances up the organisation, yet people at all levels wish to use a variety of sources, even if such sources are not available to them.

Sources which stand out as being ones where no correlations exist are coworkers, immediate superior, the grapevine, newsletters and CBIRS. The first three of these are interpersonal sources which participants commonly rank as very important means of getting information. The present result suggests a universality about these sources; access to them seems to exist regardless of one's organisational ranking. The crucial role of coworkers and superior has already been demonstrated: the value of this finding is that it displays their importance for every organisational level.

Previous discussion pointed out that CBIRS is not a heavily used source among participants generally. Interviews with

participants revealed that use of CBIRS tends to fall into one of two categories, either not being used at all (in the majority of instances) or being used quite extensively (in organisations where such systems have been installed). Thus the lack of correlations between status and CBIRS is worth noting, but does not seem to be as important as the observations concerning the other four sources.

Often it is suggested that the grapevine is a very pervasive means of communication. Table 26 supports that contention, giving no evidence that it does not reach every level of the organisation.

Memos were shown earlier to be the most frequently used of the print sources : the evidence in table 26 implies only a very weak correlation between status and memos; when the effects of education are removed, there is a correlation of a very minor nature (partial corr.=0.1395, sig. = 0.007), but otherwise no clear trend is discernable.

In all, 8 of the 10 print sources now show correlations with status at a significance level of 1% or less. It will be observed however that of these same 8 sources in the prefer section, only 2 (letters and library) record a significance level of 1% or less. In the case of one of these, library, the correlation falls to a less than significant level when in the partial correlation the effect of education is removed. (Similarly for library now, the correlation likewise drops once education is controlled for, thus

signifying that the relationship between education and library use needs to be further explored (see discussion following table 27).)

The difference between print sources now and preferred is thus quite considerable. Participants do seem to have a distinctively different attitude towards print sources now, and print sources preferred, and essentially the figures suggest that status is a very important factor in securing participants access to print-based information of a variety of kinds. Also suggested is that preferred access to print sources is not related to status.

By way of contrast, the difference between oral sources now and preferred is much less dramatic. Of the 9 oral sources now, 6 show correlations with status at a significance level of 1% or less, and 5 of those 6 are also highly correlated with status in the prefer columns (with the sole exception of seminars). It could not be said of print sources that what participants want is what they get, but to a much greater extent it can be said of oral sources.

Seminars stands out as the exception among the oral sources. Unlike most of the other oral sources and like most of the print ones, seminars and related training events are not available on demand, as it were, and this lack of assured access may be seen as a factor in the discrepancy discussed here.

Taking an overview of table 26, it will be seen that the very diverse nature of the sources correlating with status at the 1 per cent level or less, act to bring staff with higher rankings into contact with points of view from outside their workgroup or organisation. This finding suggests that as staff ascend their hierarchy, their perspective on matters will change as their sources of information change. Staff lower in the organisation seem to have information sources which are largely internal to their workgroup or organisation; as people achieve higher levels, they obtain access to sources which acquaint them with external perspectives.

In a sense, then, the information systems of the organisations surveyed seem to be best organised for those nearer the top. As we have seen earlier, people on higher levels record a relatively higher frequency of information use across nearly all sources. This result suggests the further point that not only do people higher up use more information, that information comes from more diverse sources, with a much greater likelihood that they will be external in their orientation.

Table 27

Comparison of Correlation Coefficients for
Education and all sources Now and Would
Like, using Pearson, Spearman and Partial
Correlations, controlling for status.

		Education and Sources Now			Education and Sources Would Like		
		Pearson	Spearman	Partial Contr. Status.	Pearson	Spearman	Partial Contr. Status
1.	Subordinates	-	-	-	-	-	-
2.	Co-workers	-	-	-	-	-	-
3.	Other units	-	-	-	-	-	-
4.	Immed. superior	-	-	-	-	-	-
5.	Meetings	-	-	-	-	-	-
6.	Top Management	0.1287 0.012	0.1350 0.009	0.0398 0.244	0.0176 0.379	0.0034 0.447	-0.0377 0.256
7.	Grapevine	0.1411 0.006	0.1496 0.004	0.1298 0.011	0.1402 0.007	0.1509 0.004	0.1332 0.010
8.	Personal contacts	0.2667 0.000	0.2805 0.001	0.2399 0.000	0.2497 0.000	0.2587 0.001	0.2253 0.000
9.	Seminars	-	-	-	-	-	-
11.	Memos	-0.1029 0.034	-0.1154 0.020	-0.1306 0.010	-0.0591 0.148	-0.0698 0.108	-0.0835 0.070
12.	Letters	-	-	-	-	-	-
13.	Newsletters	-	-	-	-	-	-
14.	Records	-	-	-	-	-	-
15.	Books	0.1012 0.040	0.1177 0.021	0.0627 0.140	0.0611 0.147	0.0778 0.091	0.0386 0.255
16.	Journals	0.1435 0.006	0.1530 0.004	0.0991 0.041	0.0944 0.050	0.0914 0.056	0.0753 0.095
17.	Library	0.3137 0.000	0.3134 0.001	0.2875 0.000	0.2915 0.000	0.2847 0.001	0.2661 0.000
18.	Government Documents	0.1483 0.005	0.1307 0.011	0.1042 0.034	0.1537 0.004	0.1349 0.009	0.1386 0.008
19.	CBIRS	-0.2348 0.000	-0.2415 0.001	-0.2286 0.000	-0.0733 0.111	-0.1024 0.044	-0.0876 0.072
20.	News media	0.2023 0.000	0.2101 0.001	0.1802 0.001	0.1619 0.002	0.1545 0.003	0.1444 0.006

Probability levels are shown below correlation coefficients
Most n between 290 and 318. For exact n see tables in appendices

Spearman

Educat Corr. = 0.2120
With N = 317
Status Sig = 0.001

EDUCATION AND SOURCES

Table 27 follows exactly the same plan as table 26, but this time comparing correlations for the variable education and the 19 sources of information as produced by Pearson, Spearman and partial correlation procedures. In the case of partial correlations, status is being controlled for, in view of the correlation between status and education (Spearman corr. = 0.212, $n = 317$, sig. - 0.001).

Also following table 26, results have been restricted to relationships significant at the 1 per cent level or less, only excepting sources where there is a major difference between now and prefer, where one side shows significance, the other side does not, but both levels are included for comparative purposes.

The first point of interest in table 27 is the sizeable proportion (9 out of 19) of correlations between sources now and educational level. However, whereas in table 26 all correlations were positive, in table 27, seven are positive and two are negative. Of the seven positive correlations, three are significant at the 0.1 per cent level (personal contacts, library, and news media), and four at the 1 per cent level (top management, the grapevine, journals and government documents). The two negative correlations are memos and CBIRS (significant at the 0.1 and 1 per cent levels respectively). Both these last results will be assessed below.

Looking next at the sources preferred, there are two instances of positive correlation at the 0.1 per cent level (personal contacts and library) and three at 1 per cent (grapevine, government documents and news media). Overall, then, participants appear more likely to get access to information sources they want, when viewed in terms of their educational level, than is the case with status correlations.

Seen in terms of oral and print, three out of nine oral sources are included in the table, as compared to six out of ten print (although two of the latter are negative correlations). Looking first at the three oral sources (top management, grapevine and personal contacts) it is noteworthy that the correlation for top management becomes insignificant once status is controlled for. This is as might be expected, given the relatively strong correlation in table 26 between status and top management (Pearson $\text{corr.} = 0.4462$).

In table 26 the correlation between status and personal contacts reduced quite noticeably when in the partial correlation education was controlled for. In table 27 there is also a reduced correlation once status is controlled for, but the correlation still remains relatively strong.

A further comparison of tables 26 and 27 produces the observation that there are only three sources which show no correlation with either status or education (coworkers,

immediate superior and newsletters). In a sense these can be said to be the most accessible of all sources, if access to them is dependent on neither status nor education.

One of the major features of table 27 is the presence of a group of print sources (journals, library, government documents, CBIRS and news media), three of which are significant at the 0.1 per cent level. Unlike memos, all of these are formal sources of information, and they are primarily external in their orientation. Both memos and the three significant oral sources are all internal; the external nature of the print sources suggests that one effect of education is to direct participants' attention to print information from outside the enterprise. It may be noted that the internal print sources of newsletters and organisational records do not feature in table 27, implying that access to them is not related to educational level.

The correlation for library (Pearson corr.=0.3137) is the strongest in table 27. It is followed by personal contacts (Pearson corr.= 0.2667) then by the negative correlation for CBIRS (Pearson = -0.2348).

External sources feature prominently in table 27: after library, the next strongest correlation is for personal contacts outside the organisation. The correlations for this source preferred are nearly as large as for this source now, and in neither instance does controlling for status greatly reduce the correlation.

Looking next at some of the other sources in table 27, the grapevine is significant at around the 1% level. It will be recalled that this is one of the five sources not related to status in table 26, and controlling for status in the partial correlation changes the significance level very little.

One of the two negative correlations in table 27 is for education and memos within the organisation. The relationship is significant at the 1 per cent level only in a partial correlation, controlling for status. It will be recalled from table 26 that use of memos is positively correlated with status (at the 5% level), but that this correlation strengthens (to the 1% level) once education is controlled for.

Next reviewing the two print sources of journals and library, it is noted that library has a considerably higher correlation with education than journals does (Spearman corr.= 0.3137, 0.1435 respectively), suggesting that staff who are not well educated are more at ease with print materials of this nature not held in a library. Conversely, presumably the more formal education staff have had, the more interested they will be in accessing information via libraries.

Although journals are featured in table 27, books are not (Spearman corr. for books = 0.1177, sig.= 0.021, for

journals 0.1530, sig.= 0.004); as these figures suggest there is some minor evidence of a stronger relationship between education and journals than between education and books.

A comparison of tables 26 and 27 discloses that in both instances there are notable differences for books and journals now and preferred; the relationship between education and these sources now is considerably stronger than with their preferred use. It seems from this that although access to these tends to be associated with either or both of education and status, preferred access to them is not. In other words there is some indication that irrespective of education or status, some people are saying that their present use of books and journals located outside an organised library is less than they would like.

A similar result holds true for government documents: use of this source now is correlated with both education and status (rather more so with status); in the case of status with preferred (as with books and journals), the correlation reduces in magnitude, suggesting that wish to use government documents is not as dependent on status as is present use of them. A different result appears for education and government documents, however: the correlations for now and preferred are very similar, implying that when viewed in terms of their educational qualifications, the only people who want to use government documents are those who already use them.

It may be surmised that more educated people are more aware of what government documents can and cannot do in terms of satisfying information needs; people with less education are perhaps less aware of what may realistically be expected of this source and thus respond in terms of a generalised "want more" reaction.

The last source on table 27 is news media; its relationship with education is significant to the 0.1% level in its now dimension, and to the 1% level for preferred. In both dimensions there is a slight decrease in significance once status is controlled for. News media shows a positive correlation with status, but it is less strong than with education.

Intuitively it might be expected that people with higher education will be more interested in news media sources than are other people and this finding has previously been identified in the literature. Yet this finding also ties in well with those that suggest that well educated people are at home with both print sources of information and external sources. When a source embodies both print and external elements, it should not be surprising then to find that well educated staff are inclined to use it. If well educated staff are accustomed to obtaining a variety of points of view for decisions at work, then media sources may well act as useful, additional means of enhancing one's understanding.

AN ANALYSIS OF DISCREPANCY RESULTS

Having finished the exploration of the relationships among the variables of sources, status and education, the final stage in the analysis would be an examination of discrepancies between information received now and information preferred.

Although the early part of this analysis, i.e. in tables 11, 16, 19, 22 and 25 and the ensuing discussion focussed on discrepancies, it was felt that the study of discrepancies offered more good prospects for progress. Moreover, it was felt that the simple methodology of discrepancy analysis employed so far could be further improved upon to furnish an enhanced understanding of trends in the data. In the next section theoretical and methodological issues relevant to the analysis of discrepancies are discussed.

Uncertainty and the Discrepancy Approach

The literature review touched on problems associated with the concept of information gaps. In brief, there may be said to be two schools of thought, one of which proposes that information gaps are widespread in society (and organisations) and that essentially a gap (or some form of "uncertainty") occurs when the information people have is less than the information they need or want. The other school of thought is that this constitutes too simplistic a viewpoint and that the nature of access to and acquisition of information is so complex that the concept of information

gap is of little or no use.

As in the topic of information sources generally, the subject of information gaps or discrepancies is rendered more complex by the diversity of relevant research, produced by a variety of different disciplines with very different assumptions, approaches, etc.

Some of this is discussed below, but first, the central problem (as it seems to this writer) deserves mention. Essentially the primary difficulty in evaluating problems associated with gaps or discrepancies is that the theoretical considerations surrounding the concept are complex, in contrast to the simplicity of the notion of information gap itself. Intuitively, the concept of information gap seems to fit organisational and social reality so well it is highly desirable to employ it. Yet there are considerable theoretical and methodological difficulties, as will be seen below.

Much research has been conducted into laboratory-based, single person, choice events by which people can reduce uncertainty. Individuals are said to reduce uncertainty by acquiring information, making choices from a known set of alternatives, and weighing up their relative costs and benefits.

From an information theory perspective, Spence (1984) argues that:

"Uncertainty is a probabilistic concept and measures the probability of making a wrong decision (on the basis of imperfect information). It is thus an objective quantity capable in principle at least, of being actually measured for any given decision-making process."

Spence goes on to propose that uncertainty thus defined should not be confused with the more subjective phenomenon of insecurity, which is a kind of unease induced through feeling that one lacks requisite information.

In similar vein, Garner (1962) treats uncertainty as "... the logarithm of the number of possible outcomes an event can have" (p.9). Yet the usefulness of this approach for the present research is strictly limited, for as Rapoport and Horvath (1959) point out, this definition applies only to the syntactic characteristics of language, and cannot otherwise be applied to questions of organisational functioning.

Connolly (1977) draws a distinction between "risk" (where the person seeking information knows, or believes he knows, the probability of each outcome) and "uncertainty" (where these probabilities are not known. Conrath (1967) further suggested that the view of "uncertainty" as an unknown probability distribution across future states of the world is very restricted, and situations of vastly greater uncertainty can readily be visualised. He argues for

example that the possible alternatives may not be known, nor may their possible outcomes. Real-world situations are highly ambiguous, and are not satisfactorily dealt with within a framework of laboratory-based, single person choice events.

A considerable quantity of the literature deals with what may be called a "unitary" treatment of uncertainty (Nash, 1950, Pounds, 1965, Siegel, 1957), yet Connolly (1975) warned that a unitary viewpoint of uncertainty is inadequate, given the presence in organisations of variables such as differing patterns of information search, varying satisfaction with decision outcomes, individual differences in perceiving uncertainty, and so on. Connolly argued that uncertainty is essentially a perceived rather than an objective entity, and consists of the individual's feeling of being unsure of the adequacy, accuracy or relevance of the information he has acquired. Since the focus of the present research is on what participants perceive to be, rather than what "is", in this discussion primary interest will be in perceived rather than "objective" uncertainty. In this way a distinction will be drawn between the information theory conception of an "objective uncertainty," and the organisational research concept of perceived uncertainty.

Another major area of research examines the relationships between the organisation and its environment, especially in terms of the uncertainty inherent in that environment (e.g.

Burns and Stalker, 1961, Crozier, 1964, Duncan, 1972, Woodward, 1958).

In assessing this literature, Connolly (1977) reported that:

"...there is considerable variation (among writers) in how uncertainty is to be conceptualised and measured. There is, for example, no clear agreement on whether uncertainty should be treated at the level of perceptions by organisational participants or as an "objective" property of the environment; if the former, whether or not individual perceptions can be satisfactorily aggregated into a single measure for a group of individuals; and whether uncertainty is uni- or multi-dimensional, either in the sense of multiple aspects of the decision function ... or as relating to different sectors of the environment" (p.226).

Connolly went on to argue that present research into uncertainty is at a "somewhat primitive level", and suggested that further refinements were needed.

An example of the methodology adopted by prominent researchers in the area may be found in Goldhaber and Rogers (1979) who in the discussion of their communication audit describe uncertainty in this way:

"Uncertainty is operationally defined as the difference between the amount of information received (i.e. by a group of respondents) versus the amount of information

needed on a particular topic or ... from a given source. The greater the difference between information received ... and information needed ... the greater the probability of uncertainty" (p. 57).

Thus these authors have opted for a treatment of uncertainty at the level of perceptions by respondents; these perceptions are then aggregated into a single measure, and uncertainty is separately assessed in respect of different topics and sources.

Similar methodologies have also been employed by Wiio in Europe in his O C D audit (Wiio, 1977), by Baxter and Peters in Australia (1979) and the IABC in the USA, Canada and UK (International Association of Business Communicators, 1983).

Goldhaber and Rogers further say that:

"Since a person may receive either much more or much less information than they need, uncertainty may be a function of either information overload or information underload" (p. 57).

It seems to the present reviewer that this definition is unhelpful, inasmuch as it equates uncertainty with an excess of information needed. As the discussion above has illustrated, the term uncertainty is badly in need of more rigorous definition, and extending it to include oversupply of information would seem to blur the meaning of the concept

rather than make it more precise.

Overall, however, the Goldhaber and Rogers methodology has much merit, yet some important issues remain undealt with. Two will be considered here, and the first has to do with what may be called a "normal discrepancy". In the course of the present research it was found that characteristically participants would either slightly overstate their need or wish for information and/or understate their present receipt of information. Typically it was found that a "normal discrepancy" of around 0.4 emerged when staff were asked about the perceived adequacy of the sources they used, as already mentioned in the discussion following Table 11.

In other words there seemed to be a general feeling that "we should be getting more than we are" in respect of most sources. Thus it was considered that a discrepancy of 0.4 suggests, other things being equal, that participants were reasonably satisfied with the frequency of contact with their sources. It follows from this that discrepancies of less than 0.4 may indicate that staff were receiving (on aggregate) more information than they wanted from a given source.

The second issue is perhaps of more concern, and it has to do with discrepancy amounts. Questionnaires employed in research of this nature usually invite participants to fill in two scales for each item (e.g. see Appendix A). The first shows receipt of information now, the second shows

information preferred. If information preferred is greater than information now, what may be called a positive discrepancy occurs: if information preferred is less than information now, there is a negative discrepancy.

So far the method is quite defensible. The methodological problem arises when the research attempts to compare discrepancies across different sources. For example source A may receive an average rating of 1 in its now dimension, and 3 in its prefer dimension, creating a discrepancy of 2. Source B may be rated at 3 now and 5 prefer, thus also scoring a discrepancy of 2. In this way two sources are shown as having the "same" discrepancy of 2, even though the patterns of use associated with them are completely different. Hence it becomes potentially very misleading to use discrepancies to compare sources.

No other literature sighted so far has addressed this issue, so it seemed desirable to develop a means of analysing the discrepancy data to avoid the problem. The analytical method developed has already been discussed in Chapter 4, Analysis of the Data, so the results from it will now be considered. (See Appendix B for graphs.)

Fig U shows the percentage of responses for each comparison across all sources. By this relatively simple display a useful insight is permitted into the nature of participants' responses to information sources. Previous literature does not appear to have made investigations along these lines.

The most obvious feature of the figure are the peaks and troughs which the data create. Peaks occur at fairly symmetrical points in the figure; i.e. around 2:2, 2:3, 3:3, 3:4, 4:4. Thus there appears a propensity for respondents to report that they are getting approximately the frequency of information they require.

The second feature of note is the progression evident from less to greater satisfaction. If respondents have achieved only a low frequency of source contact, it seems likely that they will want more than they get (2:2 = 6.9%, but 2:3 = 9.7%). As access to information sources improves, the urge to get more information seems to diminish (3:3 = 16.9%, and 3:4 = 12%). This tendency becomes even more pronounced when respondents report using information sources often (4:4 = 18.4%, but 4:5 = only 2.8%).

One of the particular strengths of this figure is that it allows the researcher to predict (generalising across sources) that knowledge workers are much less likely to be satisfied with low access to information sources. Further, an equilibrium between information obtained and information sought is unlikely to occur until access to sources reaches at least the level of sometimes or often. Also, if as proposed above, it is valid to suggest that as the information gap between what is received and sought diminishes, then presumably staff uncertainty declines as information supply increases.

On the basis of this figure it may be speculated that knowledge workers will experience the highest extent of uncertainty when their access to sources is around the rarely mark, and the lowest degree of uncertainty when access is often or more.

Fig V again shows the percentage across sources, but this time the percentages for subordinates as an information source are superimposed. Because not all respondents have subordinates (n=170) this subgroup (those who supervise others) may have different characteristics to the whole sample.

The importance of subordinates as an information source is very evident in this figure. Only a low percentage of respondents report less than sometimes, with the great majority recording relatively high frequencies. It is also evident that supervisors reporting sometimes as a frequency are mainly not satisfied with this amount, and would prefer to use their subordinates as an information source often.

Fig W shows the percentages for all sources and for coworkers (n = 314). The first principal feature of the figure is the very large frequency for 4:4, receive often and prefer often. The clear expectation of much communication with coworkers is plain; it is noteworthy that around the sometimes point there is an opposite trend to the percentage data across all sources. Whereas across

sources, more respondents were 3:3 than 3:4, in respect of coworkers the trend is reversed, with 3:4 being higher than 3:3. In other words this suggests that staff generally have high expectations of communication with their coworkers. If communication is only "sometimes", this is likely to be seen as inadequate. This tendency is even more pronounced with communication "rarely"; very few people say they communicate rarely now with coworkers, but of those that do, the great majority would prefer contact more often.

Fig X People From Other Units. Here most respondents say they communicate rarely or only sometimes with people from other units. There is also a perceptible trend whereby those who communicate rarely or sometimes are not entirely satisfied with this frequency and would prefer more. This is especially the case with those communicating rarely.

