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INFORMATION SEEKING AND INFORMATION PROCESSING IN TWO MEDIA -- PRINT AND ELECTRONIC PRINT

By

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ABSTRACT

INFORMATION SEEKING AND INFORMATION PROCESSING IN TWO MEDIA -- PRINT AND ELECTRONIC PRINT

By

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The purpose of this study was to compare information seeking and information processing behavior when reading a newspaper and when reading an electronic news service. It was hypothesized that more information seeking would take place when reading an electronic news service and more scanning would take place when reading a newspaper. Because a higher level of motivation to remember the information would be present, electronic news readers would remember more and understand more of what they read. In addition, the study looked at the relationship of the variable locus of control to information seeking in an electronic news service and the relationship of media use to satisfaction with an electronic news service.

A posttest only experimental design was used. Fifty volunteers from business, industry, education, and government were randomly assigned to read either the Wall Street Journal or its electronic counterpart, the Dow Jones News/Retrieval Service. Data were analyzed using t-tests and Pearson Product Moment Correlations. Secondary analyses were done using multiple regression.

The study found that more information seeking behavior was exhibited by subjects using the electronic news service. Those subjects also recalled proportionally more of what they had read. As expected, readers of the newspaper read more than did electronic news readers. There was no support for the hypothesis that predicted that

readers of an electronic news service would understand more information recalled than would readers of a newspaper.

Media use was negatively correlated with perceived benefits from using an electronic news service, but the correlation was not significant. Internals on a locus of control also perceived more benefits from using an electronic news service than did externals. But the correlations was not significant.

Dedicated to Mark and Steve.

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Whenever my ego needed bolstering or I needed encouragement to continue, Jim was always there. Even while away in Africa, he still managed to send me encouraging words from time to time.

Although Matt is a theologian and a priest, he did more than

offer up prayers (although he did that, too.) One of the best axioms he offered was "nulla die sine pagina."

Sometimes I was hard pressed to believe Noel when he told me, "you can do it." His cheerful willingness to discuss research methods and analysis in the past year helped me "do it."

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TABLE OF CONTENTS

APPENDIX A

APPENDIX B

APPENDIX C

APPENDIX D

APPENDIX E

LIST OF FIGURES

LIST OF TABLES

CHAPTER I

INTRODUCTION

Purpose of the Study

The purpose of the present study was to compare information seeking and information processing behavior when reading a newspaper and when reading an electronic news service. It was expected that readers of such services would be more likely than newspaper readers to seek out utilitarian information. Newspaper readers would be more likely to scan the newspaper, reading whatever caught their eye. If electronic news readers are more purposeful in deciding what to read, then presumably they would have a higher level of motivation to remember the information. So it was expected that electronic news readers would remember more and understand more of what they read than would newspaper readers. In addition, the study looked at predictors of information seeking, information processing, and satisfaction with the medium.

Background

Control over information in society has been primarily in the hands of senders rather than receivers of information. Consumers have had little direct control over the quality or quantity of information they receive. They either watch, listen to, or read what is offered by the mass media or they ignore the media. The opportunity to provide feedback has been minimal and confined to non-media channels such as

letters to the editor and phone calls. As Sahin, Davis, and Robinson (1981) observed, "the mass media serve as vehicles of a one-way flow of information from limited sources to dispersed and heterogeneous audiences" (p. 2).

But this scenario is changing. Cable and satellite television technologies are making more information and entertainment options available to viewers, and videotex[1] terminals and microcomputers with communication capabilities have broadened the print options. These technologies enable people to structure their information environments to suit their individual needs. Computer-based technologies that bring textual information into the home and office "on demand" enable consumers to filter and choose from a plethora of information. Electronic text services are like newspapers in that they provide textual information such as news, weather, and sports. They are like broadcast services in their ability to deliver the news at any time of day. The difference is that the consumer rather than the information provider selects the time for access. These services, of course, also provide information that caters to audiences with narrow and specialized information needs.

Much of the news provided in early videotex systems was available in other media (Weaver, 1983a). Mantooth's (1982) analysis of content in an Associated Press/CompuServe project bore this out. She found that six of the eleven newspapers on-line included at least 50

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1. Although the term videotex is now used as a generic term to encompass ASCII text services as well as NAPLPS (North American Presentation Level Protocol Standard) technology, it was originally conceived as a distinct technology.

percent of the stories from their print counterparts. More recently, Brown (1986) found that two videotex services included from 21 to 33 percent of the stories that were in their companion newspapers. Mantooth's analysis also showed that the majority of newspapers withheld stories from the on-line service until the print versions were on the newsstand. Brown found the opposite to be true. In her study, some stories appeared on-line as much as a day and a half before they appeared in print.

Pervasive in Great Britain, France, Canada, and other parts of the world, electronic text is not widespread in the United States. U.S. videotex development seemed to suffer a setback early in 1986 when the Times Mirror Company (Gateway) and Knight-Ridder Newspapers (Viewtron) gave up their efforts to market videotex to home consumers (Broadcasting, 1986; Fortune, 1986). Neither company had been able to attract the large number of users that would, in turn, attract advertisers to the service (Lane, 1985). But, in reality, these two services accounted for only about five percent of the more than 500,000 subscribers to videotext [and ASCII text] market (Lane, 1986). Another videotex company, Keycom, "overestimated the market's readiness for home-use videotex" and laid off 55 percent of its work force in June 1985 (Wall Street Journal, June 17, 1985). The company indicated that it would redirect its efforts to the business market (Editor & Publisher, 1985). Some industry observers suggest that these videotex ventures were unsuccessful because they were marketed to home consumers rather than business consumers. Currently, business applications seem to be the most viable.

Videotex is just beginning to make its way in the business

marketplace. Companies like the Buick Division of General Motors and Frank's Nursery and Crafts have been testing ways to use videotex technology as a marketing tool. Frank's, a chain of nursery stores, was using a multimedia package that included videodisc and videotex to provide an information service to its shoppers. Buick has also linked videotex and videodisc to provide showroom customers with information to make a decision about buying a car (Hurley, 1985).

Lane (1986) suggests that corporate interest in videotex and videotex-like services show promise. The latter, in fact, have shown the greatest growth. Subscribers to ASCII (American Standard Code for Information Interchange) text services such as Dow Jones News/Retrieval and CompuServe have been steadily increasing. The Dow Jones service, which had 135,000 subscribers at the end of 1984, was expected to realize a profit in 1985 (Fisher, 1984). CompuServe announced in September 1985 that it had 235,000 subscribers and was adding new subscribers at the rate of 10,000 per month (American Banker, 1985). This was a substantial increase over 1982 when CompuServe reportedly had about 28,000 subscribers. Clearly, the market for ASCII text has been growing steadily, while predominately NAPLPS services have folded.

It probably makes little difference to consumers how information is delivered to their homes or businesses, except for the costs of the hardware. As one member of the videotex industry put it:

> Who really cares about the nature of the hardware and our awesome technology? Not the people who are using it. They and millions of others have been using telephones, radio, cars and television sets for a long time now without knowing how they work (Hurley, April 1985, p. 11).

Indeed, all interactive electronic text services are capable of providing copious amounts of information. The difference between videotex technology and ASCII text lies in the graphics and color capabilities of videotex. The importance and usefulness of graphics and color in such services is uncertain. Graphics could help draw attention to particular items in a videotex service but away from other items. Ohlsson, Nilsson, and Ronnberg (1983), for example, found that while certain colors could be used to draw attention to items in a videotex system, this worked to the detriment of processing the remaining items. Edwardson, Kent, and McConnell (1986) found that graphics improved free recall of stories from a cable text newscast and from a television newscast. Color and graphics features require that users have the appropriate hardware to enable them to benefit from them.

The primary difference between electronic information services and other media is that consumers are able to actively select information at the precise moment they want it. There is no need for the consumer to wait for the daily newspaper to arrive or the nightly news to air. This change in the locus of control over information is what Smith (1980) described as "the key to the nature of the information society" (p. 313). Dizard (1982) suggests that this change could lead to a "new kind of First Amendment democracy" in which every person may collect data and publish at will. In fact, the type and quantity of information that can be obtained today is limited only by one's access to the technology and to the funds necessary to pay retrieval costs. Not bound by time or space constraints, these services can provide a far greater variety of information in one place than is offered by broadcast or print media. The type and quantity of information available via

these systems, of course, will be based on economic considerations. Information that is economically viable for information providers and consumers will determine content of these services.

Statement of the Problem

On the face of it, being able to be selective about information is a desirable individual goal, particularly in a world in which a surfeit of information overloads us. This would seem to be particularly true, if, as Smith (1982) has suggested, "the pursuit of information 'abundance'...is in reality the pursuit of a manageable modicum of relevant information" (p. 15). The daily barrage of information that bombards each person makes it virtually impossible to take all of it into account, therefore, a selection process is already taking place. As the public selects and excludes items from available information in the media, it subsequently ignores two-thirds of all stories in the newspaper (Graber, 1984). While broadening options and enabling people to better manage the available information, electronic retrieval systems might further limit exposure to information.

Readers can scan newspaper pages to look for specific kinds of information that may have some personal utility (Atkin, 1973) or to be informed about the top stories of the day. Newspaper readers may also scan the newspaper to pass the time (Grunig, 1983) or just for the intrinsic pleasure of newsreading (Glasser, 1982; Stephenson, 1964; Stephenson, 1967). Whether seeking information or reading for pleasure, readers may be attracted to certain stories because of headlines, photographs and other graphics, and placement of stories on pages. In a study by Graber (1984), for example, readers said they

were alerted to a certain story because it "appeared on prominent pages of the paper,...was characterized by prominent headlines or pictures, or...was given lengthy and often repeated exposure" (p. 82). Graber also found, however, that many front page stories were not read and headlines and photographs had limited cuing effects. Respondents indicated that they were cued by key words in headlines, opening paragraphs of stories, and cues from their social environment. If a topic was being discussed by friends or associates or aroused public controversy, respondents said they paid attention to it in the media (Graber, 1984).

Menu-driven information retrieval systems, however, do not lend themselves to browsing (Ettema, 1985; Weaver, 1983b). "Retrieval systems with hierarchically structured databases frustrate attempts to browse or scan without a specific, well-defined information goal in mind" (Ettema, 1985, p. 42). One can scan categories and menus but these systems do not otherwise lend themselves to browsing (Weaver, 1983b). Although some electronic systems may identify stories as "front page" or "top stories," generally stories in an electronic system all look alike. The headline for each story in an electronic newspaper menu generally is the same size as all others. Nothing would draw attention to particular stories nor attach any importance to them. Brown, Heeter, Salwen, Soffin, and Stanley (1985) found that "electronic text presents different and fewer media salient cues," and users might not become exposed to the top stories of the day in an electronic news service if they do not select the menu option "top stories" (p. 2).

Kerr (1986) has also pointed out that using electronic text involves different levels of cognitive processes.

> Finding one's way in electronic text is at once a matter of problem recognition and problem solving -- knowing that one has a problem that access to information might solve, knowing how to define and limit the problem, knowing where to look....It is also a matter of having requisite mechanical and search strategies -- knowing the keystroke sequences necessary to shift from one part of a program to another, knowing the command sequences for different databases...(p. 327).

While broadening options and enabling individuals to better manage an abundance of information, electronic services could conceivably limit exposure to some types of information. Peripheral information that is processed and, perhaps, learned incidentally when scanning a newspaper could be lost. Such services might also contribute to a widening of the knowledge gap. Since Hyman and Sheatsley (1947) first identified a portion of the population as chronic "know-nothings," other researchers (Tichenor, Donohue & Olien, 1970) have established that a "knowledge gap" about public affairs exists. Knowledge gaps occur because of differences in education and because of ability to use new information and to have access to new communication technology (Katzman, 1974). Those who can afford the technology, of course, could become better informed. People of lower socioeconomic status are not likely to be able to afford the technology. Hurley (1985) has noted that "the gap between socio-economic classes will be heightened by the availability of information technologies. If this occurs, the haves and have-nots will be divided by access to videotex and computers as well as by economic wealth" (p. 11). Those with less education are also less likely to have the skills needed to search for information in an electronic system.

The decision to select a mass media message is determined by the

time, money, energy, and mental ability required to obtain it (Atkin, 1973). A message could be selected from an electronic database if the reward was greater than the economic, physical, and mental costs required to select it. A person who is interested only in sports scores, for example, might scan a newspaper on the way to the sports section, stopping to read stories because a headline or photograph catches that reader's attention. The expenditure of additional time to read stories along the way is the only additional cost of acquiring those messages. If that same reader were to seek out sports scores in an electronic system, the on-line charges and the additional effort required might preclude the reader from reading other items on the way to the sports scores. In fact, the menu structure of these electronic systems enables the reader to easily bypass all information except that which is specifically being sought.

If consumers select certain types of information and bypass others, decisions on which information to provide are more likely to be based on economic factors rather than on altruistic ones. Categories of information that are not heavily read might be dropped (Mantooth, 1982). Information that is economically viable would be made available rather than information which people presumably ought to know about but which they might not be willing to pay for. Many electronic information systems, in fact, have been designed to serve the needs of particular user groups and consequently offer specialized information. As Ettema (1984) observed:

> Even the information systems designed for more diverse groups are not designed for everyone. Dow Jones News/Retrieval, for example, was designed to serve much the same financial and business user group served by that firm's old technology system, the Wall Street Journal.

> Similarly, Knight Ridder's Viewtron system was created to serve the interests (if not needs) of the urban, upscale segment of society with the disposable income to pay for the service. In this phase, then, gaps open because some groups -- typically those which constitute economically attractive market segments -- are chosen for service while others are not chosen. (p. 386)

The profile of potential videotex subscribers bears out the supposition that these systems will cater to certain groups by providing specialized information. Dozier and Rice (1984) describe the typical initial videotex user as "male, white, college educated, between the ages of 25 and 45, of managerial or professional status, and earning in excess of $30,000 per year." The same demographic characteristics, except for age, generally apply to heavy users of magazines and newspapers (p. 115). If newspaper and magazine readers were to turn to electronic systems for news as well as other types of information, this could affect their public affairs knowledge.

Being exposed to information does not mean that the information will be learned. Studies have shown, for instance, that retention of television news stories and weather information is quite low, even when viewers are asked to pay particular attention (Hyatt, Riley, & Sederstrom, 1978; Neuman, 1976; Stauffer, 1983; Wilson, 1974; Sahin, 1981) and when asked to recall a story within a few minutes afterward (Graber, 1984). Retention of newspaper stories is generally better (Perloff, Wartella, & Becker, 1982; Wilson, 1974), but sometimes newspaper stories are scanned so lightly that scanning itself is not remembered (Graber, 1982). At times information is acquired because it is available (Davison, Boylan, & Yu, 1982), and because there is no reason not to pay attention to it. Gantz (1978) found that respondents learned more if their motives for watching were to be informed rather

than to be entertained. Researchers have also found that people who are dependent on television news tend to be less informed about public affairs than those who are dependent on newspapers. The newspaper format seems to encourage learning and retention of information because of devices used to attract attention to various stories and because important aspects of stories are repeated (Perloff et al., 1982).

On the other hand, as Graber (1984) has observed, reading or watching a news story does not ensure that people will be able to recall the story even within a few minutes afterward. Nevertheless, people in her study said they paid attention to the news because they thought it was their duty as citizens to do so or because they wanted to monitor specific types of information. Graber also observed that the "bulk of information presented in the mass media never registers in people's consciousness" (p. 84).

If the bulk of information never registers, what does this mean in the larger context? Are there differences between the way that people read a newspaper and the way they read an electronic news service? Does the structure of an electronic information retrieval system enhance or limit learning? Is some information learned incidentally from scanning a newspaper and would that information be lost to readers of an electronic news service? Would knowledge gaps in an individual's information environment increase or decrease because of reliance on electronic information?

Justification of the Study

Concerns about gaps in awareness about public issues increase in magnitude as one considers that mass media audiences are becoming

increasingly fragmented because of cable, satellite, and computer technologies. With all of its faults, commercial television, for example, has had the ability to bring the nation together in crisis situations. Newspapers, too, make citizens aware of how society is changing and what issues need attention. Some of this learning and cohesion could be in jeopardy if people were to opt only for information that has personal utility or relevance, thereby becoming isolated from important issues of the day. Weaver (1983a) suggests that users of videotex-type systems will "come to know less about more subjects" (p. 20). Blumler (1980), however, believes the new communication technologies could isolate the public from information which it presumably needs to know.

It might seem premature to be studying the impact of computer-based information technology on society because access to these systems by the general public is still quite limited. Fewer than one percent of U.S. households subscribe to such services. The director of advanced technology for the Times Mirror Company may be less optimistic today, but in 1985 he predicted that "changes in technology, demographics, and lifestyle all favour the growth of electronic information technologies in the home" (Baer, 1985, p. 5). As more people become familiar with public access and business applications of videotex, they are more likely to be receptive to having the technology in their homes. Also, as the number of home computers with modems increases, so, too, will interest increase in electronic information gathering from the home.

Heikkinen and Reese (1986) surveyed newspaper readers to determine predictors of videotex adoption. Three groups emerged from their analysis: adders -- early innovation adopters with a high

information need; shifters -- those with a low information need but a "modern" orientation toward new technology; and loyalists -- those with a low information need and a traditional channel orientation. They predicted that the shifter group will grow as the younger generation becomes more familiar with electronic devices, but that people with high information needs will use both newspapers and videotex.

Predicting the extent of adoption and the potential marketability of these services, however, is not within the scope of the present study. As usage of these systems increases, they will have the potential to siphon away some of the audience from other media. This study was designed to lend some insight into the way in which electronic text might be used when compared to newspaper use, particularly as it might affect general levels of knowledge. Determining possible consequences of a technology before its widespread adoption can help to determine how it might be used to provide the "greatest good for the greatest number" (Montgomery, 1980).

Ettema (1985) observed that the social role of videotex is being defined. But the nature of a technology will determine to some extent how it will be used. It seems reasonable to expect, therefore, that electronic information retrieval systems will not be used in quite the same way as are other information sources. As already noted, for example, one can scan a newspaper, taking in much information which was not intended to be retrieved. Paying on-line time charges, however, lessens the likelihood of browsing through information which may seem superfluous to one's life.

If, as predicted, the audience for such services is the upscale consumer most sought after by advertisers, then certainly these

services bear watching as a potential competitor in the news and information arena. Knowing more about how media are used and what is gained by their use could also help broadcasters improve their own news and information product. In addition, preliminary evidence suggests that some users of these new technologies might substitute videotex information for their newspapers (Tillinghast and Visvanathan, 1983; Butler and Kent, 1983; Heikkinen & Reese, 1986; Weaver, 1983a, 1983b). Weaver (1983b) found that viewers of teletext news might skip radio and TV news broadcasts and not read certain newspaper or magazine articles. From his research he concluded that if teletext and videotex were to become mass media, "many audience members might be satisfied with the very sketchy news accounts available from these electronic 'printed radio' services" (p. 110).

Given the possibility that videotex and other text services could substitute for other media, it is important to understand what this substitution might mean to general levels of knowledge. As noted earlier, respondents in one study ignored about two-thirds of all stories in the newspaper (Graber, 1984). If the electronic news service is substituted for the newspaper, this could result in a subsequent decline in access to "random" information. Stories that might have been read in a newspaper might not be retrieved from an electronic news service if the information does not have personal utility or relevance. If more reliance is placed on an electronic news service as a news medium, there could be a loss in peripheral information that is processed and, perhaps, learned incidentally when scanning a newspaper. This could lead to a lowering of the information level about topics that might be important to the smooth working of a democratic society but which, at

the time, may not seem to be personally relevant.

Previous research on videotex and other forms of electronic text has not focused on questions related to what is learned from such systems and whether there is a relationship between what is selected and what is learned. Research has focused, for example, on predictors of videotex adoption (Atwater, Heeter, & Brown, 1985; Bolton, 1982; Dozier & Hellweg, 1984; Heikkinen & Reese, 1986; Tillinghast & Visvanathan, 1983); market potential (Reymer, 1982); legal and policy implications (Neustadt, 1982); user responses (Ettema, 1984a & 1984b; Heeter, Atwater, Stanley, & Baldwin, 1985); farmers' perceived benefits derived from videotex use (Ettema, 1983; Rice & Paisley, 1982); the effects of videotex on the volume and nature of news and information (Weaver, 1983); and the use of electronic text as a news medium (Brown, Heeter, Salwen, Soffin, & Stanley, 1985; Edwardson, Kent, & McConnell, 1984 & 1986).

Organization of the Dissertation

This dissertation is divided into five chapters and the appendices. Chapter One includes the purpose of the study background, statement of the problem, and justification of the study. Relevant literature is reviewed in Chapter Two and the research hypotheses are presented. Chapter Three is a description of the research design, variables, data collection, coding procedures, and analysis. Results of the study are presented in Chapter Four. Chapter Five includes a discussion of the results, conclusions, and implications for future research. Appendices include experimenter instructions, questionnaires, materials used to aid recall, and the codebook.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this study was to compare information seeking and information processing behavior when reading a newspaper and when reading an electronic news service. Because the technology is relatively new, little research has been done in this area. Therefore, inferences are drawn from studies of other media as well as from the few studies that have dealt directly with electronic text services. This chapter focuses on theories and variables related to information seeking and human information processing. Summaries of the literature and corresponding hypotheses are provided.

Exposure to Information

Exposure to information can be purposeful or non-purposeful, active or passive. Heyer (1986) nicely summarized information intake as a combination of the three ways in which people gather information -- by grazing, browsing, or hunting. He describes grazing as "sitting in front of the TV in an alpha trance, eyes wide open, with information, good or bad, flowing in" (p. 347). Browsing is described as "scanning a large body of information with no particular target in mind" and hunting is "seeking specific information" (ibid.). People may be grazers, browsers, and hunters at various times and at the same time. People may seek out information because it is useful in satisfying a need (Atkin, 1973) or because it is congruent with existing ideas (Festinger, 1957) and helps them maintain an inner balance (McGuire,

1974). They may also process and learn information simply because "it is accessible and because there is no particular reason not to learn it" (Davison, Boylan, & Yu, 1982).

The need for information stems from "extrinsic uncertainty produced by a perceived discrepancy between the individual's current level of certainty about important environmental objects and the criterion state he seeks to achieve" (p. 206). Atkin's model, based on utility theory, predicts that a mass media message will be selected if the reward is greater than the time, money, energy, and mental ability required to obtain it. Grunig (1983) also believed that a person would expend the effort necessary to obtain and understand a message that was sought.