Fig Y Immediate Superior. By far the highest number here is for 4:4 (34%), in second place 3:4 (17.8%) with 5:5 (17%) close behind. It may be concluded from this that the majority of respondents are achieving the frequency of information they want, but the next largest group (3:4) are not satisfied with contact "sometimes" and would prefer more.

Fig Z Department Meetings. Some dissatisfaction is also apparent here: of those who receive information from this source sometimes, a majority would prefer it often. Likewise with those recording information receipt rarely:

the great majority do not regard this frequency as adequate.

Fig A1 Top Management. The trend in this figure runs counter to the average across sources: instead of an increasing progression by frequency, the numbers here diminish. The majority of respondents receive information from this source rarely or sometimes, and in both cases (most pronounced for rarely) the wish is for more information.

Fig B1 Grapevine. "Sometimes" is the dominant response in this figure. The largest percentage of respondents report 3:3, with relatively much fewer asking for more information from this source than they are presently getting. The earlier discussion of grapevine use in this chapter explores the fact that the grapevine is unique among sources by registering a "negative discrepancy" whereby participants say they presently receive more information than they want. This figure sheds some more light on this finding; it can be seen that an important influence in this result is the abrupt change in responses that occurs between sometimes and often. It appears that when respondents receive information only rarely, they are not likely to want less than this, and will probably be either satisfied or will want more. Participants who receive information sometimes are most likely to be satisfied with this frequency.

The change occurs with information received often. Many people receiving information often will be satisfied with

this frequency, very few will want more, but more than average say they want less than often. Thus it appears that the unusual negative discrepancy result is produced mainly by the preference of these knowledge workers to receive information from the grapevine only sometimes; if the frequency exceeds this, these staff react against this happening.

The insight assists notably in interpreting the very different result for the grapevine, and helps to vindicate the use of the present analytical method.

Fig C1 Contacts Outside The Organisation. This result is notable for the relatively large numbers who report they never or rarely use this source. Also noteworthy is the fact that of the 58 people who never use this source, only 13 want to use it more than never, and of those who use it rarely the greatest number are satisfied with that amount. Both these results are in contrast with other sources assessed so far.

Fig D1 Seminars, Workshops Etc. The pattern here shows the great majority of respondents report access to this source is less than often. There is a trend of increasing use from never to rarely to sometimes. Much of the dissatisfaction is centred around those who never have such access; very few of them are satisfied with this, and would prefer some.

Fig E1 Memos Etc Within The Organisation. Clearly,

extensive use is made of this source by almost all participants, with the largest response being for 4:4. Satisfaction is highest at the often mark, with less satisfaction for sometimes and less still for rarely. Plainly these people are dependent on memos as an information source, and would be concerned if access were less good than it is. It is interesting to note that of the few people who receive information rarely from this source, only a small minority are satisfied with this and of those who receive it sometimes, the majority want more than sometimes.

It is also worth noting that respondents report almost no information overload with this source. It might be expected that considering the large numbers making extensive use of memos, a sizeable minority may feel overloaded, but in fact very few respondents (27 out of 317) would prefer less than they get. Of those 27, 13 currently receive memos very often and would prefer them less frequently, and 12 presently receive memos often.

Fig F1 Letters Etc Outside The Organisation. In this figure most responses are clustered in the rarely and sometimes categories (in contrast to memos, in the sometimes and often categories).

The very different results for letters and memos provide strong justification for separating these two sources, even though they are considered together in the principal

overseas research (e.g. Goldhaber and Rogers, 1979).

Fig G1 Newsletters From Within The Organisation. Clearly staff make much more use of this source than they do of letters; thus the importance of internal sources is reinforced again. Once more it is very evident that those people who receive information often are much more likely to be satisfied with its extent, and once again there is very little evidence of overload (4:3 = 12; 4:4 = 93). The absence of overload again is an interesting feature of this investigation, given that it is frequently thought that knowledge workers are exposed to more paper than they can reasonably deal with. Clearly more research is required into this. Once again also, further down the scale a similar progression appears; the majority of staff who receive information rarely show relatively great dissatisfaction while those on sometimes are reasonably satisfied, though with a noticeable tendency to prefer a greater frequency of information supply.

Fig H1 Organisational Records. The results for organisational records are noteworthy if only because they parallel almost exactly the percentages for all sources. For some reason(s) (unknown), this is an "average source" and possibly this finding may be of use in future investigations. If the source of organisational records can be taken as a surrogate for a group of other sources perhaps this would enable (even preliminary) research to be designed to take advantage of this finding, extrapolating from

records to other sources. This possibility would of course require further investigation.

Figs I1 and J1 Books Etc Not In An Organised Library

Journals Etc Not In An Organised Library

Figures I1 and J1 show a number of similarities (as might be expected). In both cases very frequent use is less than average, and the frequencies are greater towards the low end of the scale.

Fig K1 Organised Library Facilities. Like organisational records, the use of this source is quite similar to the average of all sources, though here usage sometimes is less than average and usage never is greater. It may be noted that in all, 85 respondents say they never use a library, and of these, 59 would like to use one to a lesser or greater extent. Comparable figures for books are 62 (now), 39 (prefer), and journals 68 (now) 40 (prefer).

Fig L1 Government Documents. Frequencies for this source are higher than average in the never and rarely categories, yet it is interesting to note that the extent of use sometimes is not much less than average. Plainly government documents are necessary to a sizeable proportion of the sample.

Fig M1 CBIRS. The patterns of use of this source are quite different to others so far considered. 50 people use this

source very often, and 80% of them prefer their use to be at this level.

In contrast, 101 participants never use CBIRS and the preferences of this group are very mixed. Only about 31% of the group would also prefer not to make any use of CBIRS, whereas 9% would like to use it rarely, 36% sometimes and 25% either often or very often.

Thus an unfulfilled demand for this source appears in this figure, with participants who do not use it mainly expressing a preparedness to do so.

Fig N1 News Media. This source differs from most of the others in two ways. Firstly, usage is greater at the lower frequencies (more people say never, rarely and sometimes). Secondly, there is greater satisfaction with this source; people are less likely to wish for more information than they are currently getting.

The largest percentage of staff report 3:3 usage (receive sometimes and prefer sometimes).

In Summary

In this chapter the data obtained in the research have been assessed from a number of perspectives. The sources of information were redefined from the vantagepoint of the researcher having completed the fieldwork, and it was found necessary to re-think some of the earlier definitions to a

minor extent.

Next, a major descriptive analysis of data from the two pilot study organisations was undertaken, both in order to make some initial, exploratory findings and to test several different analytical methods in the context of this research. Communication network analysis was found to be of some value, particularly in the detailed examination of particular small groups. Of greater usefulness was cluster analysis, which indicated that source use was strongly associated with hierarchical status within the organisation, with some support also for clustering by organisations and job type. Also, interesting differences were perceived between use of sources now and sources preferred.

The next major section of this chapter was devoted to an examination of results recorded by all participants in the study, firstly as one group then broken down by hierarchical level. A number of basic findings were established from this process and some distinct differences were observed between hierarchical levels.

To further explore questions of source use, status and education crosstabulation and breakdown approaches were employed. The chapter concluded with an exploration of discrepancy data.

Chapter 6

CONCLUSIONS

"In the social sciences particularly, there is a strange incapacity to realise that a theoretical model must have a boundary" (Dubin, 1976, p.28).

Perhaps the most difficult task in this chapter is to draw boundary lines to separate what should and should not be discussed in this final, interpretive section of the study. There are numerous points of interest arising which could be examined, as the findings were wide-ranging. To provide a focus for this chapter the research objectives as given in Chapter 3, Research Methodology are first listed here, and then next are summarised into five broad topic areas, each of which will be discussed in turn.

Objectives

1. To investigate the present frequency of contact by participants with information sources, and to determine which sources are most used.
2. To investigate what participants consider to be their preferred frequency of contact with information sources and to determine which sources are most highly preferred.

3. To find out in respect of which sources participants record the highest and lowest discrepancies between information presently received and information preferred.
4. To assess the relative extent to which staff use interpersonal as opposed to print sources of information.
5. To assess the relative extent to which staff use internal as opposed to external sources of information.
6. To explore the relationship between the organisational status of staff and their contact with information sources.
7. To investigate whether there are differences in the use of print sources by relatively well educated and less well educated staff.

In Summary

1. Present and preferred use of sources, and discrepancies.
2. Use of interpersonal and print sources.
3. Use of internal and external sources.
4. Status and sources.
5. Education and print sources.

1. Present and Preferred Use of Sources, and Discrepancies

The first finding from the cluster analysis of the two pilot studies, of preferred source use was that there

seemed to be some evidence that staff were grouping by organisation. The first group to emerge from the clustering process (six in number) were all from Organisation no. 1, suggesting that the nature of their organisation may have been a factor in influencing staff preferences for information sources. However if this was so, no such influence was evident in respect of present source use.

The next finding of note was that the first preference cluster contained people from all three status levels, in marked distinction to the clustering for present source use, where people were clearly grouped by separate status levels. In other words this was the first indication that although present source use might be heavily conditioned by status level, preference for use of sources occurred across status levels.

To this early finding could be added further indications from the cluster analysis, viz. that there was further evidence that in terms of preference for sources, staff were clustering by organisation, and may also have been clustering by the kind of work they performed. There was also some minor evidence that status level had a small effect on source preference (though not nearly to the same extent as its effect on present source use).

Probably the main difference to emerge from comparisons

of clusters for sources now and sources preferred was the factor of "level-spanning", whereby people from a variety of levels seemed to be expressing an interest in similar sources. In short, the principles of clustering observed in the pilot studies were principles of differentiation by organisation, job type, status and level spanning. Clustering for sources now seemed determined almost exclusively by status; clustering for sources preferred was influenced by organisation and then to a lesser extent by status and job type.

When attention turned to the ranking process for the whole population of the study, and the discrepancies produced by comparison of sources now with sources preferred, it was found that the sources with the highest discrepancies were mainly less accessible ones (in particular, top management, seminars, people from other units and department meetings). Other sources among the top seven on the list (CBIRS, journals and library) may or may not be accessible to participants depending on their organisation's practice. In brief, there seemed to be a relationship between low accessibility and high discrepancy, and this is discussed further below.

An interesting feature of supervisors' source use appeared in the rankings of sources now and preferred and discrepancies: distinct differences appeared among

the sources respectively above and below the "mid-way" point on their discrepancy table. Of the lower group (nine sources) seven were in the direction of a discrepancy less than the whole sample's and two stayed the same, while of the top group (ten sources) six were of a discrepancy greater than the total sample's (with three the same and one reduced).

This pattern implies a "focussing effect" which did not appear in respect of the participants in the study as a whole, or of nonsupervisory staff. Supervisors appeared to have a different attitude towards their top sources than to their less important ones, in effect saying that they wanted more information from the former group and less from the latter than the population as a whole. Such a focussing effect does not seem to have been identified elsewhere in the literature, and perhaps should be the subject of further research attention.

Discrepancies for the top management group were noticeably lower than for other levels, with only four discrepancies over 0.4, and none greater than 0.7. Apart from some unusual results for the middle management group, discussed briefly in Chapter 5 and in more detail in section 4, Status and sources below, overall a pattern seemed to emerge whereby as people moved their way up the hierarchy they tended to receive more information and broadly speaking record fewer

discrepancies between information received and sought.

Put another way, it could be said that in effect the formal and informal information systems operating in these organisations function particularly according to the needs of the most senior people, and operate progressively less successfully as far as levels below the top are concerned.

If, then, attention were to be paid to improving access to information for people right through the organisation, probably most efforts would have to be concentrated at the lower levels to reduce the greater discrepancies evident there (though also with further study needed of the particular problems of middle management).

2. Use of Interpersonal and Print Sources

An initial, interesting result appeared in the cluster analysis of the pilot organisations. The first sources to be linked were coworkers and memos, suggesting that participants regarded both these sources as of importance in their everyday source contact practice. This was a noteworthy result inasmuch as previous literature had very clearly identified the crucial nature of contact with coworkers, but very little regard had been paid to the place of memos. This result then stood both as a corrective to previous assumptions about source contact and as a

foreshadowing of possible further findings about memo use in subsequent analyses in the study.

It appeared from the cluster analysis of source use now that participants viewed print sources differently to interpersonal sources; the print sources clustered more readily than did the rest, implying that the former are regarded in a more unitary sense than are interpersonal sources. Overall, however, the sources, whether interpersonal or print, resist easy clustering, leaving the reader with the impression that notwithstanding the observation above about more ready clustering of print sources, sources are not really regarded as being in groups, but are seen as distinct entities. It is also noteworthy that staff in the pilot studies (dendrogram 1) cluster rather more readily than do the sources they cite (dendrogram 2).

When attention turned to the analysis of results from all participants, in the next stage in the analysis, there was further strong confirmation of the important place of memos and internal reports. This source was listed top equal (along with coworkers and immediate superior) and just ahead of subordinates, in-house newsletters and the grapevine.

In these top six sources then, four are interpersonal and two are print. This bears out the emphasis on interpersonal sources placed by previous researchers

such as Abdulaziz (1982) Klauss and Bass (1982) Mintzberg (1978) and Edstrom and Galbraith (1977), and stands as a useful counterweight to the perhaps excessive focus on print sources by writers such as Gessford (1980) or Keen (1976).

The nature of the print sources at the top of the now use list is also of interest: it is noteworthy that neither of the print sources near the top of the list is primarily of an MIS nature, and this tends to reinforce the comments made by Keegan (1974) in the course of his own research:

"Computer based information systems were not detected in the study and even organised and managed manual systems were hardly significant as factors in day to day information gathering" (p.411),

and by Klauss and Bass:

"... data were collected from ... engineering personnel and supervisors in a light technology plant on the media, documents and channels of communication that influenced their decision making. Almost 85% of the influence was attributed to face-to-face interpersonal interaction with co-workers" (p.ix).

When the discrepancies for all staff between sources

received presently and preferred were examined, it was observed that the top ten sources in the list were evenly divided between interpersonal (top management, seminars, people from other units, meetings and immediate superior) and print sources (CBIRS, journals, library, letters from outside and government documents). It is interesting to note therefore that staff seem to be saying that their information needs span both interpersonal and print sources, and that some of the needs in both these areas are to a greater or lesser extent not being met.

It is worth observing that two of the key one to one interpersonal sources (subordinates and coworkers) have the almost "ideal" discrepancy of 0.4 (as do organisational records). It is possible that discrepancies of less than 0.4 (news media, contacts outside, newsletters, memos and the grapevine) may signal that staff are receiving an excess of their information from these sources. This would certainly be the case for the grapevine, with its "negative discrepancy" of - 0.4.

During the interviews the researcher formed the impression that many participants had an ambivalent attitude to the grapevine. On the one hand they recognised that they needed the information carried on it, and were conscious of using the grapevine to stay in touch with significant organisational developments,

etc. On the other hand there was also a discernible embarrassment either that the grapevine existed in their organisation, or that the participants themselves admitted to using it.

Nevertheless people seemed to be saying that they needed information, but since other, official channels were not supplying it, staff turned to the grapevine. Where there is a dearth of information the grapevine may well supply it, but staff would rather get it from elsewhere.

When use of the grapevine was explored by status level in the examination of the rankings, it appeared that the middle management level made considerably more use of the grapevine than did any other level. The middle managers located the grapevine in second equal place, in comparison to fifth for nonsupervisory staff, seventh equal for first-line supervisors and tenth equal for top managers. Reasons why this may have been the case are discussed further below, in the section on status and sources.

A further characteristic of print and interpersonal source use was revealed in the tables of standard deviations in Chapter 5. There it was shown that all the sources with the highest standard deviations were print, while nearly all (all but memos) of the sources with the lowest standard deviations were interpersonal.

From this it could be inferred that participants were reporting a broader variety of practice in their contact with most print sources than with interpersonal sources. It may be considered from this that even though organisations may have widely different practice in respect of their use of print, use of interpersonal sources will be more predictable and unified.

The largest standard deviations were for the sources of CBIRS and organised library, reinforcing the impression gained by the researcher that access to these sources varies widely across job types and organisations surveyed. Use of these sources seems to be heavily dependent on the type of work performed; typically it was found that in respect of both CBIRS and library, some staff would make extensive use of them, and others none at all.

Perhaps the major apparent anomaly in the list of standard deviations was the presence of memos among the interpersonal sources. This was considered an interesting result, and one perhaps indicating the pervasiveness of the source among these staff. In a sense, too, as suggested in Chapter 5, a memo is normally written to just one other person (or perhaps to one person as the leader of a group) and as such it is a means of communication quite unlike other print sources such as newsletters, news media, library facilities etc. Sending a message by memo allows the

sender to personalise it, having regard to the receiver's needs, interests and abilities, similarly to the way in which the sender of interpersonal spoken messages has opportunities to ensure that a recipient understands the information being sent. Further discussion on memos and middle managers appears below in section 4, Status and sources.

When the standard deviations for sources preferred were compared with those for sources used now, a pattern appeared whereby in 14 out of 19 cases the standard deviations reduced from now to should (with three remaining the same and two increasing in magnitude). From this it appears that generally speaking, participants tended to be closer together in terms of how often they would like to use sources than they were, in current use. Most of the changes were small, preventing too much being made of the trend, but the trend (albeit small) exists nonetheless.

The largest change was for CBIRS: it may be gathered from this that while not all participants would wish to use this source, nevertheless their responses were converging into a more unified group.

In examining the discrepancies recorded by nonsupervisory staff, it was found that their discrepancies were more numerous than any other level's, having 13 greater than the population's. Two

of the more sizeable were for memos and organisational records, which may be a matter for concern, given that these were two of the three top print sources from which this group of staff said they presently received information. Thus there is some evidence that nonsupervisory knowledge workers have especially poor access to their top print sources in comparison to other levels.

When the balance of interpersonal and print sources used was compared across status levels during the ranking procedure, it was noted that in the group of 10 or so most used sources, the proportion of interpersonal and print sources stayed much the same across organisational levels:

	<u>Interpersonal</u>		<u>Print</u>	
	<u>Now</u>	<u>Preferred</u>	<u>Now</u>	<u>Preferred</u>
Nonsupervisory	6/10	6/10	4/10	4/10
Supervisors	6/10	6/10	4/10	4/10
Middle managers	7/10	6/11	3/10	5/11
Top managers	8/12	6/11	4/12	4/11

This points to a homogeneity of experience from top to bottom of the organisation which does not seem to have been noted in research elsewhere, and which would probably be worth more specific investigation. Possibly this finding could be seen to reinforce March and Simon's opinion (1958) that much of the communication in organisations is informal in nature, and that much informal communication is social in

nature. Since people across all organisational levels to some extent accommodate their social needs at work, it could be that patterns of interpersonal source contact will show similarities across levels.

This study offers little support to the MIS writers (e.g. Anderson, 1980, Den Hertog, 1978, Dimas, 1980, or Douglas, 1980) who stress the importance of computer based systems. They may well be "important" in an objective sense, but the participants in this study appeared to be saying, overall, that such systems presently played relatively little part in information-getting generally, and nor did they want them to do so.

Unusually consistent results across status levels were evident from the crosstabulation findings for newsletters:

	<u>Often</u> and <u>Very Often</u>
Nonsupervisory	45.2 %
Supervisors	57.7 %
Middle managers	44.2 %
Top managers	56.3 %

Newsletters thus seems to act as a fairly important information source for all levels, unlike most other sources where one or two levels tend to make much more use of them.

The use of correlation coefficients as discussed in Chapter 5 provided a worthwhile corroboration of the

point noted in section 1 above, from the cluster analysis, that there were noteworthy differences between source use now and preferred. The trend was clear: in the now analysis, eight of the ten print sources showed correlations with status at a significance level of 1% or less. However in the prefer analysis only two out of ten print sources showed a significance level of 1% or less. The difference between print sources now and preferred was thus quite considerable. Participants did seem to have a distinctively different attitude to print sources now as against print sources preferred, and in essence the figures suggest that status was a very important factor in securing participants access to print-based information of a variety of kinds. Also suggested was that preferred access to print sources was not related to status.

The usefulness of the examination of correlation coefficients for sources and status was further demonstrated by the division that soon became apparent between print and interpersonal sources.

Whereas print sources showed the differences noted above between their now and preferred dimensions, the difference between oral sources now and preferred was much less dramatic. Of the nine oral sources now, six show correlations with status at a significance level of 1% or less and five of those six are also correlated

with status in the prefer columns (with the sole exception of seminars). It could not be said of print sources that what participants want is what they get, but to a much greater extent it can be said of oral sources.

It may be surmised that even if people lack the organisational power to obtain access to the print sources they want, it is nonetheless within their ability to contact the interpersonal sources they wish to tap. Whereas it is normally legitimate for knowledge workers to go and talk to one another about some work-related matter, or perhaps more commonly, use the phone, they do not usually have the same right to buy a book or obtain a government document if it seems appropriate to them. It should be noted, further, that one of the two print exceptions, library, where the correlation for prefer is much closer to now, is traditionally a source noted for its accessibility, and it may be that those of the organisations surveyed which maintain a library encourage open access to it.

Seminars stands out as the exception among the oral sources. Unlike most of the other oral sources and like most of the print ones, seminars and related training events are not available on demand, as it were, and this lack of assured access may be seen as a factor in the discrepancy discussed here.

In short, then, it has been suggested that one factor which helps to account for the fairly substantial difference between most print and most oral sources, in terms of their now and preferred dimensions, is the characteristic of status. As discussed in the literature review, accessibility has frequently been seen as an important influence on which, if any, source will be selected.

The data cited in the foregoing discussion certainly evoke the issue of accessibility, but also seem to require that the interpretation go beyond accessibility in its simplest form. It is suggested that a more useful explanation of the data in Table 26 would include accessibility, but also more particularly would feature the status held within the organisation on which in large measure accessibility depends.