Early studies by Berlyne (1960) and Schramm (1949) cited intrinsic as well as extrinsic reasons are important factors in information seeking. Atkin's model does not take into account intrinsic motivation such as curiosity, entertainment, and personal interest. For this reason, Wang (1977) argued that Atkin's model is flawed. She examined reasons for newspaper content selection and found that although information utility was a good predictor of newspaper readership, almost one fourth of the news and advertising were read for intrinsic reasons. She suggested that the concept of "instrumental utility" be reconsidered.

Stephenson (1964) proposed that much newsreading is "ludenic,"[1]

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1. Ludenic is a word created by Stephenson (1964) to connote playing, as in playing a game. "The correct Latin, no doubt, is ludic, but there are times when euphony should take precedence over grammar; the pleasing sound of ludenic is much to be preferred over the harshness of ludic" (Stephenson, 1964, p. 370).

that is, subjective play, rather than instrumental. Glasser (1982) elaborated on Stephenson's (1964, 1967) ludenic newsreading theory and play theory of communication. Glasser observed that research on newsreading had accentuated "the extrinsic and utilitarian" and neglected the "intrinsic and the aesthetic" (p. 101). Dozier and Rice (1983) shared this view, stating that "viewing newsreading as a goal-directed information retrieval task ignores the essential communication pleasure of newsreading as an end in itself" (p. 124). They also said electronic newsreading does not lend itself to reading for pleasure.

Rubin (1981) found that subjects who watched "60 Minutes" had reasons other than information seeking. Respondents in his study watched the program to "escape," to be entertained, and to pass the time, as well as to seek information. He concluded that other communication sources would be used to satisfy information needs. Hofstetter and Buss (1981) also found that viewers watched entertainment and public affairs television programs for similar, if not identical, reasons. They explained this by noting that news programs are produced to be entertaining and entertainment television includes political and social messages.

As Glasser noted, however, most researchers have focused on the utility of information as the motivation for information exposure. Edeani and Jacoubovitch (1980), for instance, used perceived utility of information as a variable in their study of selective exposure as purposive behavior during a gubernatorial election. The researchers postulated that "to the extent a person perceives an item of information to be useful in solving a problem or meeting a felt need, he or she will

likely to select that information in preference to other available rmation" (p. 2). Variables in their study that contributed to ctive exposure to political information were past history of nforcement (prior experience with political candidates and issues) and ceived utility of information. Exposure to information may arouse erest and increase the likelihood that related information will become e salient in the future (Westley & Barrow, 1959). Other variables in ir study -- levels of fatalism and political party identification were discernible predictors of information selectivity in their study.

Social variables were more powerful than individual variables as dictors of political information seeking in a study by Chaffee and eod (1973). Information seeking was measured as a request for a tical pamphlet. Individual variables included a person's voting ns and knowledge of candidates. Social variables included frequency discussion of a campaign and the likelihood of future discussion. e researchers suggest that if information is perceived as having some ure social use this may result in information seeking.

Students' preparation of term papers served to illustrate a model information seeking, avoiding, and processing developed by Donohew Tipton (1973). In the model, a stimulus captured the attention of a dent. The student had to decide on the relevance of the stimuli to student's "image of reality" and its consistency with that image. e researchers predicted that information might be tuned out if it e so inconsistent that it is threatening to the individual or if it were consistent that it is monotonous. Factors that affected the student's ision to take action included the student's assessment of the uation, prior experience, concept of self, and information processing

style, that is, avoiding or seeking.

Donohew, Tipton, and Haney (1978) used a race-horse game to test information seeking, avoiding and processing. They identified four distinctive types of persons by their information-seeking strategies. These were loners, formal seekers, risky seekers, and informal seekers. Loners interacted less with others in the exchange of information. Formal seekers were cautious and thorough in selecting information. Risky seekers, who had the most prior knowledge about horse racing, tended to take more chances, making decisions quickly. Formal seekers perceived more information as being available to them and risky seekers perceived less information as being available. Informal seekers exchanged more information with others than did any other type. The most important variable in this study, the researchers concluded, was prior knowledge. Prior knowledge was the greatest discriminator between various types of people and their use of information.

Reasons for seeking information are varied and are different with different media. McCombs and Poindexter (1983) found that age and civic attitudes were somewhat related to news-seeking behavior, but civic attitudes did not predict exposure to media in the same way. Attitudes asserting a civic obligation to be informed were related to individual newspaper readership patterns. Those same attitudes, though, were poor predictors of exposure to local television news and marginal predictors of use of weekly newspapers and radio news.

Individual variables such as age and income were better predictors of information-seeking behavior and exposure to news sources than "levels of activation" in a study by Collins and Abel

(1985). They measured levels of activation using a Novelty Experiencing Scale developed by Pearson (1970). The data did not support the researchers' expectations that individuals with a high need for activation would expose themselves to more information sources and those with a low need for activation would reduce exposure to information sources.

Subscribing to cable television may also be a predictor of information seeking. Grotta and Newsom (1982) found that people who subscribe to cable television and other special TV services use other news media more than non-subscribers. "People who have a higher propensity to seek information are more likely to install cable and/or other special television services" (p. 591). They also observed that the demographic characteristics of cable subscribers are the same as those people who are more likely to read a newspaper regularly. Reagan (1984) found differences between cable subscribers and non-subscribers in terms of their attention to news media. Reagan found that cable subscribers tended to watch more news than non-subscribers and that viewers of the Cable News Network watched even more news than other cable subscribers. All groups spent about the same amount of time reading the newspaper.

Satisfaction with media use may not always be related to information seeking per se. McLeod, Bybee, and Durall (1982) tested two models -- the drive-reduction model and the exposure-learning model -- to determine which motivational model best represented media use and satisfaction. The drive-reduction model assumes that people know what they are looking for and know which media sources can satisfy their needs. Gratifications sought directs media use and

satisfaction. The exposure-learning model predicts that gratifications received may not have been those originally sought. Thus, accidental exposure to the media may also result in gratifications received. The researchers found that when levels of seeking and receiving information about a presidential campaign were less intense, the drive-reduction model applied. When the need was strong, as in learning about issues and candidates, the exposure-learning model was strong. But increased media exposure did not lead to additional gratification unless some motivation was present.

Garramone (1984) tested those models for gratifications received across three sources of political information -- newspapers, television news, and political commercials. She found that the exposure-learning model was the best explanation for satisfaction with political news in newspapers and on television. There was no difference in the models when applied to television commercials.

Grunig (1983) identified four variables that might explain when and how communication would occur among environmental publics. These variables were problem recognition, constraint recognition, referent criterion, and level of involvement. Problem recognition was the awareness that information was needed in a situation. Constraint recognition was the awareness of the limitations on the individual's ability to act in a situation or when the locus of control becomes external. The referent criterion was cognition that an individual brings from previous experience to the present situation. Level of involvement was the extent to which a person perceives a link to a situation.

Grunig also described information seeking as an active process that takes place when a person needs information to make a decision.

He defined information processing as a passive process that takes place randomly. "A person does not look for and generally does not need information that he processes" (p. 11). Information processing may be active as well as passive, however, so Grunig is really making a distinction between information seeking and processing available information.

Processing available information, or availability theory, is similar to what educators refer to as incidental learning, that is, learning information when there is no motivation for doing so. If people are not at all interested in a political campaign, for example, they are likely to pay attention to information that is most easily available (Davison et al., 1982) or to what attracts their attention. Atkin (1971) found that voters who read about a city council election in a newspaper had read the most prominently displayed stories.

Incidental learning from the media refers to learning that occurs from exposure to media content, even if the intent was not to gain information. Only a few studies have addressed incidental or passive learning from the media. Comstock (1978), for example, summarized trends in research of learning from television, particularly the influence of television violence on the immediate behavior of children. The research showed that children learn from entertainment programs and commercials as well as from programs designed to convey information. Comstock concluded that television does provide incidental instruction principally "when other sources of information are absent, its messages are not in conflict with one another, and these messages have some applicability to the viewer" (p. 42). Calvert and Watkins (1980) examined developmental changes in children's recall of televised and

incidental content, primarily the effect of action, loud music, singing, and dialogue on comprehension. They found that when information was accompanied by loud music, high action, and auditory and visual effects, recall of central information was improved but recall of incidental information was not. They also found that younger children remembered more incidental than central information, but the reverse was true of older children.

Much of the research in incidental learning is in child development literature, perhaps because "attention becomes more selective with increasing age." In much of this research, children are asked to remember "central" objects that are paired with "incidental" objects. They are then asked to recall incidental objects, providing a measure of nonselective attention (Miller & Weiss, 1982, pp. 543-544).

Research on passive or incidental learning from the media by an adult population was conducted with two groups in different parts of New Jersey. Zukin and Snyder (1984) compared the groups for knowledge about a New York mayoral election in which the New Jerseyans presumably had no interest. They were operating from the premise that the "mere absence of resistance" (p. 29) is all that would be required for learning from the media to occur. The researchers had a unique environment for their study because New Jersey does not have its own commercial VHF station. Residents of one part of the state were served by New York stations and residents in another part were served by Philadelphia stations. The news in the electronic media, therefore, was heavily tilted to news of either New York and Philadelphia. Although in-state newspapers carried news about New Jersey, no single newspaper covered the entire state. It was found

that New Jerseyans who lived in the New York broadcast market were more likely to be aware of the mayoral election in that city than were their counterparts in a different media market in the state. People learned about the election merely because the information was available. The researchers concluded that passive learning from the media "is a widespread process, and one that seems to characterize much citizen learning about politics" (p. 638).

Although Zukin and Snyder's research offers some evidence that incidental learning takes place, learning is more likely to occur when some motivation is present. Gantz (1978) found that people who turn to news for recreation and diversionary purposes were less likely to acquire information incidentally from the newscast. He had expected that the more one turns to news for information, the more one will retain from the newscast. But this was not the case. Holmlov (1982) also found that amount of newspaper reading did not covary with knowledge of city affairs. He suggested that when people read for pleasure they learn very little.

Culbertson and Stempel (1985) examined the relationship between focused and non-focused use of news media and news knowledge. Focused use was defined as reading or viewing about a given topic and non-focused use was defined as use of the media without regard to topic. They found that general or non-focused use of television did not correlate positively with news knowledge, but focused and general use of newspapers correlated with news knowledge. In addition, they found evidence that people who rely on newspapers attend to all media more than do others. They concluded that people who are oriented toward newspapers have a "multi-media orientation associated with active

information seeking" (p. 16).

What might have been learned by respondents in these previous studies, however, may have been quickly forgotten because the learning was not reinforced. On the other hand, the exposure may have aroused interest in certain issues, making these issues more salient (Westley & Barrow, 1959). Two indices of news-seeking behavior -- a test of knowledge of news personalities and a self-report of media use -- were not significantly related to immediate recall of factual information, but were related to delayed recall. The researchers suggested that initial exposure to programs may have aroused interest in the areas covered. In subsequent weeks subjects may have paid more attention to these issues, thereby reinforcing the original learning that took place.

In order for information to be processed, it "must get a person's attention and keep his interest" (Grunig, 1983, p. 12). This is true, of course, whether information exposure is purposive or accidental. When information is being sought, though, Grunig said that specialized media would be used. When passing time, however, the mass media would be used. Electronic information systems could be classified as specialized media because they have been created to serve the needs of particular groups of users (Ettema, 1984). If, as Dozier and Rice (1984) suggest, electronic newsreading ignores the pleasure element of newsreading, then menu-driven information retrieval systems most likely will allow a "small nonpleasure elite" to "accomplish certain goals and objectives" (p. 124).