In other words a two stage model of accessibility is being proposed. Instead of the perhaps overly simple proposal that good access to a source enables its use, a more thorough explanation which takes the data in Table 26 into account would be that before access to a source can be obtained, the participant must have the status or authority to claim that access as of right. In this model authority to status would be seen as the first stage, accessibility as the second, and both together would enable source use.

The crosstabulation process also furnished some points worth noting in respect of the sources of books, journals and organised library. It will be recalled that the first two of these exist in unorganised states, and are usually considered as being located closer to respondents, while libraries are organised according to well-developed principles, but may be further away.

When use of books and journals is assessed in terms of participants' status, fairly similar results appeared, with in both instances a weak division into two groups comprising the higher two status levels and the lower two, the higher two using both sources more than the rest. In the case of both books and journals there is evidence that use increases progressively as people move up the organisation.

Thus in respect of books and journals there seem to be two minor trends apparent, firstly whereby respondents divide into two groups by status level, with the higher status group recording more use of these sources, and secondly whereby there is a progression up the organisation as it were, with each level showing a little more use of these sources than the one below.

Both these trends vanish in the results for organised library: highest use is recorded by supervisors, followed closely by middle managers, followed by

nonsupervisory staff, followed (at a great distance) by top management:

	<u>Often and Very Often</u>	<u>Never and Rarely</u>
Nonsupervisory	21.7 %	64.1 %
Supervisors	30.9 %	47.3 %
Middle managers	28.6 %	39.0 %
Top managers	6.3 %	50.1 %

Top management's results in respect of the library are difficult to interpret. Their figure of 6.3% for often and very often combined seems extraordinarily low, especially considering that their never and rarely figure at 50.1% is very close to the same result for supervisors (47.3%), and supervisors had the highest percentage of often and very often scores. It is not easy to reconcile the fact that top managers show the highest scores for books and journals (in the often and very often categories) but the lowest for libraries.

In Chapter 5 it was surmised that the low numbers of staff in top management (16) might help account for an apparently erratic result, in that the particular characteristics of the few organisations from which top management come may be skewing the results. Another possibility is that top management people may tend to delegate library-based information getting to junior staff, so that in effect they do not use the library, but instead have other people use it for them.

However the rankings of top management's now and preferred scores do not altogether support the latter interpretation:

	<u>Library Use Now</u>	<u>Preferred</u>	<u>Discrepancy</u>
Top Management	2.3	3.0	0.7

The resulting discrepancy ranks at top equal among this group's discrepancies, and if their access to information from this source was well developed, presumably the discrepancy for library would be down around or below the 0.4 mark, along with most of their other discrepancies. So there is some evidence of dissatisfaction by top management with their access to this source. Yet such concern is perhaps at a fairly low level, given that present use at 2.3 is just over rarely and preferred use is only 3.0 sometimes.

In the discussion of discrepancies in Chapter 5, it was noted that there was little apparent evidence of overload occurring among staff, even in respect of print sources such as memos and in-house newsletters. This is an interesting result, especially in view of the conventional belief that overload is a major problem among information workers. The chief evidence of overload occurring in this study (other than negative discrepancies pertaining to the grapevine) came in regard to top managers, who reported a -0.3

discrepancy for letters from outside the organisation. (Of course depending on how the discrepancy figures are interpreted, it could be that a number of the sources for which a discrepancy of less than 0.4 was recorded (14 in all) could also be associated with overload for this top management group.)

However, this apart, the apparent relative absence of overload is an interesting result, especially in view of the conventional belief that overload is a major problem among information workers. To the discussion of it in the literature review could be added further comments such as those made by Farace, Monge and Russell (1977):

"In today's highly complex and information-rich environment, overload has reached epidemic proportions and has consequently become the most frequently discussed and studied aspect of load" (p.101).

No easy explanation for this result is apparent. One could speculate that New Zealand knowledge workers do not experience overload, but this seems extremely unlikely. More probable is an explanation along the lines that since the present investigation did not set out to look for overload, it did not find it. The whole emphasis of this research is on discovering differences between the information people get, and

that which they want. In the course of the investigation, participants seemed to be focussing particularly on the information they lacked (as suggested by the "normal discrepancy" of 0.4, for example). Even though participants may well be overloaded with information from e.g., newsletters, such overload was perhaps not sufficient to shake their conviction that access to sources should be unimpeded.

If this interpretation is correct, it helps to refine the concept of overload as discussed in the organisational literature.

Overload is often presented as a unitary phenomenon along the lines of "more information than people can or want to cope with". Characterisations such as those by French and Caplan (1973) are relatively sophisticated, in their discussion of quantitative and qualitative overload:

"When the issue (of conflicting demands of work) concerns merely the sum total of work that must be done, irrespective of its difficulty, we talk about quantitative overload - the person has more work than can be done in a given period of time. When the work is overloading because it requires skills, abilities and knowledge beyond what the person has, then we talk about qualitative overload" (p.40).

More typical is the definition by Farace, Monge and Russell:

" The most common use of the term "load"... couples load with an evaluative term - "overload" or "underload." "Over" or "under" is an evaluation of the load in a given situation vis a vis some desired level or perhaps the maximum capacity, of the system to process communication. The term overload is used to indicate situations where the flow of messages exceeds the system's processing capacity" (p. 101).

It will be noted that in this definition the authors link together the characteristics of desired level of load and capacity to handle load. An implication of the present research is that when desired level of load is explored in relation to present load, overload virtually does not appear. Although the characteristic of capacity to handle load was not investigated in this research, it can still be argued that should overload appear among New Zealand knowledge workers, it is more likely to result from lack of capacity to handle load, or some other factors, than it is to result from a low desired level of load relative to present load.

Thus the effect of this research is to encourage the

idea that overload is not just a unitary phenomenon, nor is it satisfactorily explained by concepts of quantitative and qualitative differences. Rather, it seems likely that overload is more closely related to what staff feel able to handle, rather than to what they would like to have.

3. Use of Internal And External Sources

Differentiation between internal and external sources was first noticed in the clustering of the pilot organisations, where internal sources were mainly grouped separately from external sources. This differentiation appeared to be a little clearer in respect of sources preferred than sources now. Of the four clusters for sources preferred, two (the more used) were internal, and two (lesser used) were external.

Results from the ranking procedures in Chapter 5 provided good confirmation of the importance of internal, accessible sources. The top six sources presently used were all mainly close to respondents. Coworkers, immediate superior, memos, subordinates, newsletters and the grapevine are all characteristically nearby, reinforcing Allen and Cohen (1968) Allen (1966a) Maltha (1977) and others in their view that accessibility is a major factor in source use.

Nevertheless it is also true that the source people from other units also appears in the top half of the presently use list; presumably people in this category are mainly not as accessible as the sources cited above, yet also should be seen as moderately important to respondents. This finding suggests that while accessibility is undoubtedly very important, it is perhaps not always an overriding consideration. Similarly the source organisational records may not be always near at hand.

The rankings of sources presently used also suggest a result not well identified in previous research in respect of accessibility: closeness to respondents seems more apparent for interpersonal sources than for print ones. All three of the interpersonal sources among the lowest ten sources are not normally near at hand (top management, contacts outside the organisation, seminars, courses and workshops). In contrast, some of the print sources among the least used may well be very accessible (journals, books, letters from outside). In other words two points are suggested: firstly, accessibility alone is no guarantee that a source will be used; presumably the source must also meet other criteria. Secondly, accessibility may be more relevant a factor for interpersonal than print sources. However this second factor is probably less certain than the first, and further research would be required to test it.

The first discrepancy table showed that most of the sources with relatively high discrepancies were less accessible (depending on organisational practice) than the ones showing lower discrepancies. From this it may be said that sources which are less accessible to staff are more likely to show high discrepancies, and sources which are more accessible are more likely to have low discrepancies. (Or the other way around: discrepancies are likely to signal where poor accessibility may be a problem.)

There are of course exceptions: to some people top management (at the top of the list) may indeed be accessible, or seminars (in second place) may also be freely available. Further, a source such as contacts outside the organisation (near the bottom of the list) although showing a low discrepancy, may often be quite an inaccessible source.

Therefore the principle mentioned above of a relationship between low accessibility and high discrepancy needs to be interpreted with awareness that exceptions will often occur.

Differences between the use of internal and external sources became evident in the study of supervisors' rankings: a strong orientation by supervisors towards internal sources became apparent. Both of the major

external sources of letters from outside and personal contacts outside fell in importance for this group, relative to the increased interest shown by supervisors in internal sources.

Why this should be is not very evident from the literature, though there are a few pointers. Cleland and King (1975), for example, suggest that different organisational functions will require different internal or external sources. In particular,

Marketing matters require especially external sources

Production matters require especially internal sources and

Organisational and financial matters require a balance of both.

If it can be assumed that supervisors' jobs are mainly oriented to "production", that is, ensuring the job is done, assisting staff below them and maintaining work flow, then their interest in internal sources looks very plausible. Certainly it seems likely that supervisors' tasks are geared more to production and organisational matters than to marketing and financial issues, and thus their reduced concern for external sources would be appropriate.

Such interest by supervisors in internal sources at the

expense of external ones does not seem to have been dealt with elsewhere in the literature of information sources, and more research into it would be desirable.

The literature on boundary spanning (e.g. Allen and Cohen, 1968, Covitch, Fallon and Rothenberg, 1974, De Greene, 1982, Garfield, 1976, Keegan, 1974) suggests that external sources are important in generating new ideas (e.g. Fischer, 1979) and that managers are likely to be particularly required to employ external sources of information:

"For the overall sample 66% of the important external information required came from sources located outside the respondent's organisation. This overall reliance upon outside sources is one of the surprising findings of this study and runs counter to the widespread view that executives rely principally upon company sources of information for information about the environment" (Keegan, 1974, p.419).

This finding is particularly relevant to managers, however, and there seems no evidence that there is any similar requirement for supervisors to contact external sources.

The comparison of status levels in the ranking procedure suggested that top management had a different

attitude towards external sources than the other three levels. For top managers the two major external sources (letters and personal contacts outside) were in ninth and tenth place, and both showed gains when compared with the other supervisory levels:

	Letters	Contacts Outside
Top managers	9	10 =
Middle managers	13 =	16 =
Supervisors	16	17 =
Nonsupervisory	12	13

(N.B. An equals sign (=) denotes that that source was equally ranked, e.g., 10th equal, 16th equal, etc.)

It will be noted that the nonsupervisory staff ranked these external sources higher than either of the next two supervisory levels above them, lending support to the idea that contact with the organisation's environment takes place primarily at the top and bottom of the organisation.

Further data on this matter are offered by the crosstabulation procedure in Chapter 5, where as was shown there, a large group (nearly 60%) of nonsupervisory staff say they rarely or never receive information from contacts outside the organisation,

while nearly 19% (more than either supervisors or middle managers) say they often or very often receive information from this source. In other words the nonsupervisory staff in this respect appear as being in two groups, the larger of which has very little contact with the organisation's environment, while the smaller group has a lot of such contact.

Despite top management's higher ranking of external sources, it is still noteworthy that they list as above these external sources the internal sources of subordinates, memos, coworkers, top management, immediate superior, meetings, records and newsletters, and as equal with contacts outside, the internal sources of people from other units and the grapevine. In this way, this study has found no evidence to support the contentions by authors such as Johnston and Gibbons (1975) or Shotwell (1971) that external sources tend to be more important than internal ones. Internal sources do seem to be overwhelmingly the ones which come to mind when respondents are asked which they use and would like to use.

4. Status and Sources

Organisational status appeared as a crucial factor from the hierarchical clustering process used in the pilot studies, where the most senior people in the two organisations were first linked (at level 68), then were joined by other relatively high status individuals

at level 57. Almost as soon, at level 66, a linkage appeared between two "bottom group" members.

The network analysis conducted on the pilot studies appeared to confirm the strong links between the bottom group members identified in the cluster analysis, and it was felt that the effect of the network was to shape similar attitudes among the staff most closely linked.

From the first results of the cluster analysis it appeared that the reported practices of the senior people in the two pilot organisations were sufficiently distinctive firstly to group together four of the most senior people (senior partner, partner, manager, supervisor) then secondly to exclude from this group people of lesser seniority. This seemed to provide good confirmation that status is operating as a crucial variable in use of sources.

Once all the 30 staff in the pilot organisations were grouped, the clustering process delivered even stronger confirmation of the relationship between status and source choice. The cluster plot of staff reproduced in Chapter 5 may be subdivided according to two different options (Figures K and L). In both options participants cluster very noticeably by organisational status level in terms of present source use. In one cluster of eleven people, eight were at a senior level, being nearly all of the higher status people in the two

organisations. Another cluster of six contained five people of non-senior status, and no one of secretarial level (ie, an intermediate status cluster). One more grouping was dominated by female secretarial staff; six of the seven were women and five of the seven performed secretarial work.

This clustering seemed to represent remarkably consistent grouping by status, and comprised an extremely strong first indication that status was going to be a key variable in present use of sources.

There was also some evidence from the clustering process in the pilot studies that tenure was important as a factor in source use: on the basis of the cluster plot option 1 in Chapter 5 (Figure K), supervisors of lesser tenure in their organisations appeared less close to the centre of the senior group than supervisors of greater tenure.

When the rankings for all participants were examined in the major part of the study, it was interesting to note that top equal in the present use listing were coworkers and immediate superior. This result should be compared with comments such as those of Collins and Guetzkow (1964), who found that messages tend to be directed towards people in close proximity, in the same workgroup, and of the same socioeconomic status. The present finding ties in well with the first two of

these factors on Collins and Guetzkow's list, but may add something to the third factor; it seems in this case participants were saying that the place of their immediate superior in information supply was important enough to be ranked as equal with coworkers. However it should also be noted that Collins and Guetzkow's interest was in the sending of messages, that of this study in the receiving of messages.

Next to be explored were the separate rankings for nonsupervisory staff, first line supervisors, middle management and top management. To take nonsupervisory staff first, it was found that this group appeared to receive less information than the sample as a whole for 15 out of their 19 sources. Mean scores were the same for immediate superior, coworkers and newsletters, and higher for CBIRS. This finding seems at least in part to corroborate, for example, Dervin's observation (1980) about community-based information services, whereby people of lower incomes have been identified as being "less able and willing to intake information both because of lower ability as well as less opportunity to gain and use information" (p.77).

Dervin in fact touches on two issues here: to what extent do people of lower status presently take in less information than others, and to what extent do they prefer to take in less? Some light has been shed on

the first question, and the second is addressed in Table 15, sources from which nonsupervisory staff would like to receive information. A pattern appears similar to that in the previous table, now received, whereby this group again show means lower than those of the population of the whole study. For 11 out of 19 sources nonsupervisory staff say they would like to receive a little less than the amount preferred by the sample as a whole, and in 8 instances the amount is the same.

However it is also true to say that the nonsupervisory staff want only a little less than the entire sample does, whereas they say they presently receive considerably less than average. This is confirmed by the discrepancy table following in Chapter 5, which shows that in 13 out of 19 instances, nonsupervisory staff discrepancy scores are higher than the whole sample's.

The conclusion reached in Chapter 5 was that "it appears... that people who get less, overall want less." This still seems correct as far as it goes, but is not sufficient as a description of nonsupervisory staff attitudes. It should be noted that although this group do receive noticeably less than average, this is not matched by their wishing to receive an equal amount less. Rather, plainly they are less satisfied than average with their access to information, recording

higher discrepancies than the whole sample of the study.

This result then is different in an important way to Dervin's: although this group is indeed apparently for whatever reasons "less able" to take in information, they are only marginally "less willing" to do so.

A different picture again emerges when the rankings for first-line supervisors are examined. Overall, it seems that this group make more use of more sources, with the major exception to this being the grapevine. As noted previously, there seems to be an inverse relationship between use of officially sanctioned sources and the grapevine: if access to official sources is restricted, use of the grapevine increases; or as appears to be happening with these supervisors, as access to formal sources improves use of the grapevine declines.

From the discussion of supervisors' source use it seemed that in transition from nonsupervisory to first-line supervisor level, staff tend to complete a fairly major shift in information source use. In particular, they learn to obtain more information from more sources, with meetings and organisational records especially becoming more important. Formal organisational sources such as journal and library resources are used more and the grapevine becomes less important, whether through "push" factors of distancing

from other staff, or "pull" factors such as the increased availability of preferred other sources.

These findings tended to support viewpoints such as those of Goldhaber and Rogers (1979) who reported that in their research supervisory staff normally received and wanted to receive more information than nonsupervisors.

The direction of communication contact has been the object of research by people such as Barnlund and Harland, 1963, Allen and Cohen, 1968, and Bacharach and Aiken, 1977. The last, for example, found that "level-specific analysis" (ie examination of communication functions by status level) was of value for examining organisational communication processes (p.377); more specifically, they found that communication contact initiated by administrators was both lateral and downward, whereas subordinates' was mainly lateral. The net effect of this is likely to be that upward feedback will be inhibited and subordinates will be information poor.

The present study may have something to contribute to this from the display of rankings : it is interesting to note that the two lower levels (nonsupervisory staff and supervisors) both cite their immediate superior as their top source of information whereas the two upper levels (middle and top management) both cite

subordinates as their first information source. Middle managers put their immediate superior in fifth place (after subordinates, coworkers, grapevine and memos) and top management also put immediate superior into fifth (equal) place.

Thus there is a kind of symmetry among the four status levels: the two top levels say subordinates are their most frequent information source while the two lower levels say their immediate superiors are their most frequent source. This balance would not have been predicted from the Bacharach and Aiken results, and it may be speculated that the difference in results arises either from the fact that the earlier research and this one obtained different answers because each was asking different questions, or that there is an actual difference in perceived behaviour across the two studies. (The earlier study was of knowledge workers in Belgian local authorities.) One of the problems arising here is of attempting to obtain comparisons across very different pieces of research, with different assumptions and methodologies being prevalent. As discussed earlier in the Literature Review, given that there has been very little well-focussed research into information sources as such, and given that most findings have been produced virtually as a spin-off from work with different orientations, the process of making comparisons among studies runs into many problems.

However it should be noted that the earlier study featured lack of symmetry in communication contact among status levels, whereas this one suggests that symmetry is very evident.

In the section above on interpersonal and print sources it was noted that middle managers made more use of the grapevine than did any other level. As noted also in Chapter 5, middle managers' results seem somewhat at odds with those of supervisors, for example. Whereas supervisors clearly seem to have a well-focussed interest in only certain sources, middle managers appear to display a generalised "want more" attitude across a lot of sources, and in addition they have considerably higher discrepancies. This implies a dissatisfaction with information supply at middle management level which does not seem to apply at either supervisory or top management level. Supervisors have five sources with a discrepancy greater than 0.4, top managers have four, but middle managers have eleven.

Middle managers do seem to stand out in their use of the grapevine, certainly in comparison to top managers, as the table below taken from Chapter 5, Discussion of crosstabulations: Status and sources, illustrates:

Status by the Grapevine

	<u>Often and Very Often</u>	<u>Never and Rarely</u>
Nonsupervisory	41.1 %	17.8 %
Supervisors	44.1 %	17.0 %
Middle Managers	51.2 %	12.8 %
Top Managers	25.1 %	12.5 %

The point was made in Chapter 5 that in comparison with both top management and supervisors, middle managers do not seem to have developed very satisfactory means of obtaining information. Although it might have been assumed that as a person moved up the organisational hierarchy access to information would become easier rather than harder, the comparison between supervisors and middle managers seems to suggest the opposite. This trend also runs counter to some of the literature, such as the findings of Mintzberg (1978) who argued that information tends to be directed much more to the head of any section or unit than it does to a person not in such a role.

Reasons why this study produced odd results from its middle managers may be sought in Fig F in Chapter 3, Organisations Surveyed. At first glance the spread of middle managers across organisations looks quite adequate (with 16 out of 17 organisations contributing at least one person at middle management level to the survey), but when the numbers in cells are tallied (as shown in Fig.P1 following, Organisations Surveyed No.2) it is seen that of the 78 middle managers included, 50 (64%) came from only three organisations, being a

hospital, a European multinational corporation and a high school. A similar weighting is evident for top managers (with 5 individuals, or 31 %, coming from one organisation) but results for this group appear more predictable. The distribution across organisations for nonsupervisory staff is much more even (the three largest organisations together account for only 33 %) and likewise for first-line supervisors, where the three largest organisations jointly account for 42 % of total. In both these instances the distribution across organisations should engender confidence that a few sections do not dominate the results.

FIG.P1 ORGANISATIONS SURVEYED No.2

TYPES OF ORGANISATIONS, NUMBERS AND LEVELS OF PARTICIPANTS AND RESEARCH METHODS USED

Research Methods (1) Questionn. (2) Network Analysis (3) Interview	1 Govt. Dept. Main Centre (1)(2)(3)	2 Profess. firm Main Centre (1)(2)(3)	3 U.S. Multinat. Main Centre (1)(2)	4 Polytech Main Centre (1)(2)(3)	5 Govt. Dept. Provinc. Centre (1)(2)(3)	6 Govt. Dept. Main Centre (1)(2)(3)	7 Broadcast ing Unit Provinc. Centre (1)(2)	8 Volunt. Agency H Q Main Centre (1)(2)(3)	9 Govt. Dept. Provinc. Centre (1)(2)	10 Profess. Firm Main Centre (1)(2)(3)	11 Govt. Dept. Provinc. Centre (1)(2)(3)	12 Hospital Main Centre (1)(2)	13 Európ. Multinat. Main Centre (1)(2)	14 Law Enforce. Group Main Centre (1)(2)	15 Govt. Dept. Main Centre (1)(2)	16 Polytech Main Centre (1)(2)	17 High School Provinc. Centre (1)
Level 1 Top Management N = 16		1	1					1		2		2	5		1		3
Level 2 Middle Management N = 78	2	3	2	1		1	1	1	2	3	1	10	17	3	7	1	23
Level 3 Supervisors N = 60	4		3	3	4	4	6		5	5	4	1	1	5	14	1	
Level 4 Non-Superv. Staff N = 164	8	12	9	12	8	12	9	10	13	9	6		3	16	25	12	
N =	14	16	15	16	12	17	16	12	20	19	11	13	26	24	47	14	26

Returning then to the hospital, multinational and the high school, interview data from the first two of these suggested that the people at middle management levels were experiencing particular frustrations with their communication and information problems. It was reported of managers in the multinational for example, that they:

"...feel they receive only some information regarding the problems being experienced by the organisation and how organisational decisions are made that affect their jobs. Information about major new developments in the organisation also rates...low" (MacKenzie, 1984).