When Ettema (1985) compared user responses to consumer information retrieval (news) and business information retrieval

(agricultural market data) in one electronic information service, he expected that more browsing would occur in the news service than in the market service. More browsing occurred in the market service because of an interest in the information. In that context, Ettema explained, browsing emerged "as a utilitarian information-seeking behavior rather than a communication play behavior" (p. 46). He concluded that "videotex is a more acceptable substitute for decision-oriented than for play-oriented media" (p. 47). In other words, users of an electronic database are more likely to use the service for purposive information seeking than for pleasure reading.

Summary

If people are to use the new information technology to structure their information environment in a way that fits their needs, they would actively seek out information in such systems. Because the consumer controls what is selected from an electronic system, that person can more easily avoid dissonant information and select consistent or utilitarian information. If the goal is pleasure reading, a newspaper would likely be the preferred medium. Electronic systems do not lend themselves to pleasure reading or browsing, except as utilitarian information-seeking behavior.

Several studies suggest that individuals might not be satisfied with the serendipitous exposure to information in the mass media if their goal is to be informed about political news. Although there seems to be a relationship between reading a newspaper and one's sense of a civic obligation to be informed, the same attitude did not predict exposure to other media. Given a choice between a newspaper and an

electronic news service to seek out information necessary to fulfill one's civic obligation, people may find that an electronic news service provides a more efficient and satisfying way to acquire information. The structure of an electronic news service also enables the consumer to filter out and avoid the entertainment function that is part of other media and concentrate on information seeking.

An electronic news service, then, would more likely be used for specialized information seeking. Some information-seeking is likely to take place when reading a newspaper, of course, but more non-purposive scanning is likely to take place. Headlines, graphics, and placement of stories on a page may attract the newspaper reader's attention to stories which may not contribute to satisfying a utilitarian need. Information in a newspaper may be read simply because it is there. Readers of an electronic news service would be less likely to be drawn to non-utilitarian information that was not originally sought because similar attention-arousing cues would not be present.

This literature suggests the following hypotheses:

H_1: More information-seeking behavior will be exhibited by readers of an electronic news service than by readers of a newspaper.

H_2: More information will be processed [read] by readers of a newspaper than by readers of an electronic news service.

Most of the demographic characteristics of potential videotex subscribers match those of heavy users of magazines and newspapers and cable television subscribers. This suggests that subscribers to electronic news services would be heavy media users and information seekers. Ettema (1983), however, found that farmers who used

traditional mass media less reported receiving greater benefits from an electronic news service than those who used traditional media more. This was particularly true of those who used newspapers less. The following hypothesis will explore this relationship.

H_3: Media use will be inversely related to perceived benefits from using an electronic news service.

Locus of Control

In addition to demographic and social variables discussed in the previous section, locus of control may be useful in explaining information-seeking behavior. Called fatalism in communication literature, a locus of control scale measures the degree to which a person believes he or she has control over his or her life. The most widely used locus of control instrument was developed by Rotter (1966) and consists of a series of paired statements, one of which represents internality and the other representing externality. The following statements are an example of these paired statements:

> Many of the unhappy things in people's lives are partly due to bad luck. (external)
>
> People's misfortunes result from mistakes they make. (internal)

A person with an internal locus of control believes it is possible to influence one's environment and will look for ways to do so. Internals, therefore, tend to be information seekers. They are more inquisitive and curious about their surroundings and process information more efficiently (Lefcourt, 1982). Externals, however, believe control to be in the hands of outside forces or fate and are less likely to be information seekers.

In their study relating the locus of control variable to academic achievement, Bar-Tal and Bar-Zohar (1977) found that internals were better at distinguishing relevant from irrelevant information and organizing it. They observed that internals paid more attention to information and, therefore, were able to "efficiently extract information even from ambiguous situations," organize it, and use it (pp. 190-191). Internals were shown to be better at distinguishing relevant from irrelevant information and organizing it. Similarly, Haanstad (1978) concluded that internals were more efficient processors of cognitive information.

An early study by Seeman and Evans (1962) of tuberculosis patients in a hospital setting found that internals seemed to know more about their disease. The 86 white male subjects had been matched on variables such as occupational status, education, and ward placement. The researchers suggested that externals were less attentive to available cues, and, therefore, did not process as much information as internals.

In a similar study by Seeman (1963), prison inmates received information about the reformatory situation, parole conditions, and long range opportunities for rehabilitated prisoners. Afterward, they were given a true-false test of that information. Internals scored higher than externals, once again leading the researcher to conclude that externals were less observant to cues and did not consider acquisition of information as a productive venture.

If subjects think it is possible to change the outcome of a situation, internals will seek more information than externals. In a study by Davis and Phares (1967), subjects were told that they would

be attempting to persuade another student to a particular position concerning the Vietnam War. When the experimenter was called out of the room for a false phone call, the subjects were viewed through a one-way glass to determine time spent reading deliberately-placed magazines about the war. Other criterion variables were questions the subject asked about the student and the number of requests for more information about the war. There were no differences between internals and externals when subjects were told that change was a matter of chance. If they were told that attitude change required skill or if they were told nothing, internals tended to seek more information about inducing attitude changes in someone.

Similarly, in a study by Weiner and Daughtry (1975), differences were found between information seeking by internals and externals when the degree of control they had in a situation was vague. College students were assigned to a treatment group that determined whether or not subjects would have to return for a second experiment. In conditions in which the degree of control was specific, there was no difference in the amount of information sought by internals and externals. When the degree of control was vague, internals sought more information than externals.

In an academic situation in which information seeking was related to completing course requirements, Prociuk and Breen (1977) found differences between internals and externals. Their subjects were 36 university students. As the researchers had predicted, internals demonstrated greater seeking of information relevant to the completion of academic course requirements than did externals. The researchers suggested that internals may use academic information more effectively.

Internals were also more likely to focus on successfully completing a task (Pines & Julian, 1972). Externals seemed less interested in the informational demands of the task, and more interested in determining the social demands of the situation. Although striving toward the same end, internals and externals may see the means to that end differently, the researchers suggested.

The values placed on health and locus of control were variables in two studies by Wallston, Maides, and Wallston (1976). College students were exposed to a mildly threatening, written message about the danger of hypertension. They were then given an opportunity to seek further information by choosing from a list of pamphlets prepared by health care professionals. As in other studies, internals tended to seek more information than externals. The study was replicated with another group of college students, and the hypothesis was again supported.

Another study, by Devito, Bogdanowicz, and Reznikoff (1982), built on research which had shown that individuals with an internal locus of control orientation regarding their health and who placed a high value on health intended to obtain a greater mean number of health pamphlets. These researchers found that internals expressed a similar intent to obtain the pamphlets, but they also found differences between intended and actual information seeking. Therefore, they cautioned against using intent measures as if they were almost identical to actual behavior.

Internals were better at incidental learning in a study by Wolk and DuCette (1974). In one experiment the learning task was non-competitive and in another it was competitive. In the first task the subjects were asked to read two stories and identify typographical

errors. After completing the task, subjects were asked to recall information such as names, dates, and other facts which might have been learned incidentally. In the second task, subjects were given two minutes to memorize the dates in a story and were then asked to recall names in the story. Internals were generally better at incidental learning, especially during the competitive task. The second experiment added differing levels of task difficulty and cue explications. Internals retained more story content and demonstrated more intentional learning as well as higher levels of incidental learning. The researchers concluded that internals have greater attentive processes than externals and that externals fail to use their attentive abilities as well as internals.

Organ (1976) also found that there were differences between internals and externals on incidental learning tasks but only when subjects were under stress. No differences were found in a non-stressful condition. The researcher had injected stress conditions to determine its impact on proofreading and incidental learning tasks. In the stress condition, subjects were told that the tasks could be regarded as a test of certain perceptual and cognitive skills important in a number of occupations.

One study suggests that information seeking through the media may not be correlated with locus of control (Travis, 1974). Although internals were expected to favor informative media content, Travis found only a low order relationship between internal locus of control and information seeking through the print media. The relationship did not hold for broadcast media. Travis attributed the results to his failure to account for certain variables in his design.

Locus of control orientation was not a significant predictor in selective exposure to information in a gubernatorial election (Edeani & Jacoubovitch, 1980). Their subjects were 93 freshmen and sophomores enrolled in two journalism courses. Variables used in addition to locus of control (fatalism) were perceived utility of information, past history of reinforcement, and political party identification. Perceived utility of information and past history of reinforcement were the dominant predictors of selective exposure whereas locus of control and party identification were found to be of little value as predictors. The authors pointed out, though, that the locus of control orientation of college students tends to change from external to internal as they progress through their college years. Conceivably, findings could have been different with an older group of students. Students may not have perceived an election to be particularly relevant to their lives.

The age of the students and the perceived relevance of information may have confounded the results of a study by Jarvis (1977) as well. Jarvis found no relationship between locus of control and perceptions of health care information utility among the 96 undergraduates in his study. The purpose of the study was to examine audience reactions to the content of selected television commercials of over-the-counter drugs in terms of uses and gratifications. Audience needs were assessed on two levels -- internal versus external control of reinforcement and intrinsic or instrumental human values. Intrinsic values were defined as the end state the individual hopes to attain and instrumental values were the methods of obtaining or leading to the intrinsic value. Subjects were asked to evaluate commercials for over-the-counter drugs on a set of six semantic differential scales

related to the commercials' health care information utility, advertised brand information utility, and entertainment utility.

No differences were found between internals and externals in acquisition of computer literacy in a study by Wesley, Krockover, and Hicks (1985). Subjects used printed programmed instruction or computer assisted instruction. Neither were differences found between method of instruction and acquisition of computer literacy.

Summary

Although there are a few studies to the contrary, the literature generally supports the view that internals on a locus of control scale tend to be information seekers as well as efficient processors of information. The literature is not definitive, however, regarding the application of this variable to seeking information from the media. Assuming that internals are basically information seekers, they are more likely to be satisfied with an electronic news service, if that medium lends itself to their information-seeking needs. Externals are likely to be more satisfied with the newspaper because they will not have to make information-seeking decisions. They can scan the newspaper, relying on the editor's ordering of the news and reading whatever happens to catch their eye. Internals are also likely to be satisfied with the newspaper if they are not looking for information but reading for pleasure.

The fourth hypothesis proposed, therefore, is:

H_8: Individuals who score lower on a locus of control scale will perceive more benefits from using an electronic news service than will individuals who score higher on a locus of control scale.

Human Information Processing

Thus far, this chapter has focused on theories and variables related to active and passive exposure to information. This section reviews literature that contributes to understanding how people process information after exposure to media content has taken place. Several researchers have recognized the role that cognitive psychology can contribute to such understanding. Ray and Ward (1976) believed that information processing research could lead to a "more valid indication of mass media effects" (p. 9) and Graber (1982) urged communication researchers to draw on the work of cognitive psychologists.

> We lack good theories about cognitive processes through which information becomes communication. Lacking such theories, we do not know how best to ask questions about the nature of learning that has taken place from exposure to media information. Therefore, we do not know the transformation factors that explain what elements of information are merged with what the receiver of information brings to the situation. (p. 559)

Kellermann (1985) suggested that "understanding how memory processes operate may provide clues as to where and how mass media effects could be systematically uncovered" (p. 84). Berry (1983) also argued that the motivation for processing news material was not as important as "how far people process the news material" (p. 365).