Unfortunately further evidence was not available from the high school, so it was not known whether this group of staff had similar problems. However it seems to be widely considered that New Zealand high schools are in many cases functioning under stress, with problems of inadequate resources and administrative difficulties of various kinds. If this is characteristic of the high school in this study, then these three organisations would probably represent an unusually problem ridden group, likely to produce skewed results.

This then would help to account for the unusual showing of the middle managers vis a vis first line supervisors and top management. It might also help to explain the

large discrepancy for top management recorded by middle managers: as was remarked in Chapter 5, despite the close links that should exist between these two levels, middle managers' discrepancy for top management, at 0.8, is only 0.2 less than supervisors' and 0.4 less than nonsupervisory staff.

The impact of organisational differences may also be apparent in the results of the crosstabulation of status by memos, as previously illustrated in Chapter 5:

Status By Memos

Often and Very Often

Nonsupervisory	49.1 %
Supervisors	70.0 %
Middle managers	50.0 %
Top managers	81.3 %

The much lesser use of this source by middle managers in comparison to supervisors at first comes as a surprise; one would expect middle managers' use to be at least as frequent as supervisors'; if not more so. However when the nature of the three dominant organisations from which middle managers came is recalled, the result may look less unusual: of the multinational, hospital and school perhaps only the first is geared to the very frequent and habitual use of memos. Very likely information flow within a hospital or among teachers in a high school is rather less oriented to memo use, with more reliance perhaps

being placed on interpersonal contact of various sorts.

The barriers to communication formed by organisational status levels are illustrated quite well in the section in Chapter 5 on Discussion of crosstabulations: Status and Sources, item 7, Status by Top Management

	<u>Often</u> and <u>Very Often</u>	<u>Never</u> and <u>Rarely</u>
Nonsupervisory	6.9 %	65.7 %
Supervisors	11.7 %	51.6 %
Middle managers	31.1 %	28.4 %
Top managers	57.2 %	7.1 %

It is noteworthy that fewer than 7% of nonsupervisory staff cite top management as a source of information often or very often, and with very little increase recorded by the supervisors, at less than 12 %. Even middle managers, at just over 31 %, could not be said to be overwhelmed with information from this source.

Another facet of the relationship between status and source use may be noted from the correlation coefficients displayed in Table 26, Comparison of Correlation Coefficients for Status and the Sources Now and Would Like. To the discussion of status and sources in section 2, Use of interpersonal and print sources, above, should be added the observation that the very diverse nature of the sources correlating with status at the 1 % level or less, act to bring staff with higher rankings into contact with points of view from outside their workgroup or organisation. This finding suggests that as staff ascend their hierarchy,

their perspective on matters will change as their sources of information change. Staff lower in the organisation seem to have information sources which are largely internal to their workgroup or organisation; as people achieve higher levels, they obtain access to sources which acquaint them with external perspectives.

5. Education And Print Sources

In Chapter 3 it was proposed that it seems intuitively likely that well educated people will use some print sources more than will less educated people (this in any event seems to be the trend in the literature), but if so, the nature of those sources and the extent to which this is the case are not known. It was also proposed that there might be a simple relationship along the lines that as educational level increases, use of print sources generally also increases.

Chapter 5 demonstrated that this postulated simple relationship does not exist, but that a rather more complex set of relationships seems to apply. From the breakdown of print sources by the variable Education certain trends started to emerge.

A simple "more education = more use of print sources" trend did not appear or was only very weakly supported in respect of the sources of memos, letters, in-house newsletters, organisational records and CBIRS (ie. five out of ten sources). More specifically, memos seem to

be used quite extensively by every educational level and letters used fairly little by every level. Newsletters receives the highest mean score from the least educated group, and also shows a consistently high extent of use across levels. All levels show very consistent results for organisational records, while CBIRS furnishes results directly opposite to the postulated simple trend of more education, more use: the two lowest levels (up to SC and UE +) use CBIRS most, followed by the middle level (some TU) then followed by the two highest levels (complete TU and PG) with notably the lowest extent of use.

Both news media and government documents showed minor evidence in favour of the trend: in both instances it did appear that at the top educational level these sources are somewhat more used.

The trend was supported to a greater extent in respect of the traditional print sources of books, journals and organised library. Books and journals delivered similar results with a fairly low extent of use across all levels, but with notably more use by the two top levels. It was noteworthy, too, that for each source only the two top educational levels registered discrepancies of less than 0.4, indicating that they alone were satisfied with their access to these sources.

The results for organised library divide the educational levels into three categories: the two lowest levels have the lowest extent of use (and the highest discrepancies), the next two educational levels show rather more use (also with noteworthy discrepancies) and the highest level shows considerably the highest use (with the lowest discrepancy).

Organised library, then, is really the only source to follow so clearly the proposed relationship of more education equalling more print source use. The result also suggested that it is only when staff experience some level of postgraduate study that they become highly oriented to the services an organised library can provide.

However, more extensive insights into the nature of the relationship between education and sources became available with the results for the correlation coefficients, as already discussed in Chapter 5. (See Table 27, Comparison of Correlation Coefficients For Education and All Sources Now And Would Like, Using Pearson, Spearman And Partial Correlations, Controlling For Status.)

Although the primary interest of this section of the study was in education and print sources, it was decided to extend the investigation to education and interpersonal sources as well, in line with the avowed

exploratory intent of the research.

The first point of interest in the correlation of education and sources now, was that two negative correlations appeared, in respect of CBIRS (as could have been predicted from the discussion immediately above) and also memos.

Seen in terms of oral and print, 3 out of 9 oral sources are included in the table, as compared to 6 out of 10 print (although two of the latter are negative correlations). Looking first at the three oral sources (top management, grapevine and personal contacts), it is noteworthy that the correlation for top management becomes insignificant once status is controlled for. This is as might be expected, given the relatively strong correlation in Table 26 between status and top management (Pearson corr.=0.4462).

In Table 26 the correlation between status and personal contacts reduced quite noticeably when in the partial correlation education was controlled for. In Table 27 there is also a reduced correlation once status is controlled for, but the correlation still remains relatively strong.

There is a similar effect for the grapevine; a minor reduction in correlation is evident once status is controlled for, but significance still exists at just

less than the 1 per cent level.

A further comparison of Tables 26 and 27 produces the observation that there are only three sources which show no correlation with either status or education (coworkers, immediate superior and newsletters). In a sense these can be said to be the most accessible of all sources, if access to them is dependent on neither status nor education.

One of the major features of Table 27 is the presence of a group of print sources (journals, library, government documents, CBIRS and news media), three of which are significant at the 0.1 per cent level. Unlike memos, all of these are formal sources of information, and they are primarily external in their orientation. Both memos and the three significant oral sources are all internal; the external nature of the print sources suggests that one effect of education is to direct participants' attention to print information from outside the enterprise. It may be noted that the internal print sources of newsletters and organisational records do not feature in Table 27, implying that access to them is not related to educational level.

The correlation for library is strong (in relative terms) (Pearson corr.=0.3137), the strongest in fact in Table 27. It is followed by personal contacts (Pearson

corr.= 0.2667) then by the negative correlation for CBIRS (Pearson = -0.2348).

External sources feature prominently in Table 27: after library, the next strongest correlation is for personal contacts outside the organisation. The correlations for this source preferred are nearly as large as for this source now, and in neither instance does controlling for status greatly reduce the correlation.

This finding is another unexpected one: the previous research on external contacts has focussed mainly on the relationship between organisational ranking and contacts outside. In the literature review reference is made to the contact maintained by senior staff in organisations with people outside, but such accounts have examined primarily the organisational level of staff rather than their educational attainments.

Table 26 shows that there is a relationship between status and contacts outside (though it diminishes in partial correlations when education is controlled for), but the correlation with status is noticeably less strong than with education. As implied in the previous discussion of external print sources, it is considered likely that higher educational levels are associated with a more sophisticated attitude to points of view other than those currently available within the

organisation.

This interpretation could well be supported by a different reading of the elements in the Literature Review pertaining to education. Although there are apparently contradictory findings about education and source use (see Chapter 3, Objective 7, and the brief summary of the Literature Review which follows), it is felt they may to some extent be reconciled by the possibility that a unifying characteristic of more educated respondents is that they show an interest in sources which, regardless of whether they are print or interpersonal, possess the potential of expanding the observer's understanding.

Within this framework may be included the apparently discordant findings in the Literature Review that more educated manufacturers use more print sources (which are also external ones) (Stuart, 1979), that more educated knowledge workers use fewer print sources (ie office files) but do use coworkers more, presumably to draw upon their collective experience (O'Reilly, 1982), and that more educated buyers use more sources generally (Westbrook and Fornell, 1979).

If this interpretation is correct, it would follow that to some extent dangers of groupthink are mitigated by group members' education; the better educated people are, the less likely they are to be satisfied with the

viewpoints available only within their work group and the more interested they are likely to be in obtaining information from outside.

Presumably this has implications for organisations with major needs to maintain strong links with groups in their environment: possibly, other things being equal, better educated staff should be selected for such external roles.

Looking next at some of the other sources in Table 27, the grapevine is significant at around the 1% level. It will be recalled that this is one of the five sources not related to status in Table 26, and controlling for status in the partial correlation changes the significance level very little.

While a considerable amount has been written about the functioning of the grapevine in organisations, in no literature sighted by the researcher so far has a connection been drawn between educational level and the grapevine. On the face of it, this finding is difficult to reconcile with the observation that as participants obtain more education, they tend to use formal, print sources of information such as libraries, journals and books.

The present finding in effect provides a new suggestion for further research on the grapevine and its users.

It may be construed from the finding that more highly educated participants in these organisations seek out other points of view likely to be useful to them. Such points of view may be found in places as various as the media, formal print sources, or the grapevine. Possibly it is a characteristic of the well educated participants that they attempt to test out their ideas on other people, or that they are concerned to maintain close touch with what is going on within their organisation, hence cultivate the grapevine.

It should also be noted that participants' wish to use the grapevine parallels their reported present use of it. Table 27 shows that the the grapevine appears again in the prefer category, also at the 1 per cent level. This suggests an awareness by well educated participants of the value of the grapevine and of the extent to which they use it. It also implies that less well educated participants, as well as not using the grapevine as much, also have a relatively low interest in using it.

Earlier discussion about the grapevine included the proposition that participants were likely to use the grapevine more if their access to other, preferred sources of information was restricted to any extent. In other words this follows the line of thinking that people want information at work, and usually make sure they obtain it, preferably by official channels, but

failing that, by unofficial ones. This perspective displays the grapevine as a "second best" means of communication, and it is further reinforced by the discrepancy figures for the grapevine as discussed above: typically the mean score for use now is greater than for use preferred, adding weight to the notion that the grapevine is used only on sufferance.

In the light of the finding in Table 27 it may be seen that while this point of view may well be valid as far as it goes, essentially it is limited, inasmuch as it does not take into account the apparently deliberate intent to use the grapevine by well educated people.

Computer-based information retrieval systems (CBIRS) are shown as having a negative correlation with education. Again, this was an unexpected finding, unsupported by previous research. Investigations of the relationship between CBIRS and other demographic variables found no other correlations, positive or negative.

It may be speculated that people with higher educations have worked themselves into an organisational level which does not call for them to have direct contact with CBIRS, hence the negative correlation. It should also be noted that the negative correlation with CBIRS (Table 27) is much weaker in the prefer category. That is, education seems to be a factor in usage or nonusage

of CBIRS now, but it is not to the same extent a factor in preferred usage. It may be assumed that well educated people are nearly as prepared as anyone else to employ CBIRS, but their present jobs give them little opportunity to do so.

This finding may be at least partially explicable in terms of what computer-based systems presently available in organisations are capable of doing. If it is correct that most applications of computer-based systems have been to eliminate routine, repetitive tasks, then possibly mainly less well-educated staff have been kept on, and retrained, to use these systems. The finding seems to imply quite strongly that the nature of well educated knowledge workers' tasks not only carry no obligation to use CBIRS, as noted above, but also are presently too complex to permit computerisation. It may be said that if such tasks can be computerised, then the present evidence suggests that these knowledge workers will accept the new technology.

The other negative correlation in Table 27 is for education and memos within the organisation. The relationship is significant at the 1 per cent level only in a partial correlation, controlling for status. It will be recalled from Table 26 that use of memos is positively correlated with status (at the 5% level) once education is controlled for.

The positive correlation between status and memos, combined with the negative relationship between education and memos, is difficult to explain. It has already been suggested that better educated participants are more attuned to external sources than are less well educated people, (external sources that are both print and interpersonal) and they are also more frequent recipients of information from the internal grapevine than are their colleagues.

If a profile were to be drawn of the well-educated knowledge worker's information-accessing habits, it might look something like this. The well educated knowledge worker is familiar with the use of formal information sources such as libraries and government documents. S/he has an interest in maintaining links with personal contacts, situated outside the organisation, and watches the news media for work related information that may be of value. Within the organisation, this knowledge worker as yet will have little direct contact with computer-based information retrieval systems, but is reasonably prepared to countenance their use. The grapevine (unofficial word of mouth communication within the organisation) is an important source of information for this person, but s/he tends to avoid the use of memos, preferring to contact colleagues face to face.

Such might be an imaginary profile of a well educated knowledge worker, and within such a framework the negative relationship with memos could make sense. However, there is no other evidence to support the proposition that such staff prefer internal information transfer of a face to face nature rather than written, so at this stage it must remain speculation.

Meanwhile the negative correlation with memos remains poorly accounted for, and further research into this correlation is required.

Next reviewing the two print sources of journals and library with education it is noted that library has a somewhat higher correlation than journals does (Spearman corr. = 0.3137, 0.1435 respectively), (though neither is strong) suggesting possibly that staff who are not well educated are more at ease with print materials of this nature not held in a library. Conversely, presumably the more formal education staff have had, the more interested they will be in accessing information via libraries.

One implication arising from this for organisations is that as their environment becomes more complex, and as the educational levels of their staff rise, it will increasingly be found that staff information needs demand access to libraries, either of an external nature (perhaps along the lines of the SATIS or ACTIS

services) or more probably, of an internal sort.

Limitations of The Study And Suggestions For Future Research

Seven research objectives (reducing to five main topic areas) were specified for this study (as listed in Chapter 3 and at the beginning of Chapter 6). While they provided a sufficient focus for the research, they did not enable exploration of specific questions in as much depth as formal hypotheses might have done. In a sense it could be said that the study sacrifices depth in favour of breadth, attempting to develop a fairly wide-ranging scope of interest rather than pursuing particular questions in great detail. It has already been argued that such is an appropriate, and indeed a necessary course of action for a research topic such as the present one, in which the basics are not well known or agreed upon.

Later research could well be developed using an hypothesis testing approach to examine more focussed issues in more detail than has been possible here. However such research could not attempt to cover the scope of the present study, but might instead be aimed at casting light on the interrelationships of relatively few variables, such as perhaps supervisors' use of print sources in comparison to middle managers' or sex or age differences in source use.

It is unlikely that subsequent research into use of information sources would attempt to span either as many separate organisations as are featured here, or more

particularly, as many different organisational types. The very considerable spread of organisations, with the numerous inter-organisational differences that would have been present, is seen as the most probable reason for the low correlations evident, for example, in Tables 26 and 27. Nevertheless given the perceived need for some base-line findings about New Zealand knowledge workers' perceived use of and preference for information sources, a wide-ranging study is seen as a desirable first step in the discovery process. Probably it is desirable that future research should employ larger samples from fewer organisations (rather than smaller from more organisations, as here) in order to reduce the incidence of individual organisational differences.

Now that a fairly wide-ranging study has been completed, it may be appropriate for some research to be mounted either in one organisation containing mainly knowledge workers, or in two such organisations for the purpose of comparisons. Although single-site research is sometimes considered inferior (e.g. see Chapter 3) there is also a place for it in the establishment of foundation studies in a field. A useful study could readily be envisaged which would explore aspects of the use of print sources by knowledge workers in only two or perhaps three organisations. Further research might also be designed on an industry by industry basis, perhaps assessing several different organisations, but all of which were within a particular industrial or professional grouping.

In the cluster analysis of the pilot studies it was indicated that one variable of possible significance in source use was tenure. This possible relationship was not explored further in the present study, partly out of a desire to keep the discussion reasonably unified, but more especially because the variable status appeared as by far the most important, and further because the variable education was considered likely to be strongly correlated with status, education and sources, it was thought necessary to restrict consideration of other variables so as to keep the study within a manageable size.

There are also a number of other variables which may well influence knowledge workers' choice of sources; they include cognitive differences among participants and personality differences. The writer has earlier speculated (Sligo, 1982a) that there may be personality differences along an extroversion - introversion continuum which are associated with preference for interpersonal sources as against print sources. The present study did not attempt to explore this, as such was considered premature meantime, but now some basic findings have been made about New Zealand knowledge workers' source preferences, further investigations along these lines could follow.

To keep the discussion reasonably focussed, it was decided not to explore too closely the ways in which knowledge workers see information itself. Although in the Literature

Review brief mention was made of perceived quality and accessibility of information, and although the questionnaire obtained responses from participants about perceived quality and accessibility (see Appendix), it was felt that a thorough examination of these factors would make the study excessively large and result in loss of unity of treatment.

However both information quality and information accessibility are seen as potentially important elements in source use, and in an exhaustive theory of knowledge workers' source use, both would have to be taken into account.

The role of knowledge workers' perceptions might also, in future studies, be supported by other, more objectively-based methods. Although the use of attitudinal measures was considered adequate for the present study, depending on the objectives of subsequent work, possibly other research measures could be devised. In the exploration of use of print sources, for example, actual instances of use of libraries, government documents, or books and journals not in a library could be observed and assessed. In organisations which make CBIRS available to staff, the characteristics of users and nonusers may be assessed, as could users' perceptions of quality of information from this source, perhaps in comparison to the perceived quality of traditional print or interpersonal sources.

From the discussion of the pilot studies it seemed evident

that the use of both cluster analysis and network analysis offers good prospects for further developments in the field. Generally speaking, it was found that both methods are best suited to the intensive study of small groups of participants rather than to the investigation of trends across larger numbers, and for this reason their use in this research was limited. If small-scale, in-depth assessments of particular organisations or industries were planned in future, either or both methods should be considered for incorporation in the research design.

Other major issues which have been suggested as potentially useful topics for further research include the following:

1. That when staff make the transition from nonsupervisory to first-line supervisor level, their source use appears to change quite noticeably; they obtain more information from more sources, use more formal sources of information, appear to use the grapevine less, and become quite focussed in that there seems to be a heightened interest in the sources they use most, and a reduced interest in the sources they use least. It would be desirable to see more specific comparisons drawn between supervisors and other levels.
2. The middle management group in this study appeared to produce some skewed results; subsequent research should attempt to overcome the problems of excessive influence by a few organisations which affected the present

research.

3. Generally speaking, both formal and informal information systems within organisations seem to serve most effectively the needs of the most senior ranks, and operate progressively less successfully for levels below. Staff of lower status may well be less able to access information, but do not seem much less willing to do so. Further investigations are needed into why this is the case, whether it is true for all industry groups, and whether it is as true for print as it is for interpersonal sources.
4. Given the very limited attention paid to internal memos in earlier literature, yet given further the importance of this source demonstrated in the present study, future research would do well to take an interest in the extent and conditions of use of this source.
5. The phenomenon of overload would benefit from a more focussed investigation than has been possible in this work. In the present study some ambiguity surrounds the incidence of overload, but it seems likely that among the participants in this study, overload is more likely to result from lack of capacity to handle load than it is to result from a low desired level of load relative to present load. Based on overseas experience overload might have been expected to be present at middle management level, yet these middle managers

exhibited a generalised "want more" reaction in respect of most sources.

This consideration makes it even more desirable that fresh investigations should be made into the middle management level of knowledge workers.

6. In this study it appeared that accessibility may be more pertinent an issue for interpersonal than print sources, but also it was considered that accessibility alone was no guarantee that a source would be used; presumably it would have to meet other criteria. It would be very useful to have a study which looked particularly at the question of accessibility of print in comparison to interpersonal sources.
7. Some useful findings emerged in regard to education and source use: the correlation of education and external sources is particularly interesting, and suggests a new direction for research into source use. For example, given that so much of the research points to a strong interest in internal sources, why do well educated participants seem to take an interest in external sources? If there is a relationship between education and external source use, do well educated staff at all organisational levels show a similar level of interest in external sources?

Education and the grapevine appeared at first to be an

unlikely combination, but it did appear that well educated staff both used and wanted to use the grapevine more than did their less well educated colleagues. Again, this relationship, if validated, should be assessed in terms of organisational levels, and also possibly in respect of other variables such as sex, age and tenure.

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APPENDIX A

The Questionnaire, Network Analysis and Interview Guide

QUESTIONNAIRE SURVEY

Thank you for taking the time to answer the following questions.

Please answer all questions. Each answer may help to improve the working of your organisation. If you find any questions unclear or ambiguous, please ask the researcher about them.

Confidentiality

The individual responses from people will be kept confidential.

No one will be identified in the research report, and individual responses will not be made available to anyone in your organisation.

Purpose

The purpose of this survey is to assess the ability of your organisation to give people the information they need to do their work effectively.

INFORMATION WHICH I RECEIVE

Example

Planning carried out in
the organisation.

This is the amount
of information I
receive now

Very little
Little
Some
Much
Very much
1 2 3 (4) 5

This is the amount
of information I think
I should receive

Very little
Little
Some
Much
Very much
1 2 3 (4) 5

In this case your answer could be that you do receive much information now about the planning carried out in the organisation, and that you think you need to receive much.

	This is the amount of information I receive now					This is the amount of information I think I should receive				
	Very little	Little	Some	Much	Very much	Very little	Little	Some	Much	Very much
1. My work duties	1	2	3	4	5	1	2	3	4	5
2. How well I am doing in my work	1	2	3	4	5	1	2	3	4	5
3. The problems being experienced by my organisation	1	2	3	4	5	1	2	3	4	5
4. How organisational decisions are made that affect my job	1	2	3	4	5	1	2	3	4	5
5. Opportunities for promotion and advancement in the organisation	1	2	3	4	5	1	2	3	4	5
6. Major new developments in the organisation	1	2	3	4	5	1	2	3	4	5
7. How my job relates to the total operation of the organisation	1	2	3	4	5	1	2	3	4	5
8. How my work performance is assessed	1	2	3	4	5	1	2	3	4	5
9. How well my organisation is achieving its goals and objectives	1	2	3	4	5	1	2	3	4	5

INFORMATION WHICH I SEND

	This is the amount of information I send now					This is the amount of information I think I should send				
	1	2	3	4	5	1	2	3	4	5
0. Reporting what I am doing in my work	1	2	3	4	5	1	2	3	4	5
1. Reporting problems I meet in my work	1	2	3	4	5	1	2	3	4	5
2. Complaining about my work or working conditions	1	2	3	4	5	1	2	3	4	5
3. Requesting information I need to do my job	1	2	3	4	5	1	2	3	4	5

(1)
VERY LITTLE

(2)
LITTLE

(3)
SOME

(4)
MUCH

(5)
VERY MUCH

SOURCES OF INFORMATION : FREQUENCY OF CONTACT

I RECEIVE WORK-RELATED INFORMATION FROM THESE SOURCES :

	This is the frequency with which I now receive information					This is the frequency with which I would like to receive information				
	Never	Rarely	Sometimes	Often	Very Often	Never	Rarely	Sometimes	Often	Very Often
<u>INFORMATION FROM OTHER PEOPLE, NOT IN WRITTEN OR PRINT FORM</u>										
. Subordinates (if applicable)	1	2	3	4	5	1	2	3	4	5
. Co-workers in my own unit or department	1	2	3	4	5	1	2	3	4	5
. People from other units or depart- ments in my organisation	1	2	3	4	5	1	2	3	4	5
. My immediate superior	1	2	3	4	5	1	2	3	4	5
. Department or unit meetings	1	2	3	4	5	1	2	3	4	5
. Top management	1	2	3	4	5	1	2	3	4	5
. "The grapevine" (informal word of mouth communication inside the organisation)	1	2	3	4	5	1	2	3	4	5
. Talking with personal contacts out- side the organisation	1	2	3	4	5	1	2	3	4	5
. Seminars, courses or workshops	1	2	3	4	5	1	2	3	4	5
. Other(s) (specify).....	1	2	3	4	5	1	2	3	4	5
<u>WRITTEN OR PRINT INFORMATION</u>										
. Memoranda or reports from inside the organisation	1	2	3	4	5	1	2	3	4	5
. Letters or reports from outside the organisation	1	2	3	4	5	1	2	3	4	5
. In-house newsletters or circulars	1	2	3	4	5	1	2	3	4	5
. Organisational records	1	2	3	4	5	1	2	3	4	5
. Books, notes or files <u>not</u> held in an organised library	1	2	3	4	5	1	2	3	4	5
. Magazines, journals or serials <u>not</u> held in an organised library	1	2	3	4	5	1	2	3	4	5
. Organised library facilities	1	2	3	4	5	1	2	3	4	5
. Government documents (e.g. statutes, white papers etc)	1	2	3	4	5	1	2	3	4	5
. Computer-based information retrieval systems	1	2	3	4	5	1	2	3	4	5
. News media (T.V., radio, newspapers)	1	2	3	4	5	1	2	3	4	5
. Other(s) (specify).....	1	2	3	4	5	1	2	3	4	5

(1)
NEVER

(2)
RARELY

(3)
SOMETIMES

(4)
OFTEN

(5)
VERY OFTEN

CHARACTERISTICS OF THE INFORMATION YOU RECEIVE

- 1) On the next page (p.5) you will see that the same sources of information as on page 3 are listed there again.
- 2) For all sources of information which you use, please give your opinion about their

RELEVANCE, ACCURACY, RELIABILITY, TIMELINESS AND ACCESSIBILITY.

- | | |
|---------------|--|
| RELEVANCE | Sometimes, information you receive may be just what you need to solve a work problem. How <u>relevant</u> is the information you receive from the sources below? |
| ACCURACY | How exact, precise or <u>accurate</u> is the information you receive from the sources below? |
| RELIABILITY | To what degree do you trust, or find <u>reliable</u> , the information sources listed? |
| TIMELINESS | To be useful, information has to be available when you need it. Generally speaking, how <u>timely</u> is the information you receive? |
| ACCESSIBILITY | Some information sources are easier to make contact with, are <u>more accessible</u> than others. How accessible are the information sources you use? |

3. Please do not respond for any sources from which you never receive information.

CHARACTERISTICS OF INFORMATION RECEIVED (Cont.)

(1) VERY LOW	(2) LOW	(3) QUITE GOOD	(4) HIGH	(5) VERY HIGH
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<u>Example:</u> (U) Press-clipping service	<u>Relevance</u> (1) 2345	<u>Accuracy</u> 123 (4) 5	<u>Reliability</u> 12 (3) 45	<u>Timeliness</u> 1 (2) 345	<u>Accessibility</u> 1234 (5)
---	------------------------------	------------------------------	---------------------------------	--------------------------------	----------------------------------

In this example, you may feel that the relevance of the source is very low, the accuracy high, the reliability quite good, the timeliness low and the accessibility very high.

	<u>Relevance</u> 1 2 3 4 5	<u>Accuracy</u> 1 2 3 4 5	<u>Reliability</u> 1 2 3 4 5	<u>Timeliness</u> 1 2 3 4 5	<u>Accessibility</u> 1 2 3 4 5
A. Subordinates	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
B. Co-workers in my dept.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
C. Others in my organisation	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
D. Immediate superior	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
E. Dept. or unit meetings	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
F. Top management	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
G. The grapevine	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
H. Contacts outside	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
I. Seminars, etc.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
J. Other(s)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
K. Memos. from inside the organisation	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
L. Letters, from outside the organisation	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
M. In-house newsletters	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
N. Organisational records	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
O. Books not in a library	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
P. Journals not in a library	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Q. Organised library	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
R. Govt. documents	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
S. Computer-based info. system	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
T. News media	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
U. Other(s)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

(1) VERY LOW	(2) LOW	(3) QUITE GOOD	(4) HIGH	(5) VERY HIGH
-----------------	------------	-------------------	-------------	------------------

(1)	(2)	(3)	(4)	(5)
NEVER	RARELY	SOMETIMES	OFTEN	VERY OFTEN

In a normal working week I talk to these people about the work I do :

Eric Ericson	1	2	3	4	5
Aaron Aardvaark	1	2	3	4	5
Chris Christmas	1	2	3	4	5
Dan Davin	1	2	3	4	5
Gillian Golightly	1	2	3	4	5
Belinda Belie	1	2	3	4	5
Felicity Ferret	1	2	3	4	5

(1)	(2)	(3)	(4)	(5)
NEVER	RARELY	SOMETIMES	OFTEN	VERY OFTEN

(1)	(2)	(3)	(4)	7.	(5)
NEVER	RARELY	SOMETIMES	OFTEN		VERY OFTEN

In a normal working week I talk to these people about new ideas related to work :

Belinda Belie	1	2	3	4	5
Dan Davin	1	2	3	4	5
Felicity Ferret	1	2	3	4	5
Aaron Aardvaark	1	2	3	4	5
Chris Christmas	1	2	3	4	5
Eric Ericson	1	2	3	4	5
Gillian Golightly	1	2	3	4	5

(1)	(2)	(3)	(4)	(5)
NEVER	RARELY	SOMETIMES	OFTEN	VERY OFTEN

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(1)	(2)	(3)	(4)	(5)
NEVER	RARELY	SOMETIMES	OFTEN	VERY OFTEN

In a normal working week I talk to these people about social activities :

Gillian Golightly	1	2	3	4	5
Chris Christmas	1	2	3	4	5
Felicity Ferret	1	2	3	4	5
Belinda Belie	1	2	3	4	5
Eric Ericson	1	2	3	4	5
Aaron Aardvaark	1	2	3	4	5
Dan Davin	1	2	3	4	5

(1)	(2)	(3)	(4)	(5)
NEVER	RARELY	SOMETIMES	OFTEN	VERY OFTEN

BACKGROUND INFORMATION

This section is for statistical purposes only. It will be used to study how different groups of people view your organisation.

Item No.

1. Sex Male _____ Female _____
2. Age _____
3. How long have you worked in this organisation?
 - 1] Less than 1 year
 - 2] 1 to 5 years
 - 3] 6 to 10
 - 4] 11 to 15
 - 5] More than 15 years
4. How long have you held your present position?
 - 1] Less than 1 year
 - 2] 1 to 5 years
 - 3] 6 to 10
 - 4] 11 to 15
 - 5] More than 15 years
5. What is your position in this organisation?
 - 1] I don't supervise anybody
 - 2] First-line supervisor
 - 3] Middle management
 - 4] Top management
 - 5] Other: (please specify _____)
6. What is your highest educational level?
 - 1] Up to and including School Certificate
 - 2] U.E. or higher school qualifications
 - 3] Some technical or university study
 - 4] Completed a technical or university qualification
 - 5] Post-graduate work
7. During the past ten years, in how many other organisations have you been employed?
 - 1] No other organisations
 - 2] One other organisation
 - 3] Two other organisations
 - 4] Three other organisations
 - 5] More than three others.

Thank you for your assistance

INTERVIEW GUIDE

1. Do you have any comments or questions about the survey you have just completed? _____

2. Please describe your job. _____

3. What is the most important information you need to do your job well?

4. Where do you get that information from? _____

(If the interviewee gives a very full reply to question 4, skip question 5.)

5. Can you describe the main channels of communication through which you receive information related to your work? (N.B. If the interviewee asks what is the difference between a source and a channel, say none.)

6. What do you particularly like about working here? _____

7. What do you particularly dislike about working here? _____

8. Now to get a little more specific, what do you like best about the information and communication in your organisation? _____

9. What do you like least about the information and communication?

10. What do the other people who work here think about the information and communication in your organisation?

11. If you could make any changes you wanted to, what would you do to improve information and communication in this organisation?

12. Why haven't these changes happened yet? _____

13. Is there anything else you would like to talk with me about?

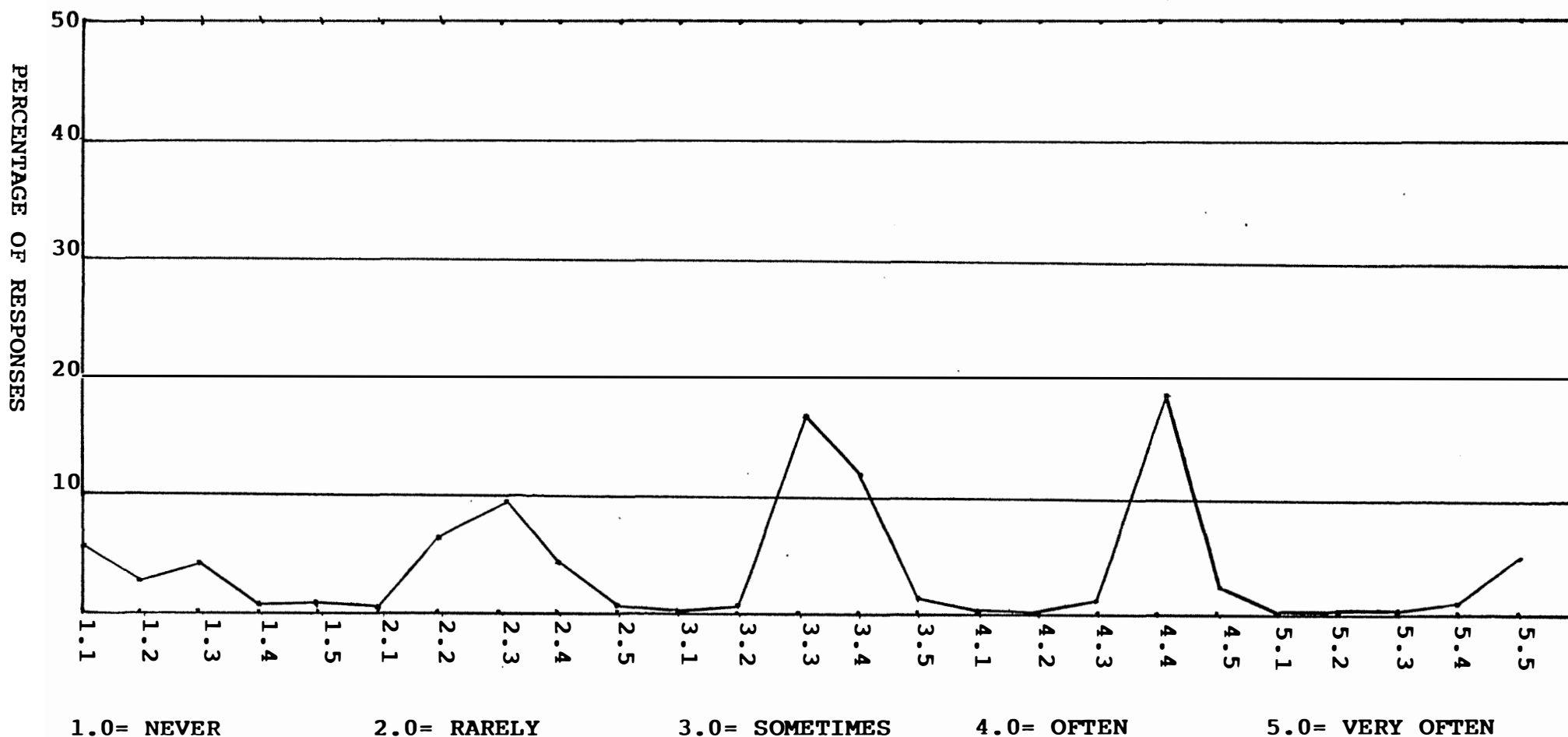
14. Are there other people with whom you think I should talk? _____

APPENDIX B

Graphs of Discrepancy Scores For Sources

Fig. U DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

Average of all Sources ———

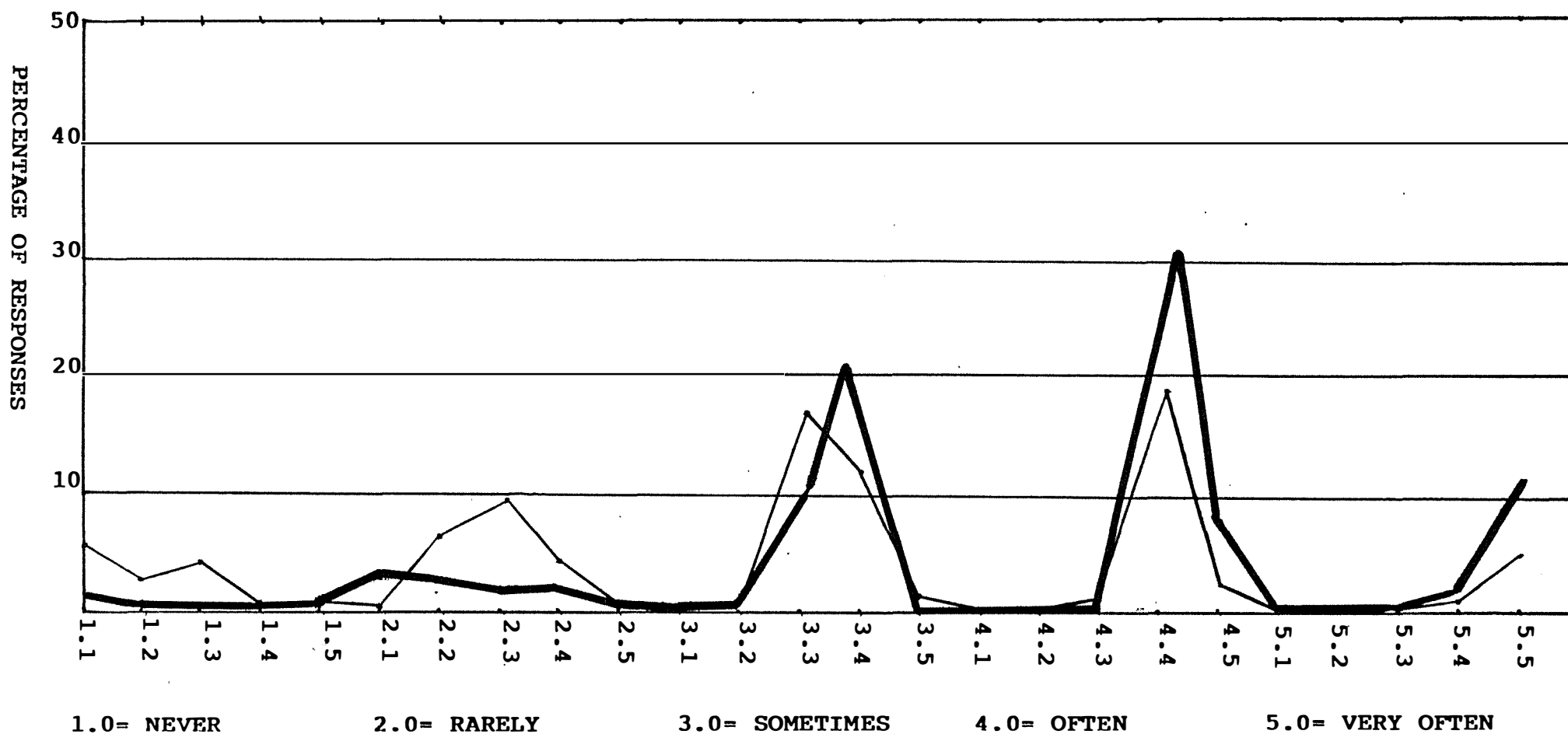


COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig.V DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

Subordinates N = 170

Average of all Sources

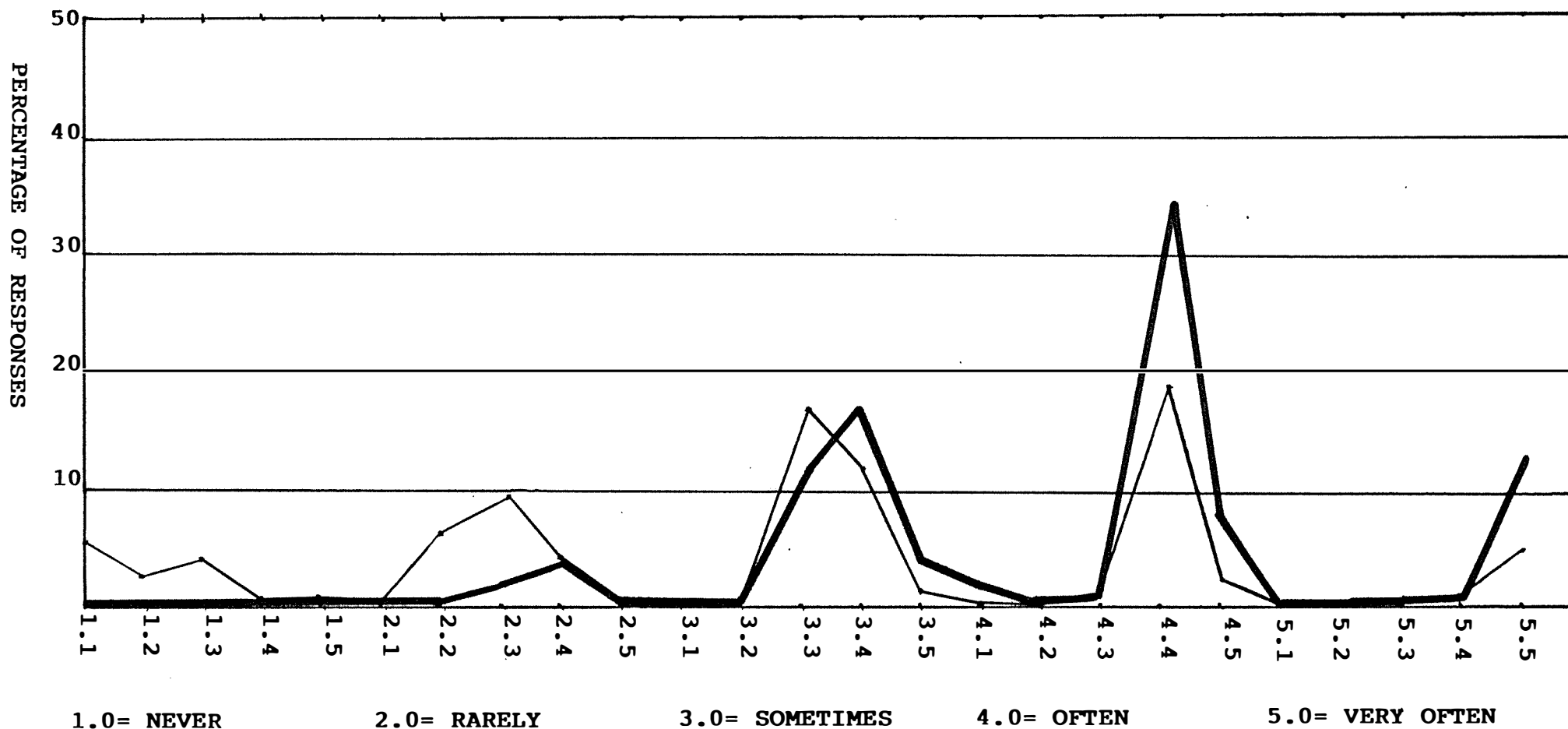


COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig.W DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