One way of describing human information processing is in terms of "stage models. Stage analysis separates learning and memory into at least three stages or processes: acquisition, retention and retrieval. The term learning applies to acquisition of information or "the placing of information into memory storage." Memory applies to retention and retrieval of information. Retention is "the persistence of memory over

time" and retrieval is "the extraction of information from memory storage when it is needed" (Crowder, 1976, p. 2).

Remembering information and understanding it involve separate and different cognitive processes (Ortony, 1978). Remembering involves storage, retrieval, and access to input information. Understanding requires an interaction between incoming information and information that is already stored in memory. Because of this difference, people sometimes can remember things they do not understand and forget things that they do understand.

The interaction between incoming information and stored information involves "bottom-up" and "top-down" processing. Top-down processing is merely the reverse flow of bottom-up processing. Briefly, information goes into a sensory store, enters a pattern recognition stage, proceeds through a selection stage, and enters memory. Presumably, each of the senses has a store where information is held for up to a second in its original form. The incoming information will be lost if it is not recognized during the pattern recognition stage (Crowder, 1976; Reed, 1982; Rumelhart 1977).

Pattern recognition is how people identify objects in their environment. For example, because of the human capacity for "perceptual generalization" individuals are able to read (or decipher) many different types of handwriting. From the pattern recognition stage, the information proceeds through a selection stage and enters short term (primary) memory or long term (secondary) memory. Short term memory is limited in the amount of information it can hold and the length of time it can hold it. More permanent information is stored in long term memory, which has no limits on its capacity (ibid.).

Information stored in long term memory is distinguished as semantic and episodic (Klatzky, 1980; Tulving, 1972).

Semantic memory includes generalized information about classes of objects, events, and sequences in the world. It permits deductive inferences, but does not include the circumstances surrounding acquisition of these classes of objects. For example, the word "animal" and words representing many kinds of animals may be in one's semantic memory, but the situation in which the word entered memory may not be recalled.

Episodic memory stores factual information about events that individuals have experienced or been told about. Studies of recall of media content have focused on information in episodic memory (Kellermann, 1985). Episodic memory is constantly changing, making recall difficult. Therefore, appropriate cues are necessary to enable a person to retrieve information from episodic memory.

Understanding how the brain and its memory processes work may help researchers design studies that reveal useful information regarding intentional and incidental learning from the media and remembering and understanding of news and other information in the mass media. Woodall, Davis and Sahin (1983) urged attention to these processes in news comprehension research. They pointed out that both bottom-up and top-down processing are involved in processing television news because the "visual and verbal information catch viewers' attention and the viewers' frames of reference guide attention-related efforts" (p. 3). In addition, they said that both the semantic network model of memory and the episodic model of memory could be important in research dealing with news comprehension.

Research done in the area of news comprehension was summarized by Sahin, Davis, and Robinson (1981) under three points: low recall, minimal learning, and flawed comprehension. A significant problem with the findings in this area of research, though, is that investigators have failed to distinguish between remembering and understanding information or to explain what they are measuring. "Whether researchers have in the past measured viewers memory or understanding of television news events, or both, is ambiguous" (Woodall, et al., 1983, p. 5).

Several studies (Wilson, 1974; Neuman, 1976; Hyatt, 1978; Gantz, 1978; Sahin et al., 1981; Housel, 1984), illustrate disappointing or unclear results regarding "comprehension" or "learning from television." It is not clear from the research whether those terms stand for memory processes, understanding processes, or a mix of both. If the characteristics of television news make it likely that visual and verbal information are stored in episodic memory as Woodall et al. (1983) suggest they are, then recall would require enough visual cues to recall the verbal content. Human information processing theory suggests that target information must be placed in context if it is to be retrieved. Inconsistent results of previous research, perhaps, can be partially attributed to the failure of researchers to provide the necessary contextual cues to respondents in recall situations.

> Without retrieval cues, respondents may simply lack adequate cognitive access to episodically stored news information. Thus, these results can be attributed to poor access to stored information rather than poor memory for televised news. As such, conclusions that viewers recall little or nothing from televised news should be carefully reevaluated; viewers may have lacked access to news information, but not the information itself. (p. 10)

The semantic network model of memory also can be applied to the

processing of television information (Kellermann, 1985; Woodall et al., 1983). Pre-existing information must be stored in memory to make sense of new information, therefore, the better the semantic network, the better the understanding. In other words, viewers with good general knowledge are better able to recall and understand newscasts than viewers with poor general knowledge. Information stored in memory determines the extent to which news stories are meaningful because people process information "when they are able to link it to established schemas" (Graber, 1982b, p. 17). They might also process information that is perceived to have some future social role utility (Chaffee & McLeod, 1973). Or, as Kellermann (1985) suggests, the information provided in newscasts may not be sought by the consumer and, therefore, is dismissed as irrelevant. If a person does not have pre-existing knowledge about an issue, understanding is affected, and the person is less likely to pay attention to a particular news story. Graber (1982b) assessed the consequences of this process.

> The process of understanding the news is a cumulative process both for the individual and for society. The ability or inability to understand and remember the news presented to viewers on any given day will leave viewers more prepared or less prepared to understand the news tomorrow. Misconceptions of important stories can persist and influence future understanding and decision making. As a society, we make decisions about collective actions based on our understanding of the world around us which we derive in part from news stories.... If there is widespread and increasing misunderstanding of certain news stories, we may all make poorer decisions. (p. 22)

Graber (1982a, 1982b) noted that when people are exposed to information about public issues, three types of information processing or interactions occur. First, they may remain unaware of the information or they may use it. Once they are aware of it, they may

purposely ignore it. Third, they may pay attention to it and combine it with information and judgments stored in memory. To determine what happens when people read or listen to the news or discuss current events with others, Graber (1982b) tested recall of selected news stories with a 21-member panel in Evanston, Illinois. The panel was interviewed 10 times during 1976. Panelists kept diaries of at least three news stories that had come to their attention and also recorded the sources of those stories.

Graber also had panelists mark stories that caught their attention in the newspaper by running a marking pen alongside them. On the average, she found that 67 percent of all the stories in the paper were ignored. Scanning was done carelessly and unsystematically, and some stories were scanned so lightly that subjects did not recall the scanning. She likened this light scanning to watching a passing scene from a moving train. "Only a fraction of the information supply is incorporated into the average individual's knowledge base" (p. 3). Because past and present experiences and personality factors shape one's exposure to news, much important information was missed, and "the bulk of political news is never processed at all." What is processed "tended to reinforce existing stereotypes, rather than [produce] new outlooks" (p. 17).

Cognitive psychologists Findahl and Hoijer (1982) similarly observed that much of the public catches only fragments and scattered details of news programs. Different ways of presenting and structuring the news were tested in experimental settings. In one experiment people with high general knowledge were able to recall considerably more of the program content compared to people with little general

knowledge, even though they paid equal attention to the program. This led the researchers to conclude that producers of news programs and audiences do not necessarily have the same frames of reference. Producers may assume that they and the audiences have the "same body of silent knowledge," but they do not.

Although pre-existing information helps make sense of new information, Findahl and Hoijer found that possessing a good knowledge reserve is no guarantee that all information in the news will be absorbed. On the other hand, poor knowledge reserves do assure that very little of the program content will be absorbed. In addition, information that is recalled is often distorted or misperceived, and the misconceptions are seldom random. Listeners tended to fill in gaps in recollection or reconstructed "new" events by mixing together portions of various items and by adding details from previous knowledge and experience. Background factors are not included in many news items, so only those people who already know something about a news event could place the information in context. The researchers concluded that "broadcast news is written for the initiated" (p. 401).

Because there is evidence that one verbal item could affect memory for another, Gunter, Clifford, and Berry (1980) conducted several experiments to see if memory for one television news item would affect memory for another in the same newscast. Subjects were presented with television news items from the same taxonomic categories, sports and politics. Recall declined when the same taxonomic category and similar visual formats were repeated. "People do seem to encode broad taxonomic and production features of news items while watching such material, and similar items interfere with each

other during their attempts to recall" (p. 223).

If subjects are told in advance that they will be asked to recall information but are not told how their memory will be evaluated, the amount recalled could be lower (Nelson, Bajo, & Casanueva, 1985). Half of the subjects in an experiment were told to concentrate and remember as many words as possible (intentional condition). The other subjects were not told to remember anything but were asked to rate items on a scale by saying a number (incidental condition). Recall was lower in the intentional condition than in the incidental condition.

Other researchers have attempted to find out whether the medium makes a difference or whether structure of news stories is important in information processing. Wilson (1974), for example, explored whether there are differences in the way audiences process the same news message presented by radio, television, and newspapers. To do this, he constructed two news stories, one interesting and one dull or neutral. Both stories were written in standard inverted pyramid news style. The greatest loss of information was in the radio condition and the least amount of loss was in the newspaper condition. Television fell in between the two. There was less loss from the interesting story and from the shorter story.

Comprehension and retention of folk tales read from a storybook with pictures was compared with the same stories presented on television and radio to third and sixth graders (Pezdek, Lehrer, and Simon, 1984). Comprehension and retention from the television version was compared with the radio version and reading was compared to radio. Comprehension from the television and print versions was better than from the radio version. The television and reading conditions

were similar in absolute levels of performance.

Although not focusing on the effects of information processing, Neuman (1976) suggested that the impact of television news is visual and perhaps even subliminal in character. Neuman examined whether the knowledge-gap phenomenon applies to learning from broadcast news as it does to learning from print media, as previous research had shown. Independent variables were level of education, motivation for watching TV news, and general news consumption habits. The dependent variable was media impact, that is, what and how much was learned from television news viewing. The primary indicator of media impact was aided and unaided recall of specific news stories. College-educated individuals had a higher overall rate of news recall, but not by much.

Motivation seems to have been a factor in remembering information from newscasts in Neuman's study as well as others. Neuman found that those who watched the evening news primarily to relax, had significantly lower rates of recall, especially compared with those who said they wanted to keep informed. Likewise, Culbertson and Stempel (1985) found that news knowledge was not correlated with non-focused use of television, although it was correlated with both focused and non-focused use of newspapers. Gantz (1978) also found that viewers were less likely to remember newscasts if they were not motivated to acquire information. Likewise, Holmlov (1982) recognized that people learned little when they were reading the newspaper for pleasure.

The majority of viewers in Neuman's study said they just happened to catch the news but had no special interest in keeping informed. The researcher pointed out, however, that his study focused

on short term learning and did not tap dimensions of long term learning about public affairs. The fact that major news stories are often repeated could make a difference in the long term. As previously noted (Westley & Barrow, 1959), exposure could make news stories more salient in the long term. Zukin and Snyder (1984) also found that lack of resistance was all that was required to learn about an election from television news.

It has also been noted that remembering and understanding information involve different cognitive processes. Remembering information, however, may be an important first step in understanding. Katz, Adoni, and Parness (1977) were interested in both remembering and understanding in their study. First of all, they considered the importance of presentation mode and whether television news was more likely to be remembered than radio news because television news was accompanied by pictures. More news items were forgotten by radio listeners than television viewers, but there were no differences in their performance on tests of content recall. As a result, the researchers concluded that the picture did not add much to recall. They also measured understanding and concluded that exposure to a news story does not "educate the uneducated to complex concepts" (p. 238). These researchers also concluded that much of the audience was not familiar with basic concepts which news editors take for granted, and, therefore, was unable to understand the news.

Graphics did contribute to recall of stories from a videotex[1]

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1. The authors use the term videotex to refer to all text delivered to a television screen. Their study used cable text rather than an interactive service which allows the viewer to make choices.

newscast and from a television newscast in a study by Edwardson et al. (1986). But the graphics contributed only to free recall and not to aided recall. "This may indicate that a still graphic accompanying a news story can produce a conceptual peg that aids retention of a story topic but does much less to increase retention of information not conveyed by the graphic" (p. 15). Ohlsson et al. (1983) concluded that manipulating certain colors in a videotex system helped to draw attention to particular items. But when attention was drawn to some items, remaining items were not processed.

Gunter (1979, p. 57) cited a study by Booth (1970-71) in which the researcher found retention of news items to be influenced by several variables. These variables were: repetition of an item; amount of time or space devoted to it; its position in the newscast; and the presence of visual material. Longer items with visuals that came at the beginning of the newscast were more likely to be remembered than short, unrepeated, non-pictorial items placed somewhere in the middle of the newscast.

Research by Sahin et al. (1981), however, found that longer stories were not always well understood, and that placement in the newscast did not always make a difference. In addition, misinformation tended to occur when viewers were confused by several related stories. The researchers called this a "meltdown effect" that occurs when viewing brief but closely-related stories such as a report of different Supreme Court decisions. This was especially true when news stories triggered recall of facts from similar stories.

Gunter attempted to expand on the findings of Katz, Adoni and Parness (1977) and Booth, both of whom had done field studies, by

doing a controlled laboratory experiment. He found that subjects who watched a video presentation had better recall of items than those who only listened to a presentation. News items accompanied by pictures were more likely to be recalled than non-pictorial items, and placement in the newscast affected recall. These findings, he says, are consistent with the dual-coding hypothesis. This hypothesis states "that high imagery conditions are effective in learning and memory because they increase the probability that both imagery and verbal processes will play a mediational role in retrieval" (p. 61).

Warshaw (1978) found support for his hypotheses that more information would be recalled from television commercials when audio information was presented without video or when video information was presented without audio. Television commercials usually project audio and visual stimuli that viewers are expected to perceive. This research suggests that viewers may have some difficulty processing audio and visual stimuli simultaneously. Singh and Rothschild (1983) suggest, though, that recall may not be the most appropriate measure of learning from commercials. They conclude that brand choice decisions may require only a recognition level of learning, which may not be tapped by recall measures.

Whereas there is some evidence that pictures may enhance learning and memory, Reese (1984) thought that adding redundant print information (captions) might have an adverse affect on learning. He hypothesized that picture-word redundancy would enhance learning, but redundant spoken and printed information would not. Understanding was operationalized as the ability of subjects to reproduce the central point of stories. Subjects were asked multiple choice questions that

focused on important concepts and facts central to the story. Overall, redundant pictures and words enhanced learning, but redundant print information either had no effect or detracted from learning. Splitting attention between two language channels, even when providing redundant information, resulted in information loss.

The time of day a newscast is viewed also may affect recall, according to Gunter, Jarrett, and Furnham (1983). Subjects were given a sequence of news items at 9:30 a.m., 1:30 p.m., and 5:30 p.m. followed by four memory tests. The first test was free recall in which the subjects wrote down the main points from each item. They were then given a test of recognition of countries, a test of minimal cued recall, and a test of detailed cued recall. For the analysis, points were awarded for correct recall of the main points (essential information) and for less important information (incidental). No points were given for information recalled incorrectly. The researchers found that recall of meaningful information about the causes of events declined more rapidly with time of day than did concrete information about people or places involved.

A similar study by Gunter, Furnham, and Jarrett (1984) found that recall of television news items is better early in the morning for those who expect to use the information right away. These researchers also found that the personality of the subject produced different levels of recall. Introverts remembered more than extroverts.

Summary

Having access or being exposed to information does not ensure that the information will be acquired and retained in memory for future

retrieval. Retention of news stories and weather information was quite low, even when respondents were asked to pay particular attention to a newscast. When information is recalled, it often is not recalled accurately. Although the newspaper format encourages learning, sometimes stories in a newspaper are scanned so lightly, scanning itself is not remembered. Information processing literature suggests that in such cases the information entered short term memory, which is limited in the amount of information it can hold and the length of time it can hold it. It is also possible that the cues necessary for information retrieval were inadequate or missing altogether.

One's ability to recall information is enhanced by previous information stored in memory. Information seeking implies some previous knowledge that precipitates an interest in certain information as well as a motivation to acquire that information. The present study, in effect, deals with different newspaper formats. Therefore, if there are any differences in recall, it is likely to be in favor of the electronic news service, particularly if information seeking is more prevalent when reading that service.

Graphics or visual materials may contribute to recall of stories from television newscasts and from cable text stories. Researchers have also found better recall of information presented through only one medium at a time and presented early in the day.

Although recalling or remembering information is an important first step in understanding, information that is recalled is not necessarily understood. Exposure to a news story can result in recall but does not necessarily result in understanding of that news story. Understanding requires an interaction between incoming information and

information stored in memory. Information could be selected for reading if a person has some prior knowledge related to the subject stored in memory. On the other hand, an item could be read merely because it catches the reader's attention. Newspapers, in fact, are designed to draw the reader's eye from one part of a page to another by the use of headlines, illustrations, photographs, and other techniques. Therefore, a reader may not have related information stored in memory that would enhance understanding of the new information. Unless the person is particularly interested in an item, attention might be diverted because of other headlines, for example.

When reading an electronic news service, however, no other information competes for the reader's attention. Attention can be focused only on one item at a time. Given that focused attention plus the motivation that can be presumed to be present if the information seeking hypothesis holds, then understanding of electronic information ought to be enhanced. In addition, when a person seeks information, that person is more likely to expend the effort necessary to obtain and understand the message.

The remaining hypotheses suggested by this literature are:

H_5: Readers of an electronic news service will recall proportionally more factual information than will readers of a newspaper.

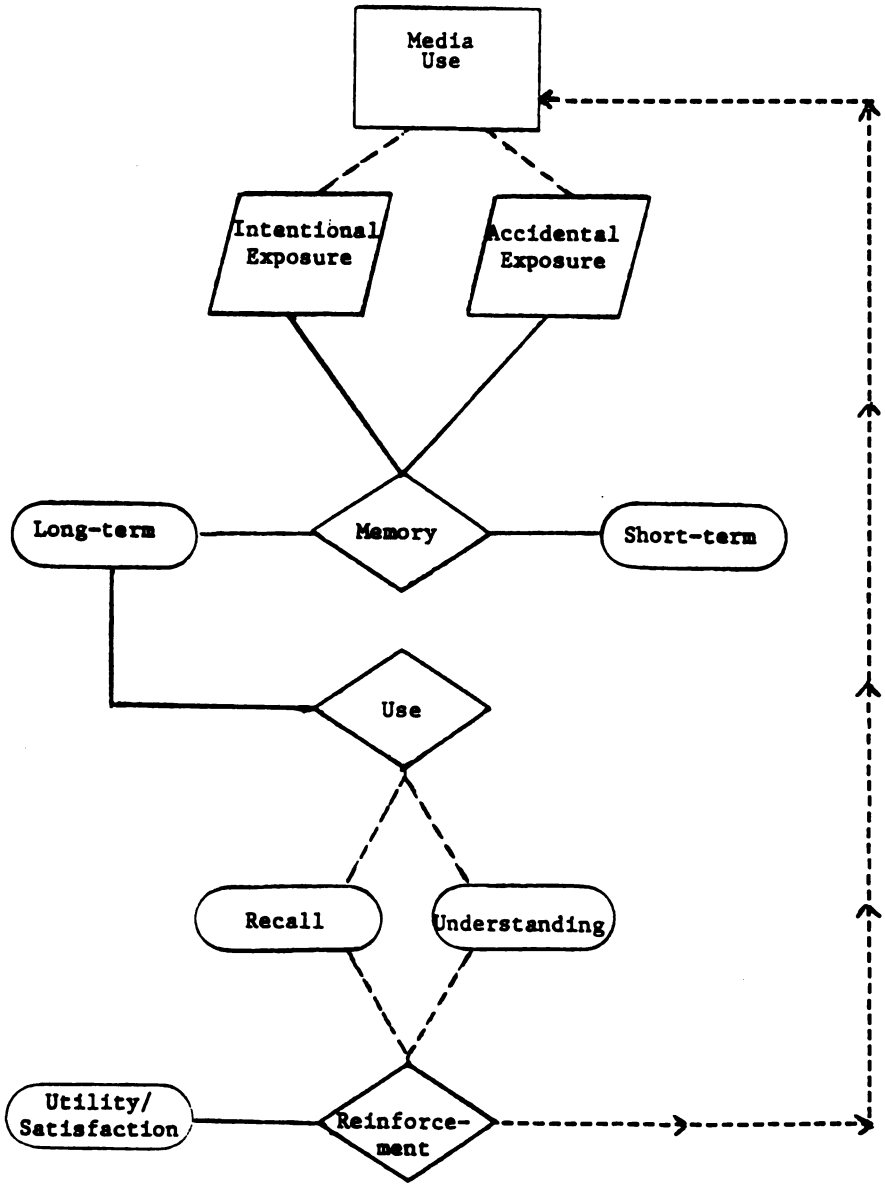
H_6: Readers of an electronic news service will understand more information recalled than will readers of a newspaper.

Conclusion and Research Hypotheses

The previous sections have discussed the relevant literature related to exposure to information and processing of that information.

Figure 1

AN INFORMATION PROCESSING SCHEMATA



The systems flowchart in Figure 1 (p. 51) attempts to illustrate the process as described by the literature in this chapter. It is, of course, a simplification of that process. Briefly, exposure to information in the media can be intentional or accidental. Both accidental and intentional exposure result in information flowing into a person's memory. If the information enters short term memory, it goes no further and is forgotten. If the information enters long-term memory, the information may be used at a future time. This use may result in a person's ability to simply recall the information, or it may result in understanding, a more complex cognitive process than recall. When the information is recalled, understood, or recalled and understood, this provides reinforcement that may result in additional media use. Reinforcement is a result of some attribute such as utility of the information or satisfaction with it because of some intrinsic quality. The cycle then repeats itself.

Variables discussed in this chapter that may confound the process include locus of control and overall media use. A person who is more internal than external on a locus of control scale may be a more efficient processor and user of such information. People who tend to heavy media users, may also tend to be information seekers. However, even information seekers may sometimes be passive receptacles for information. So, the basic schemata of information processing remains the same. The research hypotheses proposed in this chapter, therefore, deal with various aspects of this system of processing. To summarize, the following hypotheses were tested in this study:

H_1: More information-seeking behavior will be exhibited by readers of an electronic news service than by readers of a newspaper.

H_2: More information will be processed [read] by readers of a newspaper than by readers of an electronic news service.

H_3: Media use will be inversely related to perceived benefits from using an electronic news service.

H_4: Individuals who score lower on a locus of control scale will perceive more benefits from using an electronic news service than will individuals who score higher on a locus of control scale.

H_5: Readers of an electronic news service will recall proportionally more factual information than will readers of a newspaper.

H_6: Readers of an electronic news service will understand more information recalled than will readers of a newspaper.

CHAPTER III

METHOD

Research Design

A posttest only experimental design (Campbell & Stanley, 1963) was used in this pilot study to compare the information seeking and information processing behavior that obtains when reading a newspaper and when reading an electronic news service. The posttest only design was chosen because subjects were to be tested on what they read. If subjects had been asked in advance what they usually read in a newspaper, they might have looked for types of stories to demonstrate consistency in their behavior, thereby introducing a threat to validity.