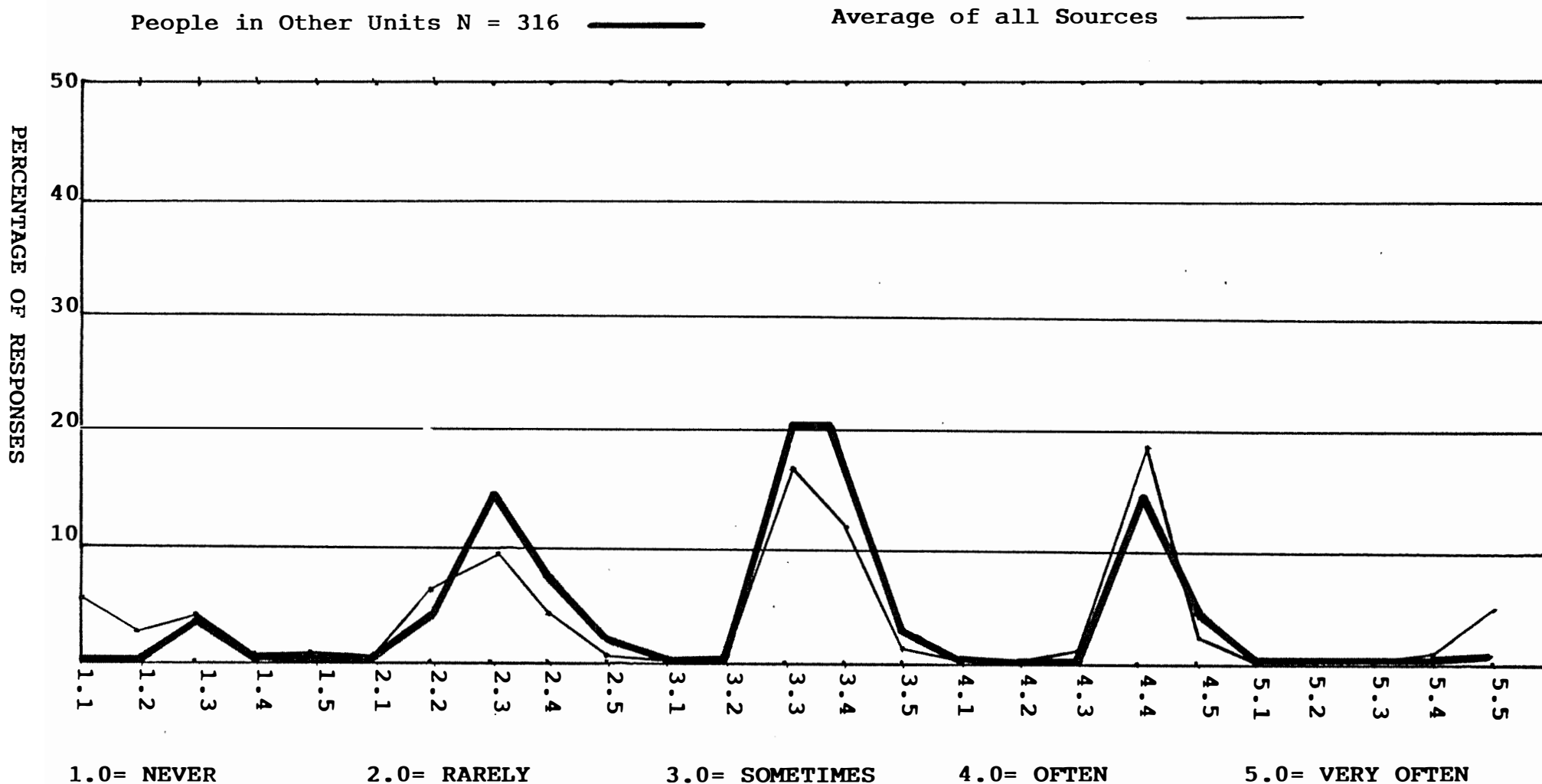
Coworkers N = 314

Average of all Sources



COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig.X DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

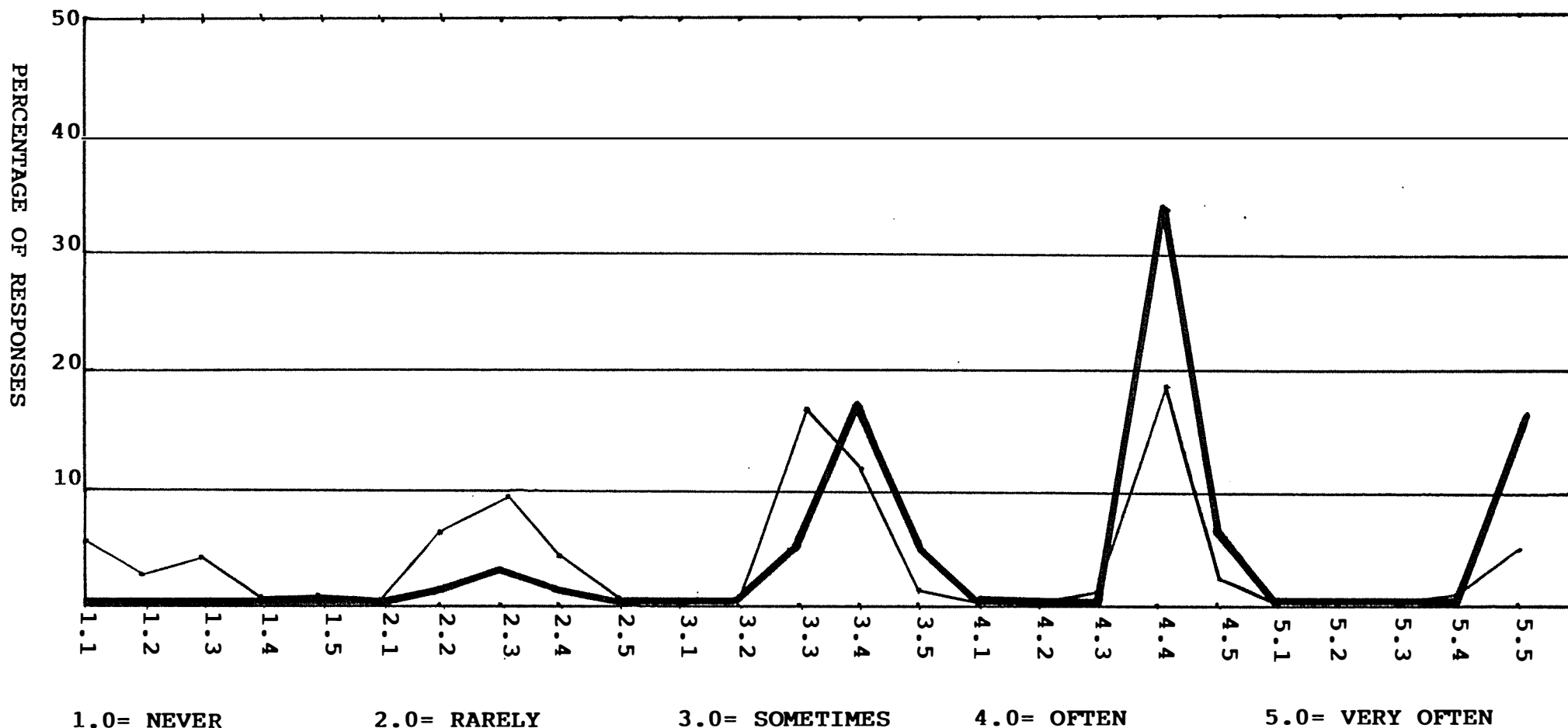


COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig.Y DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

Immediate Superior N = 297

Average of all Sources

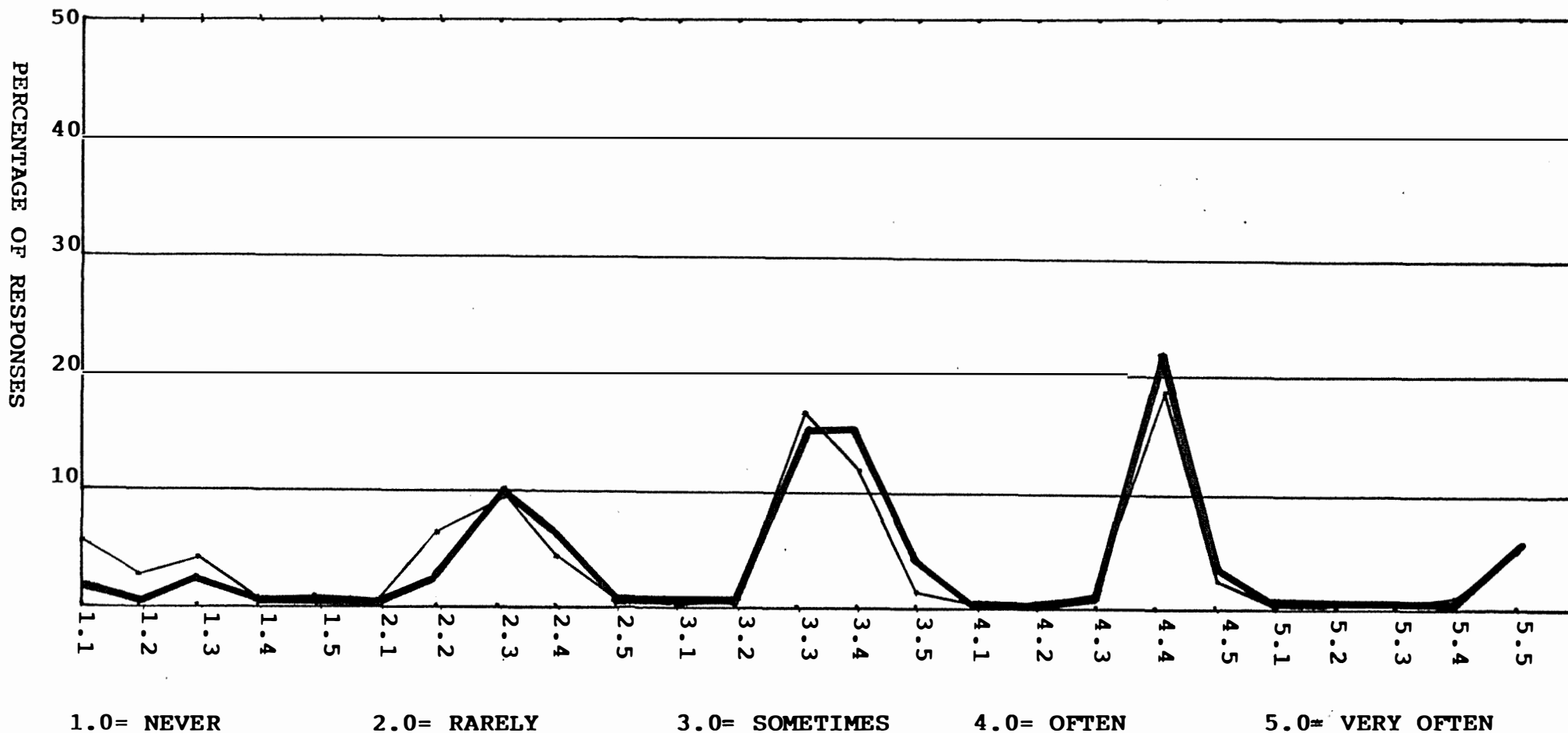


COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig. 2 DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

Department Meetings N = 310

Average of all Sources

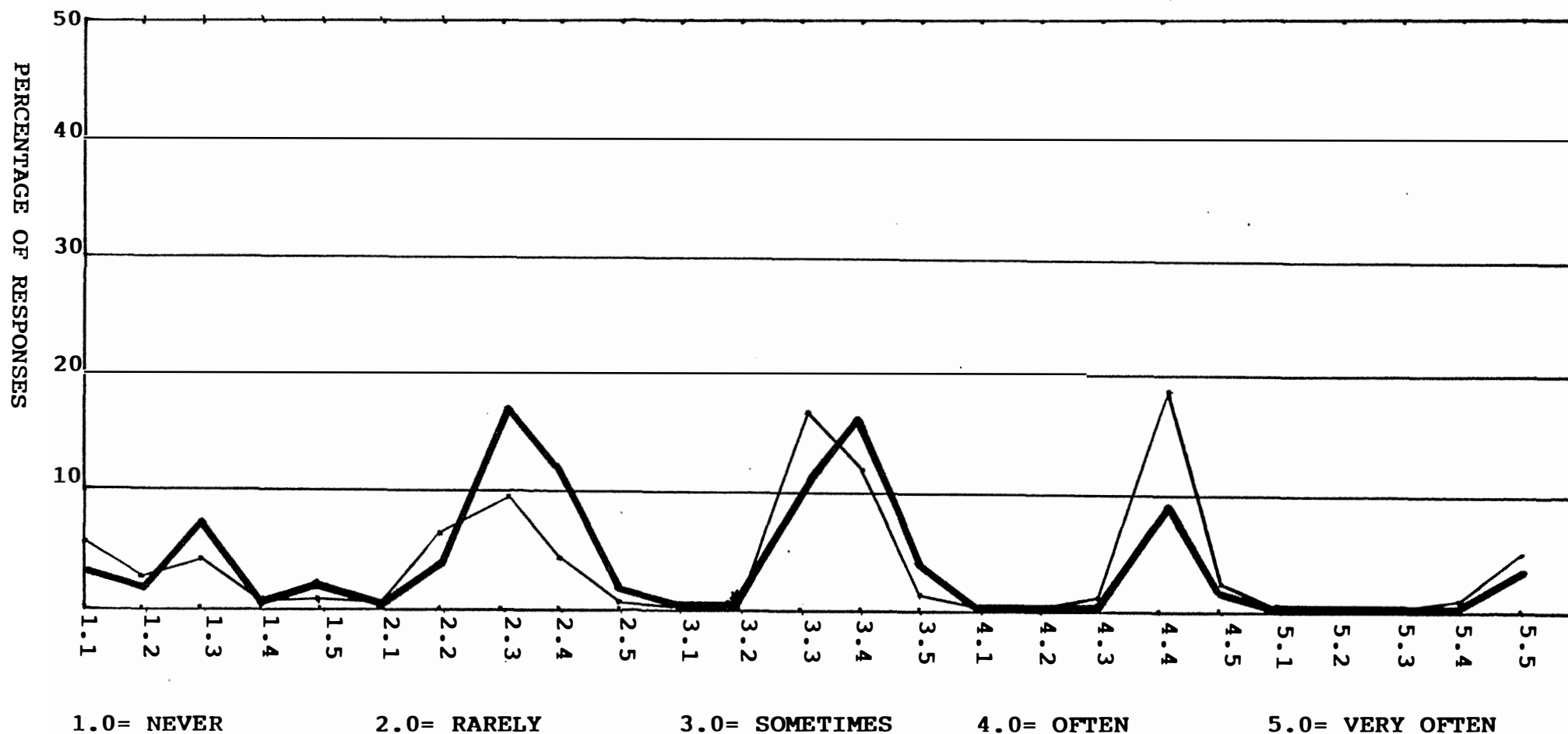


COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig.A1 DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

Top Management N = 308

Average of all Sources

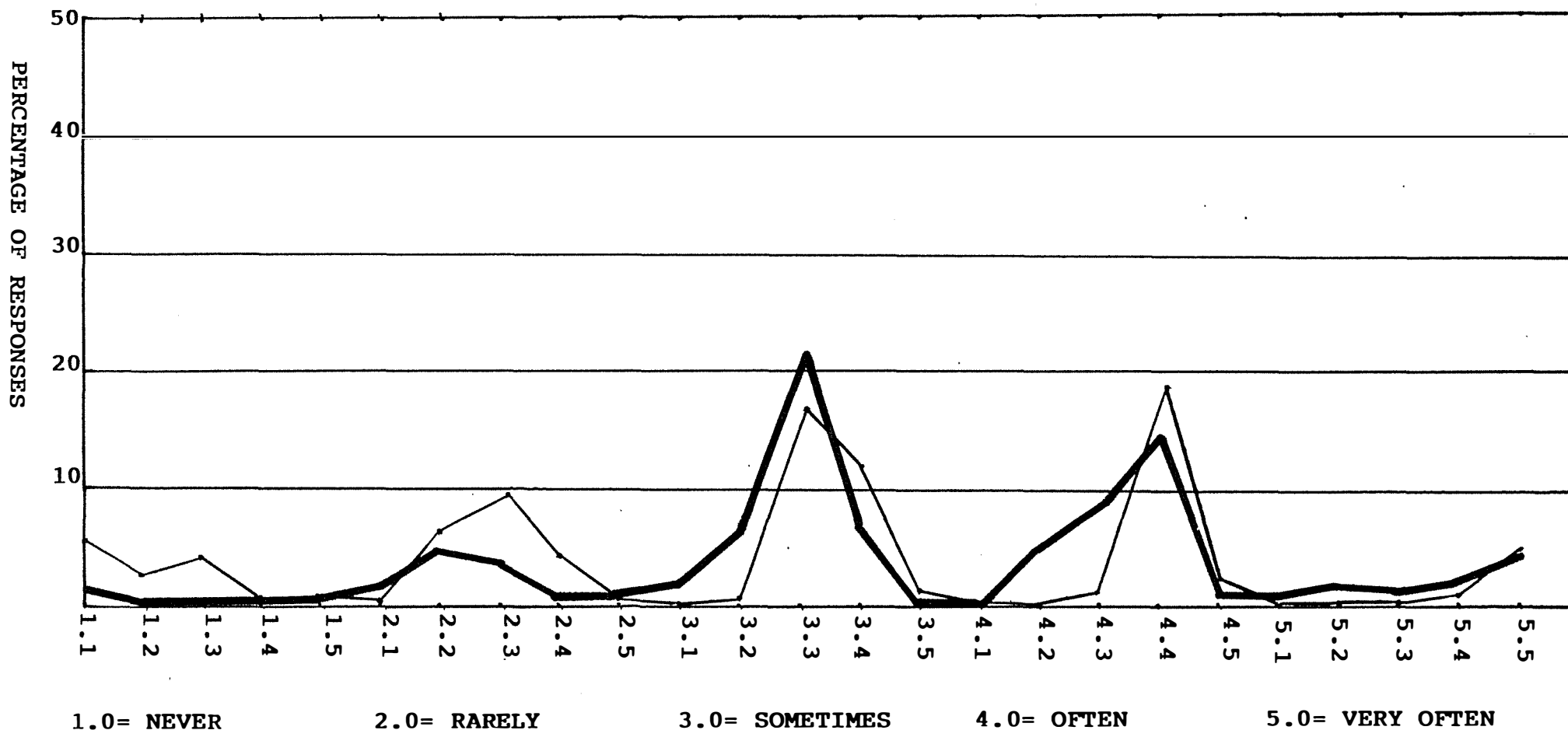


COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig.B1DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

The Grapevine N = 316

Average of all Sources



COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig.C1DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

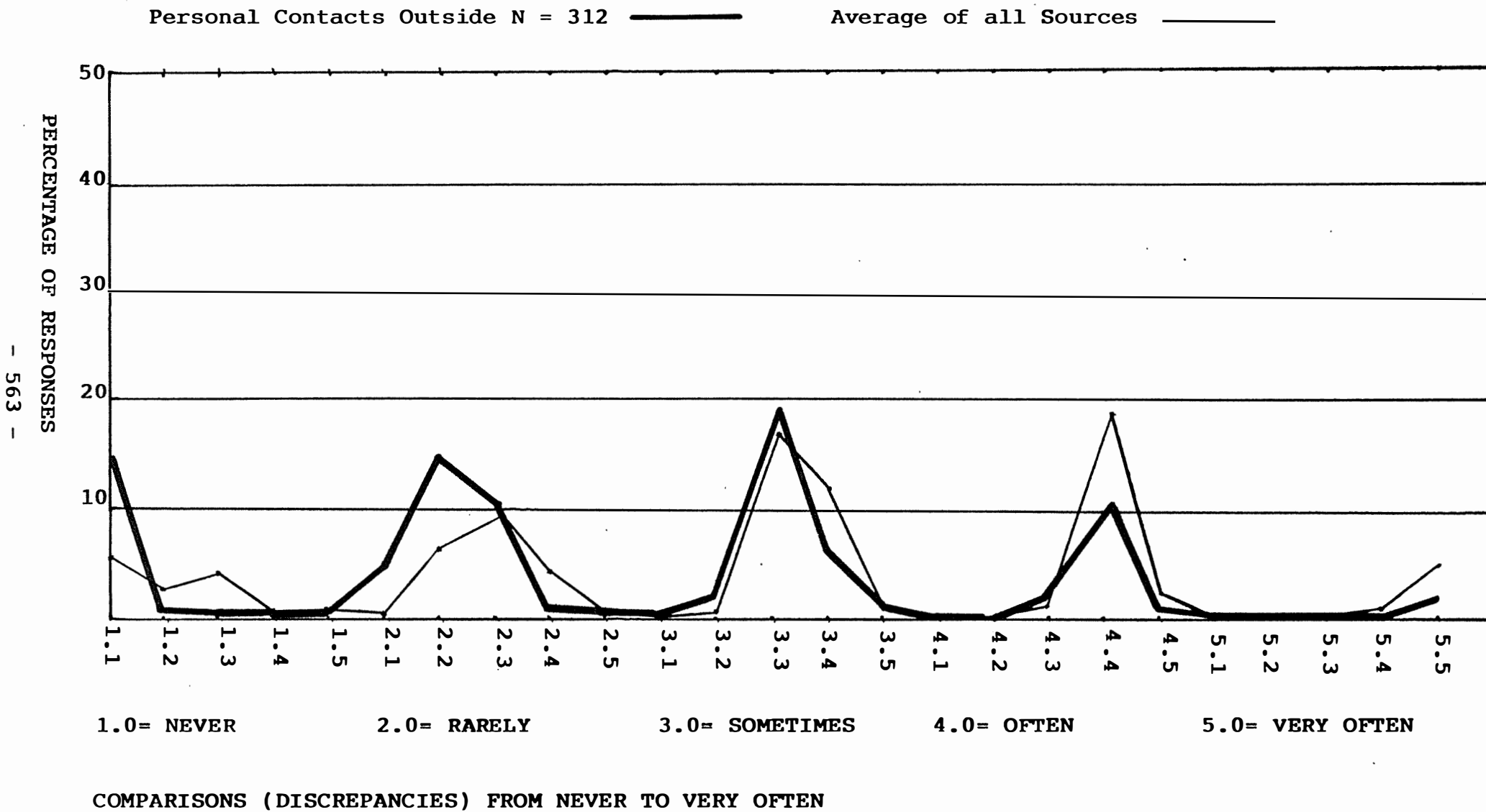
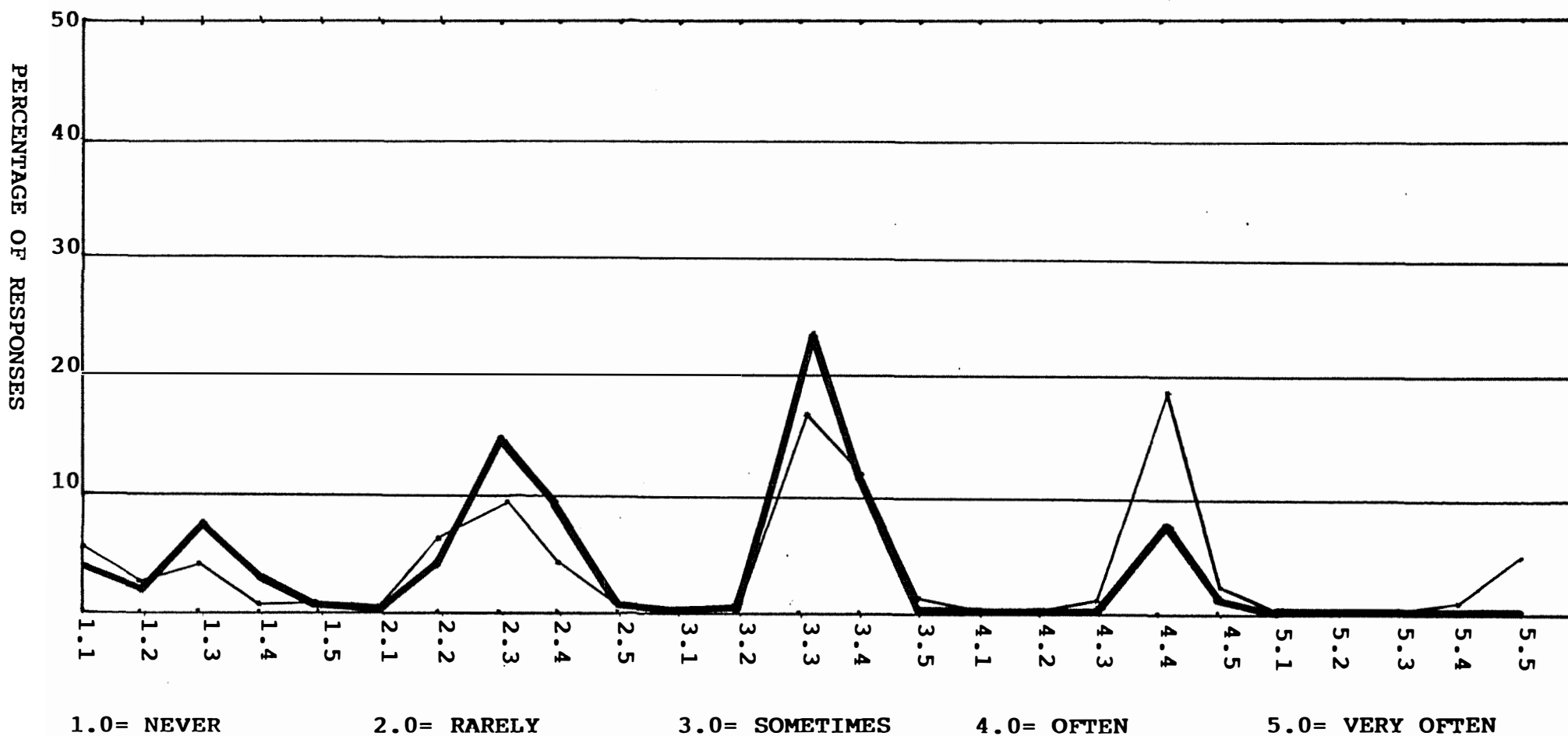


Fig.D1DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

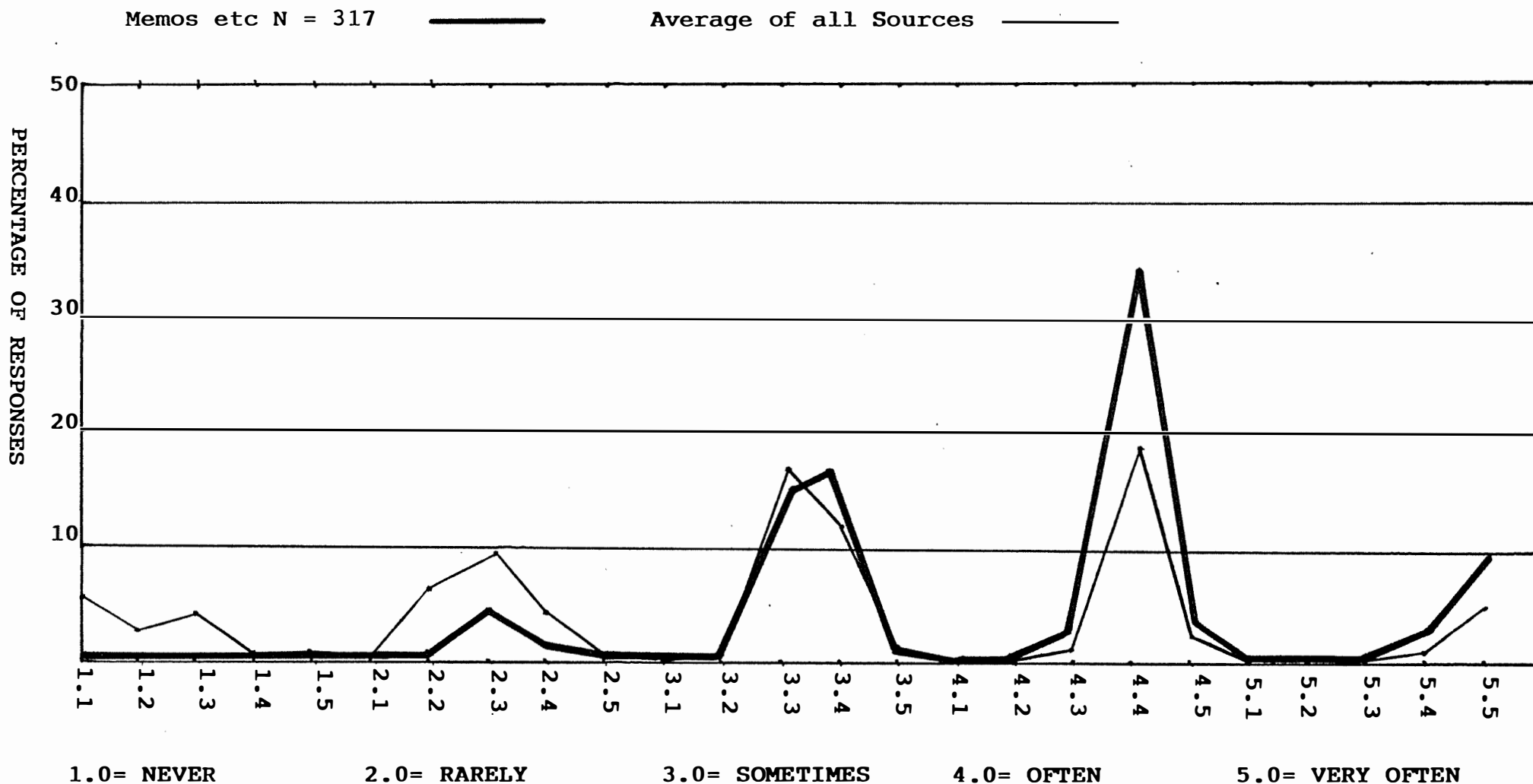
Seminars, Workshops Etc N = 309 —————

Average of all Sources —————



COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig.E1 DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

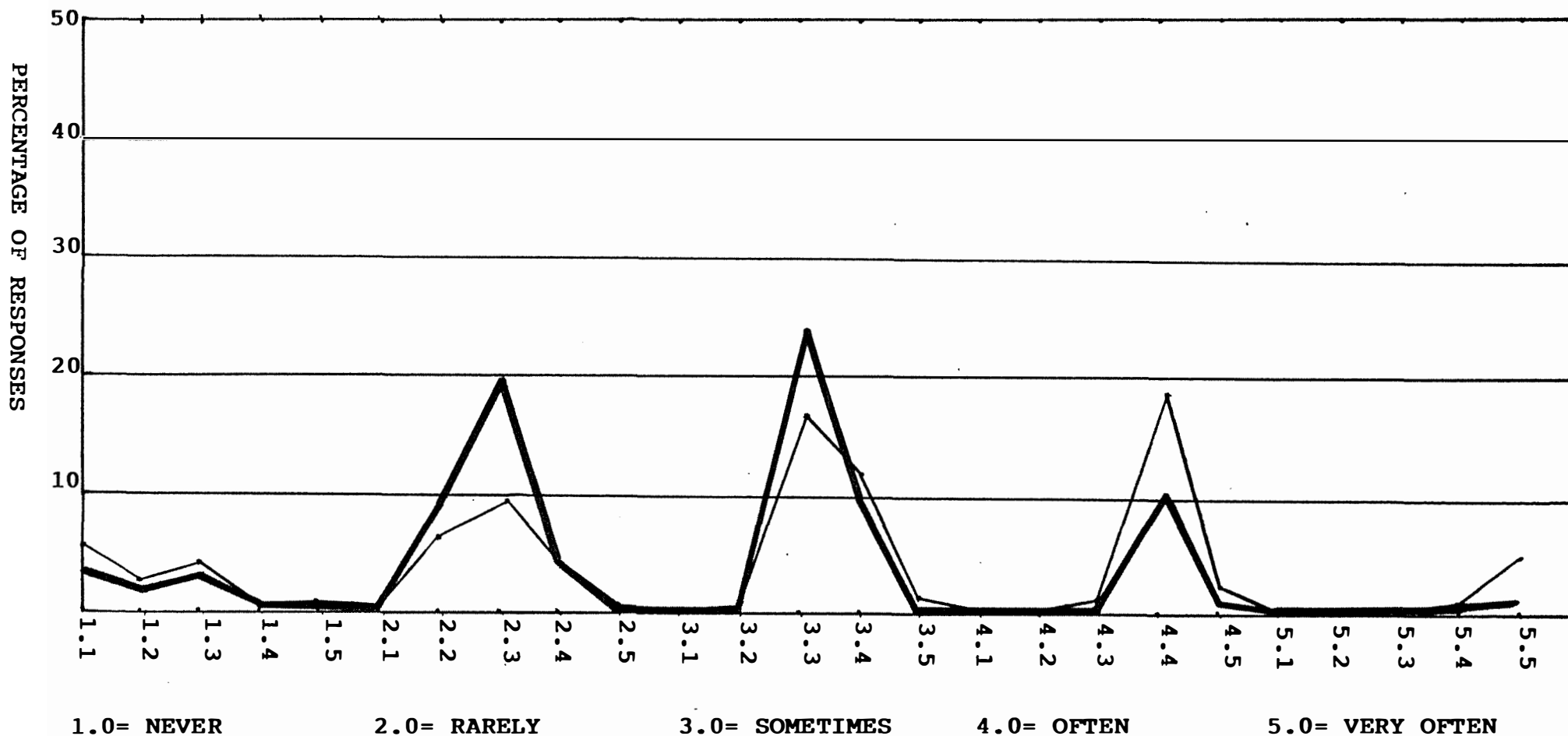


COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig.F1 DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

Letters etc from Outside N = 317

Average of all Sources



1.0= NEVER

2.0= RARELY

3.0= SOMETIMES

4.0= OFTEN

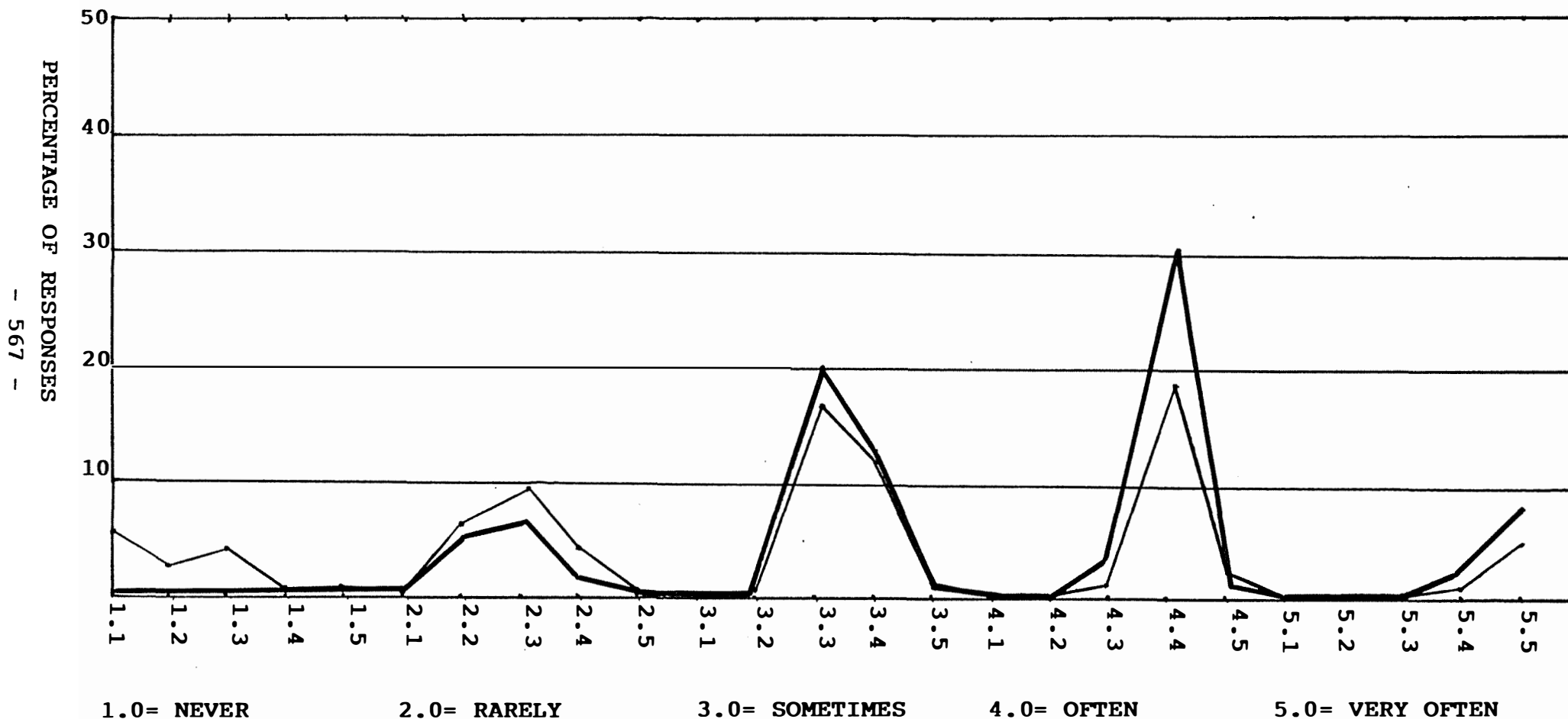
5.0= VERY OFTEN

COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig.G1DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

Newsletters N = 308

Average of all Sources

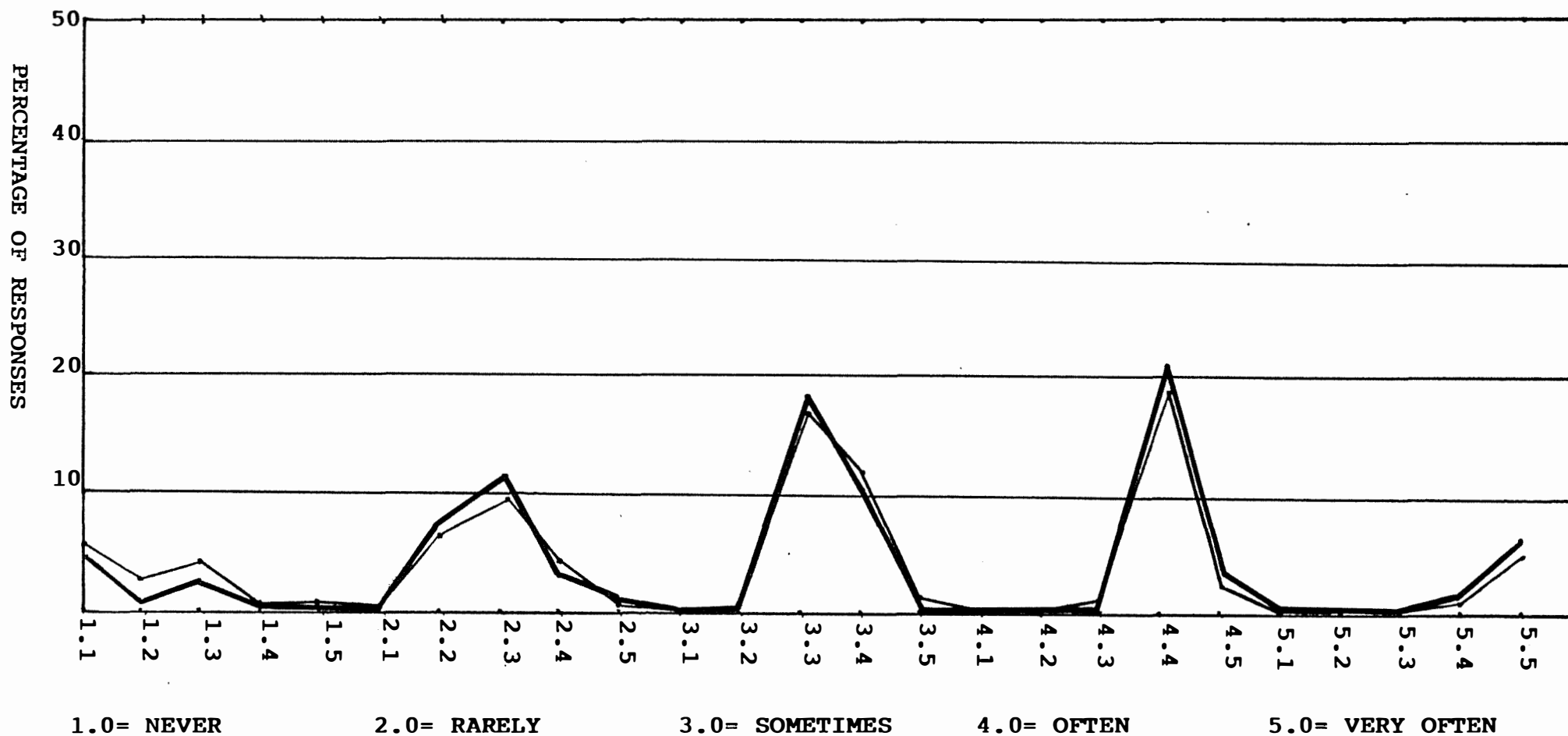


COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig.H1 DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