A pretest of general news knowledge was considered because of the literature which states that people with good general knowledge are better able to recall and understand current news items (Findahl & Hoijer, 1982; Graber, 1982b). However, the information available in the Wall Street Journal and the Dow Jones News/Retrieval Service is more comprehensive than general news. In the news service particularly, the options for selecting non-news items are very broad. Therefore, prior information about the world would likely have had little to do with recall of information in the present study. Even if it there was some relationship, though, random assignment to groups should have controlled for such an impact. It also was not possible to administer the same test of general news knowledge to subjects because they could not be scheduled in the same week. While some information about the world remains constant, much of it does not. Even if an equitable test

of general news knowledge could have been constructed, such a test might have prompted certain news-seeking behavior by subjects. Subjects might have been cued to particular stories because of the test (Westley & Barrow, 1959).

The media selected for this study were the Wall Street Journal and its electronic counterpart, the Dow Jones News/Retrieval Service. Dow Jones and the Journal were selected because a videotex system was not available and because other nationwide ASCII text services did not meet the requirements of the experiment. Services such as CompuServe, NewsNet, and the Source did not have readily available national newspaper counterparts.

The Wall Street Journal, regarded as one of the best daily newspapers in the United States, has the largest circulation (more than two million) of any U.S. daily. The primary emphasis in the Journal is on business and financial news and information. It also includes world-wide news briefs, editorials, letters to the editors, and news features that could be of interest to a general audience. Copies are 50 cents each.

Begun in 1974, Dow Jones News/Retrieval had more than 150,000 subscribers in 1985 when this study was conducted. The service is available 22 hours a day, seven days a week. Access was possible with a personal computer, a communicating word processor, a time-share terminal, and, in a few areas, via cable television. Access cost at a special educator's rate was 25 cents per minute any time of the day or night. Other subscribers paid a minimum of 50 cents per minute before 6 p.m. each day. News/Retrieval subscribers can access any portion of the full text of the current issue or back issues of the Wall Street

Journal by using key words, numbers, or dates. (Since this study was completed, the full text of the Washington Post has been added to the service.) Included in the database are headlines and summaries of stories from the Wall Street Journal and foreign and national news from the Associated Press. Also available is news from the Dow Jones News Service that is accessed by key word or company names. In addition, the database provides a weekly economic update; Dow Jones current and historical stock market quotes; and various financial investment services. A general news and information services category includes an encyclopedia, medical information, the Official Airline Guide, weather for 90 domestic and foreign cities, sports, movie reviews, an electronic shopping service, and transcripts of the PBS television program "Wall Street Week."

Most of the database was made available to on-line users because only a truncated version of the current Wall Street Journal was available through menu access. Although the entire text of the Journal can be accessed by key word searches, it is a complicated technique. Therefore, editorial content was not identical in both treatments, but it represented what users of each medium would confront in the real world. Obviously, the database contains a greater variety of information than is available in the Wall Street Journal, and overall, the Journal stories are longer. Some items, such as World-Wide News Briefs, are identical in both media. A threat to external validity does arise with the use of the Journal because it is unlike most daily newspapers in that it uses few graphics and no photographs, except in ads. There is little variation in headline size or in page layout. Support for the hypotheses using this newspaper, though, increases

the likelihood that the results would hold using newspapers with more editors' cues and attention-arousing features. In addition, because the page layout does not vary, each subject in the study was being exposed to a paper that has similar cues from day to day. Therefore, the general layout of both the newspaper and the on-line service remained substantially the same.

When the study was conducted, corporate accounts comprised about 70 percent of Dow Jones News/Retrieval subscribers. Although this service appeals primarily to the business community, many services offered on the system could be expected to appeal to the home consumer as well as the business consumer. The Wall Street Journal, widely read by the business community, certain parts of the paper could appeal to the non-business consumer as well.

Subjects were to be tested on what they read and recalled from each medium. Therefore, no control group was used in the present study because it would serve no function. Instead of a control group, the 50 subjects were randomly assigned to either the newspaper group or the news service group. Not all researchers (Culbertson, 1981, e.g.) agree that random assignment provides an adequate measure of control but others (Westley, 1981) believe randomization does provide an adequate control. In addition, the researcher also controlled the circumstances under which subjects were exposed to the treatment, the instrument used, and its administration. Each of these contributes to the "quality control" of the experiment (ibid).

The following sections will describe how the study was carried out. Briefly, 50 subjects were assigned to read either the Dow Jones News/Retrieval Service on-line or the Wall Street Journal. After

subjects had read for a maximum of 20 minutes, the instrument was administered. First, subjects were asked to recall as much as they could about what they read. Then they were asked to complete a questionnaire that solicited information regarding their media use habits and demographics, such as age, education, gender, and marital status. The instrument also included a 23-item locus of control scale and a 7-item benefits index.

Hypotheses one, two, five, and six required comparing the means of each treatment group and a t-test was used to test for significant differences. Hypotheses three and four required comparing the relationship between the dependent and independent variables. Therefore, a Pearson Product Moment Correlation coefficient was computed to test for significance.

The Sample

The sample was comprised of 50 volunteers from business, industry, education, and government from metropolitan Milwaukee, Wisconsin. The researcher attempted to get a random sample from the business community, but was unable to secure the cooperation of various companies contacted. Therefore, volunteers were secured through referrals from people with whom the researcher was acquainted. These volunteers were selected because they indicated an interest "in the type of information one might find in a newspaper like the Wall Street Journal." People with such an interest would be likely to have the ability to comprehend business and economic news, which makes up a substantial portion of the editorial content. Also, the way in which members of the business community use these systems might

very well indicate how the non-business consumer might also use them. Home adoption is more likely to follow adoption and familiarity with the systems in the workplace. Some of the occupations represented in the group were bank vice president, real estate developer, company treasurer, certified public accountant, stockbroker, public relations practitioner, and teacher, to name a few.

The 50 volunteers included 36 (72 percent) who were male and 33 (66 percent) who were married. There were 16 men and 9 women in the Wall Street Journal group and 20 men and 5 women in the Dow Jones group. Subjects ranged in age from 22 to 61 years, with an average age of 35.9. The average age of those in the Dow Jones group was 32.5 and in the Wall Street Journal group it was 39, a significant difference.

Only one of the subjects did not have at least a bachelor's degree, and that subject was in the Dow Jones group. Nineteen subjects had advanced degrees and 19 others were studying full-time or part-time for degrees such as the master's in business administration. Subjects with previous experience using a computer included 19 in the Dow Jones group and 14 in the Wall Street Journal group.

Only one person reported reading no daily newspaper regularly, and 32 people reported reading two or more daily newspapers regularly. Although the majority of subjects said they spent an average of more than 20 minutes reading a daily newspaper, they also reported reading an average of 2.2 newspapers per day. Total time spent reading daily newspapers each week was computed by multiplying the time spent reading daily newspapers each day by the number of days each subject reported reading a daily newspaper. If a subject

reported spending "20 to 30 minutes" reading a daily newspaper, the mean number of minutes was coded. The newspapers and the number of subjects who reported reading them regularly were the Milwaukee Journal, 42; Milwaukee Sentinel, 24; Wall Street Journal, 19; Chicago Tribune, 8; New York Times, 8; and USA Today, 3.

Twenty-six subjects reported reading a weekly newspaper regularly and they spent an average of about 54 minutes doing so. The majority of the newspapers that subjects reported reading regularly were various suburban weeklies. But the weekly newspaper with the largest number of readers in the study was the Milwaukee Business Journal, which 10 subjects reported reading regularly. A few specialty weeklies such as Sporting News, Barron's, and the Catholic Herald were also weekly newsreading fare for some of the subjects. In addition, two subjects reported reading only the Sunday editions of the Milwaukee Journal, Chicago Tribune, and The New York Times.

Weekly newsmagazines were read by 26 subjects in the study. The magazines and the number of subjects who reported reading regularly included: Time, 15; Newsweek, 10; U.S. News & World Report, 5; Business Week, 1; and The Nation, 1.

All but four subjects reported watching some television after 5 p.m. weekdays. Only 24 (48 percent) of the subjects reported that they usually watched national news programs on television, but 35 (70 percent) said they usually watched local news broadcasts. National news programs are broadcast in Milwaukee at 5:30 p.m., perhaps too early in the day for many working persons to view. In the debriefing following the experimental sessions, some subjects also commented that they tended to watch local news broadcasts at 10 p.m. rather than at

6 p.m. About a fourth of the subjects said cable television was not available where they live, but about one third of all subjects said they subscribed to cable television. Subjects spent an average of 24 hours with the media each week, not counting weekend television viewing. The average time all subjects spent with each medium is reported in Table 1. Time spent by subjects with all media were totaled for a media use score. Treatment groups did not vary significantly on the variable media use or when individual media use was compared. The number of subjects who said they read the Wall Street Journal regularly also did not differ significantly.

Table 1

AVERAGE TIME IN MINUTES SPENT WITH THE MEDIA EACH WEEK

Medium	Minutes	(Hours)	(N)
Daily newspapers	334.82	(5.6)	(49)
Weekly newspapers	53.61	(8.9)	(26)
Weekly newsmagazines	86.73	(1.5)	(24)
Television (after 5 p.m., weeknights)	540.76	(9.1)	(46)
Radio	438.17	(7.3)	(46)

Subjects in the study also tended to rely more on newspapers than on other media as their source of information in various news categories. Robinson and Levy (1986) suggested that interpersonal communication may be overlooked as a source in "main source of news" studies, but that did not seem to be so for subjects in the present study. Responses to questions about subjects' primary source of news are reported in Table 2.

Overall, the profile of the sample is similar to that of potential

Table 2

PRIMARY SOURCE OF NEWS

Primary Source of news:	N of Subjects
About state & govt affairs	
Newspapers	39
Radio	4
Television	6
Friends, relatives, co-workers	-
Other	1
About international affairs	
Newspapers	26
Radio	6
Television	16
Friends, relatives, co-workers	-
Other	2
About business & the economy	
Newspapers	38
Radio	3
Television	3
Friends, relatives, co-workers	4
Other	2
About federal government & politics	
Newspapers	29
Radio	6
Television	12
Friends, relatives, co-workers	1
Other	2
About local government & politics	
Newspapers	37
Radio	2
Television	10
Friends, relatives, co-workers	1
Other	-

videotex subscribers -- "male, white, college educated, between the ages of 25 and 45, of managerial or professional status," characteristics that also apply to heavy users of newspapers and magazines (Dozier & Rice, 1984).

The Instrument

The instrument used was designed to gather data on subjects' information seeking behavior, perceived locus of control, media use, perceived benefits derived from the treatment medium, and demographic characteristics. (See Appendix A for a copy of the instrument.)

Information seeking was operationalized as a five-point, Likert-type interval scale. The poles of the scale were labeled: "I was looking for this type of information" and "I was not looking for this type of information." Responses were coded from 5 to 1, with 5 representing the greatest degree of "looking" and 1 representing the least degree of "not looking." The information seeking score was computed by summing subjects' responses on the scale for each item they recalled. This score was then divided by the number of items read. In the portion of the instrument that asked subjects about their use of the media, subjects were asked to indicate which of the following statements best describes how they usually read a newspaper: "I usually go through the newspaper looking for articles that are relevant to my personal or professional life, or which are about things that are important to society" or "I usually scan the newspaper just reading whatever happens to catch my eye, but not looking for anything in particular."