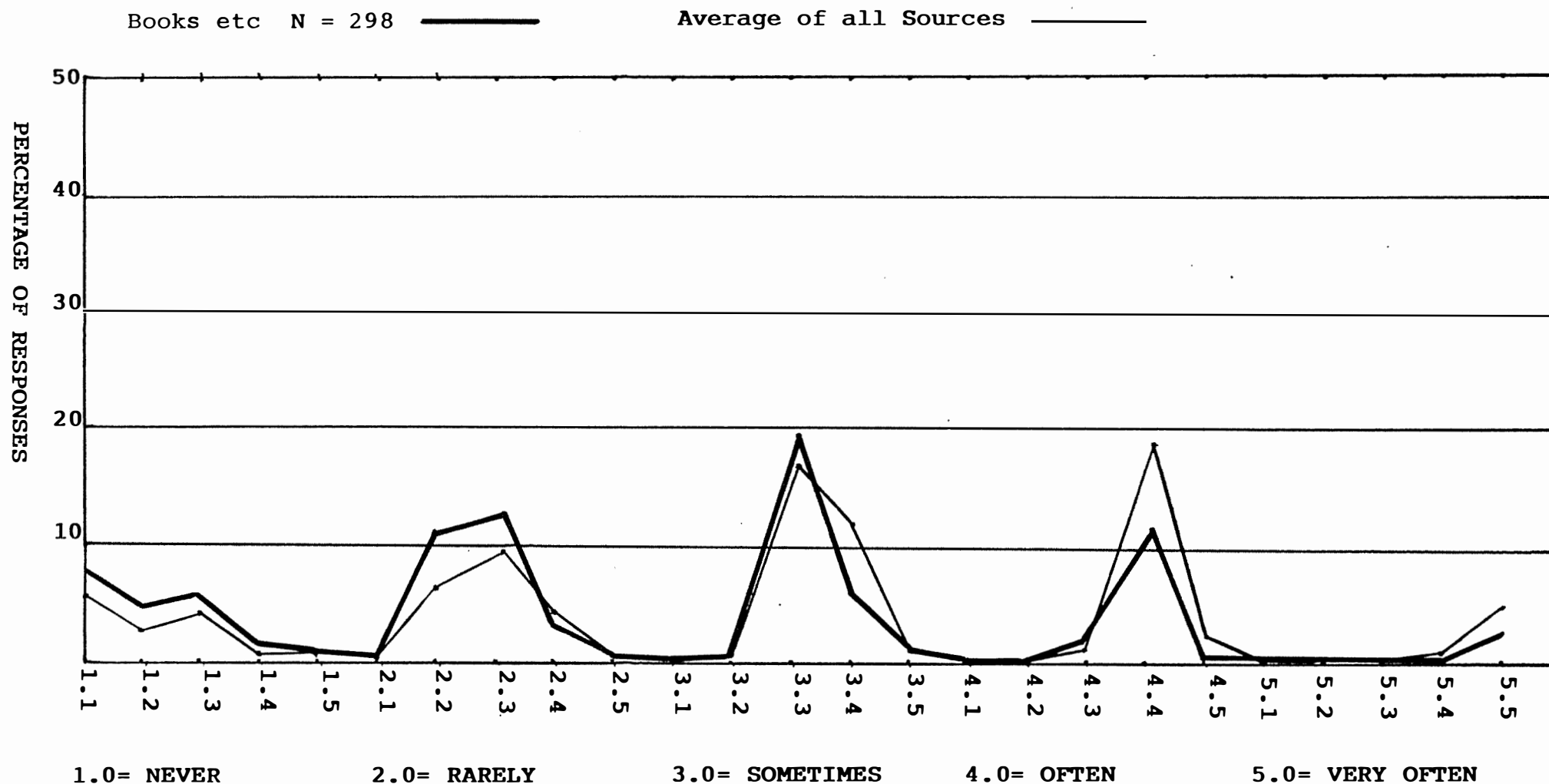
Organisational Records N = 302

Average of all Sources



COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig.11 DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

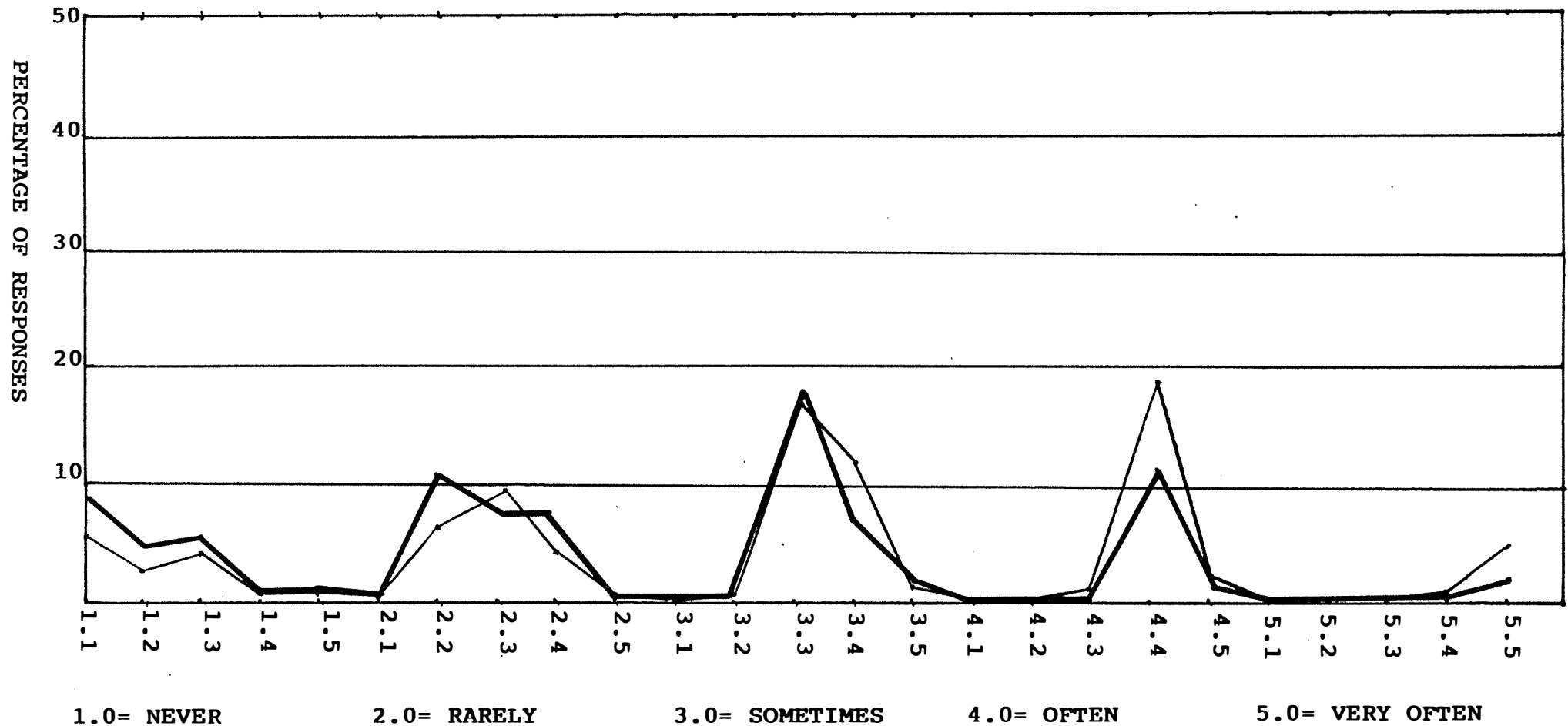


COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig. J1 DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

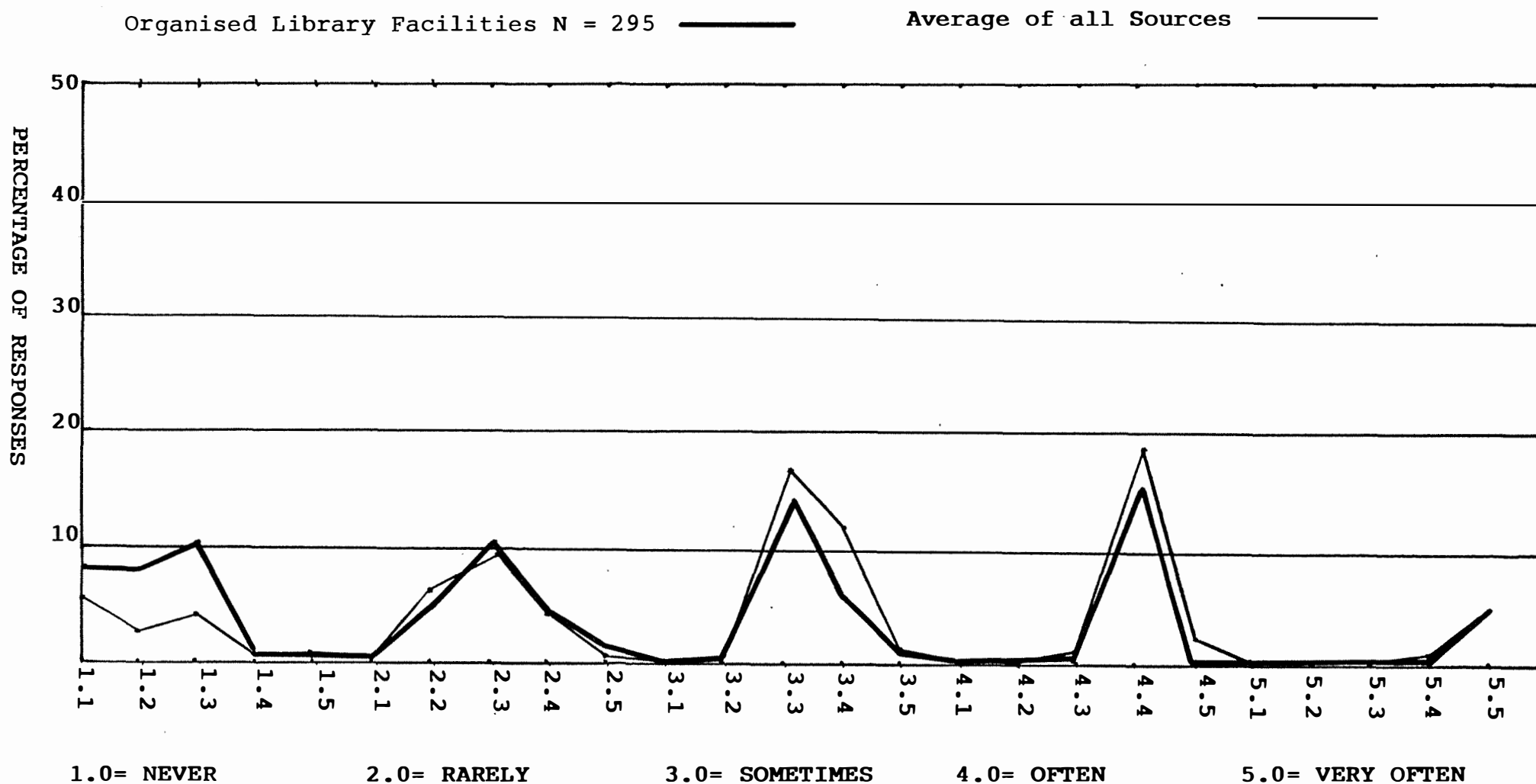
Journals etc N = 308

Average of all Sources



COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig.K1 DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318



COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig.L1 DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318

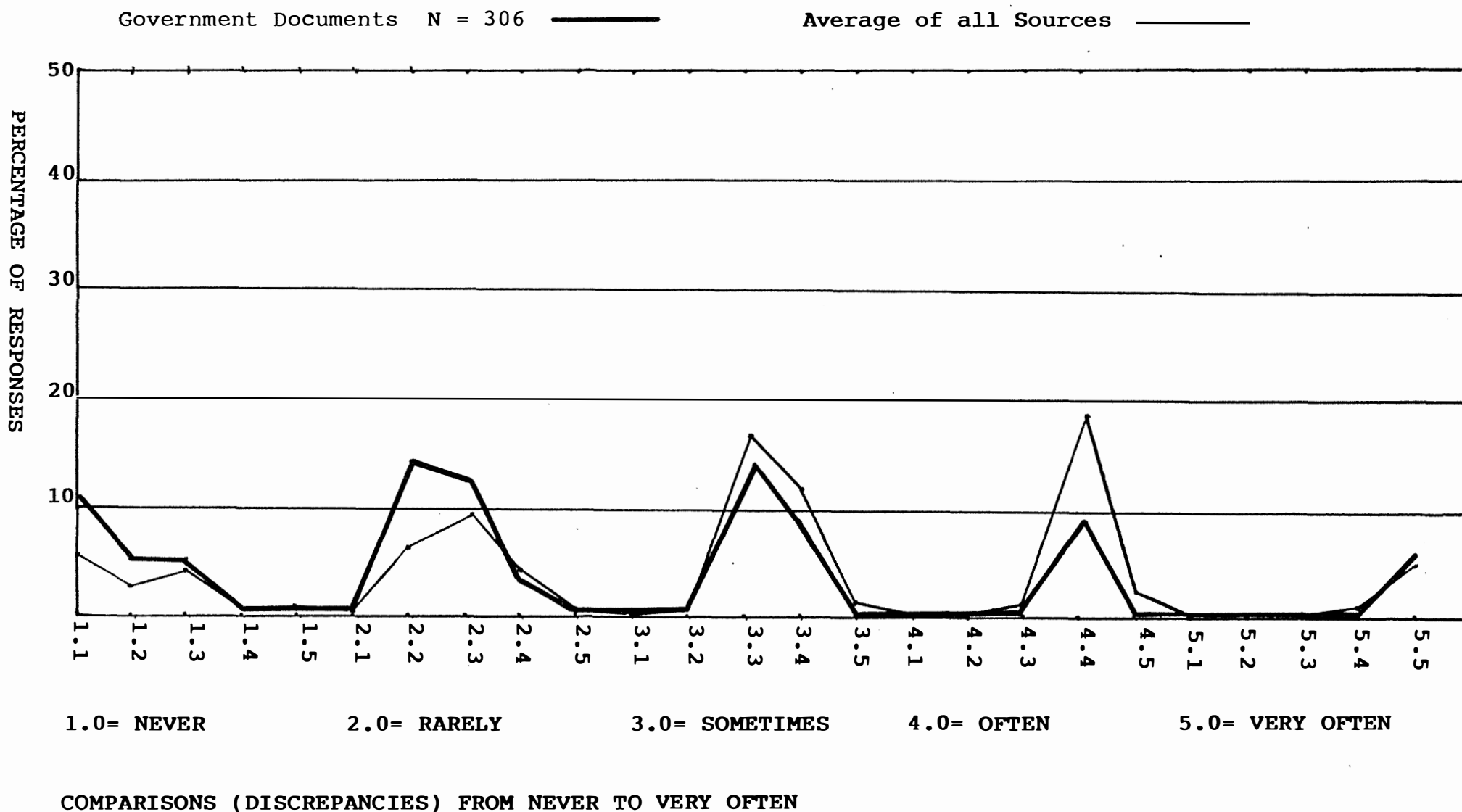
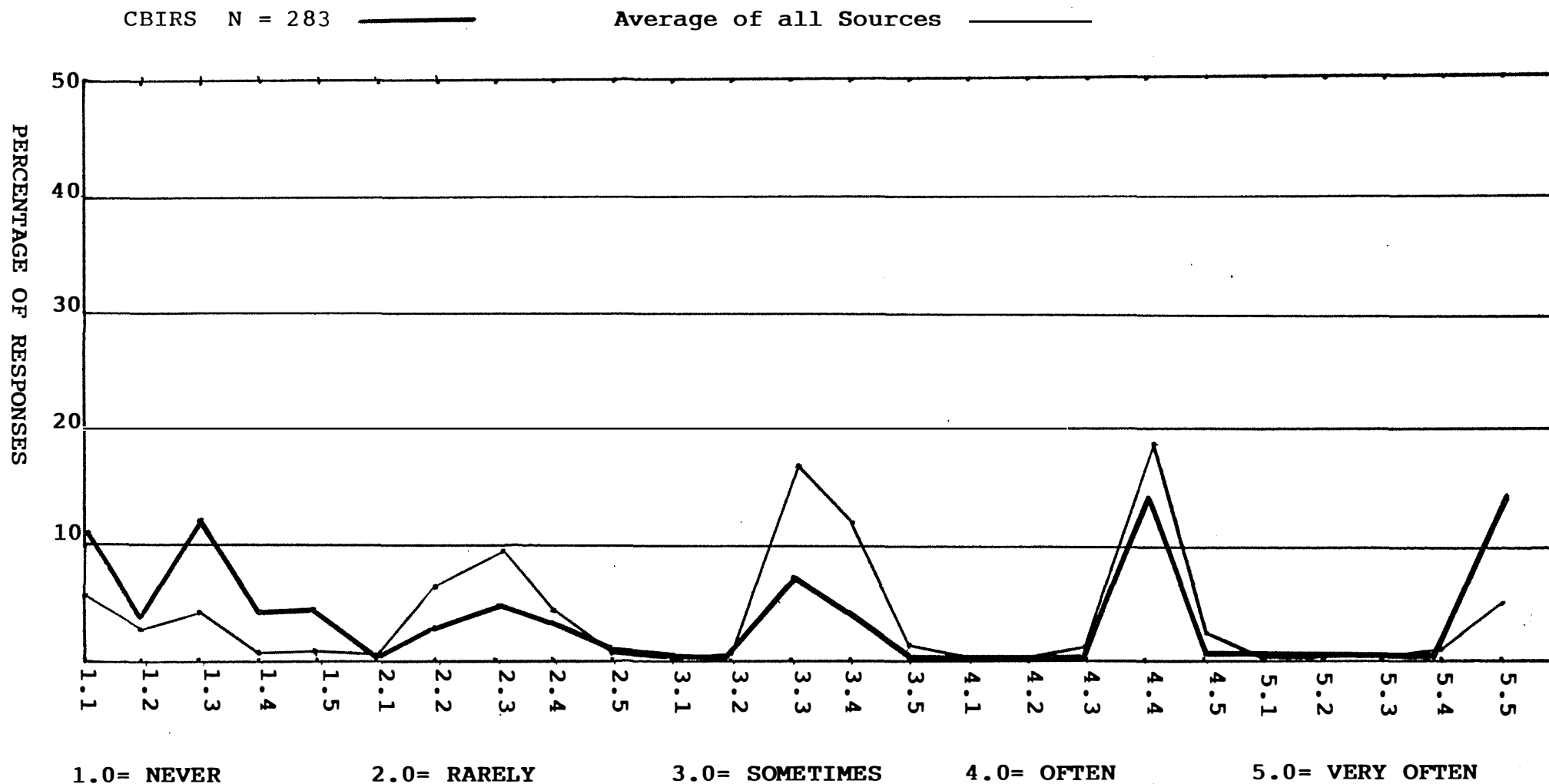
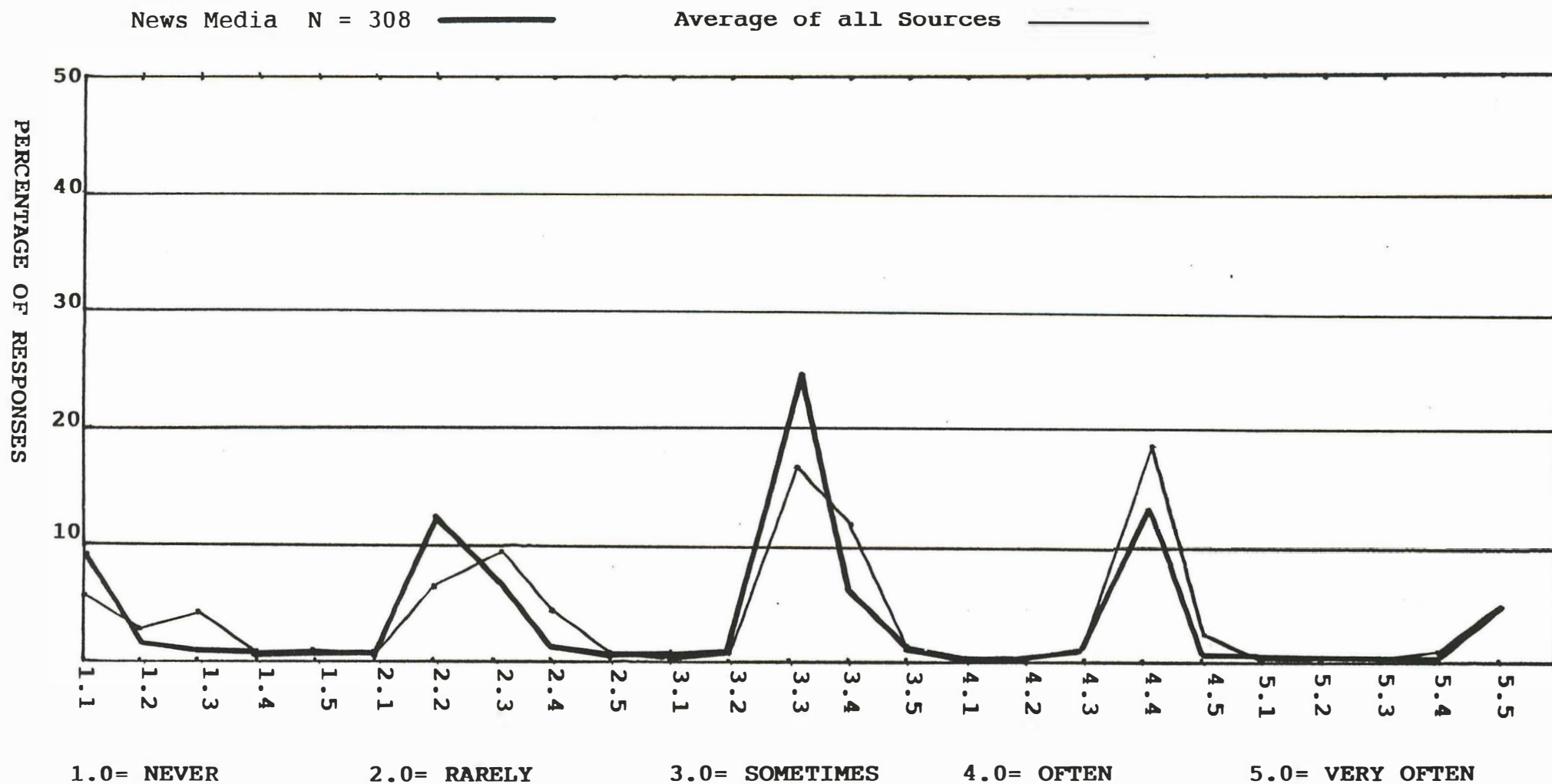


Fig.M1 DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318



COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN

Fig.N1 DISCREPANCIES BETWEEN INFORMATION NOW AND INFORMATION PREFERRED N= 318



COMPARISONS (DISCREPANCIES) FROM NEVER TO VERY OFTEN