Locus of control was measured by using the Rotter (1966) I-E

(internal-external) scale. The scale is designed to measure the degree to which people perceive control over their lives to be in their hands or in the hands of fate. The scale consists of 23 paired, forced-choice items plus six filler questions. One filler question was eliminated from the instrument used in the present study. The paired statements in the omitted item were: "There is too much emphasis on athletics in high school. Team sports are an excellent way to build character." Each item in the Rotter instrument consists of one internal and one external statement. One point is given for each external statement and 0 points are given for internal statements. The points are added for a total score. The higher the score, the more an individual perceives control to be external. Scores can range from 0 (most internal) to 23 (most external). When Rotter administered the scale to 400 college students in an elementary psychology class, he reported a combined internal consistency coefficient (Kuder-Richardson) of .70. When the instrument was administered to a smaller sample at one-month and two-month intervals, test-retest reliability coefficients of .72 and .55 were reported. A reliability analysis of the locus of control scale in this study yielded a combined internal consistency coefficient (Kuder-Richardson) of .82.

Media use was measured by asking subjects how much time they usually spend with various media. Subjects were asked which daily and weekly newspapers and newsmagazines they read. Some daily newspapers were listed by name to expedite completion of the questionnaire. The daily newspapers listed on the instrument were the Milwaukee Journal, Milwaukee Sentinel, Wall Street Journal, USA Today, and Chicago Tribune. A space was provided for subjects to write in

"other" newspapers they read regularly. Subjects were also asked how much time they spend reading daily and weekly newspapers and magazines, watching television, and listening to the radio. If cable television was available where they live, they were asked to indicate whether they subscribe to it. In addition, subjects were asked if they watch local and national news broadcasts. They were also asked to indicate their primary source of information for news about state and government affairs, international affairs, business and the economy, federal government and politics, and local government and politics.

Seven items of the instrument comprised an index regarding benefits a user perceived from the treatment medium, the Wall Street Journal or the Dow Jones News/Retrieval Service. Item choices were "extremely useful," "somewhat useful," "don't know," "not very useful," and "not at all useful," coded from 5 to 1, respectively. This index was comprised of questions based on one developed by Ettema (1983) that showed a relationship between media use and reported benefits derived from a videotex system. Not all of the questions developed by Ettema were appropriate for the present study because the subjects were not homogeneous in terms of occupations. Ettema's respondents were farmers who had access to a videotex service. Ettema factor-analyzed responses to 24 items in his survey and four factors emerged. The four factors and their alpha coefficients were General Benefit Index, .92; Information-Seeking Value, .93; Decision-Making Value, .89; and Electronic Newspaper Value, .76. Seven questions were adapted from Ettema's index for the present study. These questions included two each related to general benefit, information seeking value, and electronic news value, and one question related to decision-making

value. A reliability analysis of this benefits index produced an internal consistency coefficient (Kuder-Richardson) of .79.

Subjects were also asked to provide demographic information such as age, gender, marital status, occupation, highest degree earned, and whether they were currently studying for an advanced degree. Income levels were not requested because income has not been shown to be a useful variable in predicting information seeking behavior. In addition, subjects in the pretest were reluctant to supply income information. Because pretest subjects were similar in professional status to those in the study, a comparable reaction was expected to accrue if income information was requested. Such information, therefore, was not perceived as important enough to risk offending the subjects.

Previous computer experience was not essential to the experiment, but subjects were asked if they use a computer at home, work, or school, and 33 (66 percent) said they had used a computer. Those who had some computer experience adapted more quickly to the on-line system, but only by a minute or two. Because the subjects were well educated and the system commands were simple, they required very little instruction overall. Subjects were also asked to indicate any databases they had used by checking off the Source, CompuServe, Dow Jones News/Retrieval, NewsNet, and "other," filling in the name of the service if "other" was checked. It was also expected that some experience using a database or a personal computer might help to mitigate the novelty of using the Dow Jones service. Two of the subjects reported that they were currently subscribing to Dow Jones News/Retrieval.

Pretest

Six volunteers participated in a pretest of the techniques and instrument to be used in the study. Their occupations were similar in status to the final sample used in the study. Three subjects were tested in the newspaper condition and three were tested in the electronic news service condition.

In the pretest, subjects were permitted to spend as much time as they desired reading the Wall Street Journal. Although other research had indicated that the average person spends 15-20 minutes reading a daily newspaper, averages could vary with the newspaper. In the pretest, the time spent reading the newspaper ranged from 15 to 45 minutes. The person who spent 45 minutes reading the newspaper was doing so as part of his job requirements. Each day he reads the Wall Street Journal to locate and clip items of possible interest to his employer. This was not expected to be typically the case in the present study. If it did turn out to be the case, it would have biased the results in favor of rejecting the information seeking hypothesis rather than in favor of accepting it.

Subjects would not be reading the newspaper as part of their jobs, therefore, it was decided that 20 minutes would be an adequate amount of time for reading the Journal. As with any newspaper that is consistent in its placement of types of stories, readers who had some familiarity with the Journal would generally know where to find what they want to read or don't want to read because page layout does not vary from day to day. For example, in a pretest of the instrument and techniques, one subject said he never bothers to glance at column 1 on

page 1 because he knows that column will contain a feature in which he would be likely to have no interest.

Subjects in the on-line pre-test might have stayed on the system indefinitely, had they been permitted to do so. But, after about 15-20 minutes, subjects attempted entry into databases that require more complex commands than the databases used in the present study. Because subjects lacked sufficient information to do tasks such as keyword searches, they were unsuccessful in entering those databases, and the sessions were terminated after 30 minutes had passed. It seemed, then, that 20 minutes was an adequate time period for the on-line service as well. Additional time would not be likely to add any knowledge to the research and it could frustrate the subject.

The pre-test also showed that people with computer experience adapted more quickly to the system than those unfamiliar with or fearful of computers. Random assignment of subjects to treatment groups, however, controlled for these differences.

Findings from the pretest helped to modify the questionnaire and to determine the length of each session. It also helped to draw the researcher's attention to subtle differences in the Wall Street Journal from day to day. For example, one front page column has a different topic focus each day, such as "Economic Outlook" and "Labor Letter."

Data Collection and Preparation

None of the subjects knew what they would be doing in the experiment. Most of the subjects did not know each other so there was a minimal chance that they would discuss the experiment with each other. Nevertheless, all subjects were asked not to discuss the study

with anyone else. When appointments for testing were made with subjects, they were told that the session would last about an hour during which time they would "read something" and then answer some questions. To ensure that they had not read the Wall Street Journal on the day of testing, subjects were told to refrain from reading a newspaper on that day. At the start of the test session, subjects were asked if they had read a newspaper that day. The researcher was not concerned with controlling exposure to other media because, under normal circumstances, subjects might very well read more than one newspaper. Besides, much of the content of the Wall Street Journal is different than that of other readily available newspapers. Other newspapers that subjects might have read such as the Milwaukee Sentinel emphasize local news. Only one subject admitted having read a newspaper before the testing, but she had not read the Wall Street Journal. Her data was included in the analysis.

Testing took place on weekdays during the summer of 1985. The Wall Street Journal publishes on Mondays through Fridays and the current issue of the newspaper was used. Subjects were tested individually in a room free of distractions and interruptions. Sessions lasted from 45 minutes to one hour. Variations in the length of the sessions depended on the length of time it took individuals to recall information and complete the questionnaire. The researcher conducted all sessions so as not to introduce experimenter bias into the experiment.

In some instances, the researcher was required to go to the subject's place of business for the testing. In those cases, subjects were asked to provide a location that was free from distractions and

interruptions. For some subjects, the additional requirement of a telephone jack was made. Those who were tested in their workplaces were very cooperative in meeting the requirements of the experiment.

Subjects were assigned randomly to either the newspaper condition or the electronic news service condition. To do this, appointments were made at the convenience of the volunteers. Prior to making the appointments, 50 slips of paper were equally divided and labeled with "WSJ" or "DJ" and placed in a box. These slips were then randomly selected to determine the treatment assignment of each subject. If the slip of paper selected was labeled WSJ, the subject was assigned to the newspaper group. If the slip of paper was labeled DJ, the subject was assigned to the electronic news service group.

Readers of the Journal were instructed to mark the newspaper as they read it. As Stamm and Jacoubovitch (1980) have observed, a news story is an aggregate of several smaller units such as headlines and text. In their study of newspaper readership, they operationalized readership of headlines as simply whether they were read or not read. Text was measured by column inches. Subjects in the Stamm and Jacoubovitch study were to place a check mark on headlines, photos, cutlines, cartoons, and ads, and to trace a line alongside columns of stories when reading text. This procedure was adapted for the present study. Subjects were given a china marker and told to put a check mark on all headlines, graphics, and ads as they read them. They were also told to trace a line along the right side (or left side for lefthanded people) of each column, stopping the line when they stopped reading. This allowed the researcher to know exactly which stories or items had been read by each subject. Then subjects were told that

they would have up to 20 minutes to read the newspaper freely, but to signal the researcher if they finished reading before the time was up. This allowed subjects to read the paper naturally without feeling pressured to fill up the time. The comments and instructions recited by the experimenter to subjects in the newspaper group are included in Appendix B.

Access to the news-retrieval service was possible with a personal computer, communicating word processor, time-share terminal, or, in a few areas, via cable television. For the present study, the researcher's Kaypro II transportable microcomputer and Hayes 1200 Baud Smartmodem were used to access Dow Jones. The service was accessed at 300 baud to minimize research costs. Transmission at 1200 baud would have doubled the on-line time charges. Each subject's session was saved on a computer disk for later printing and analysis. Before accessing the service, subjects were given a list that briefly described the contents of each database that they would be permitted to access and the symbols used to access each. This list is included in Appendix C of this report. Certain databases were excluded from the options because of the complexity of access or special requirements needed for access. For example, the complete text of previous issues of the Wall Street Journal was not included because that database was not menu-driven and required key words and special codes to access. The electronic shopping service also was not offered as an option because an account number was required for access.

Subjects were instructed to spend a few minutes reviewing the various databases in the Dow Jones New/Retrieval Service. They were told that when they finished reviewing the options, they would be

shown how to use the system and then would have up to 20 minutes to use the system freely, but they could discontinue use at any time. When the subjects indicated they were ready to begin, the experimenter demonstrated how to use the service by calling up INTRO, a free on-line newsletter for Dow Jones subscribers. This served as a model for the menu structure of the databases and provided the researcher with a cost-free way of demonstrating the system. As much time as was needed was given to the subjects to familiarize themselves with the method of operation. Comments and instructions given by the interviewer to subjects in the news/retrieval group are included in Appendix B of this report.

After subjects had completed reading the newspaper or the electronic news service, they were each given generic descriptions of the contents of the newspaper or the electronic news service to aid them in recalling what they had read. As Woodall et al. (1983) noted, retrieval cues are necessary for access to stored information. Journal subjects were given a list of story types, columns, and other information that could be found in the newspaper on the day of testing. Certain front page columns change each day so the appropriate list was prepared for each day of the week. Dow Jones readers used the description of the databases as an aid to recall. In both instances, the subjects were referring to generic descriptions rather than specific stories or headlines. Although these were only generic descriptions or titles, it was hoped that they would provide some of the cues that are necessary for information retrieval (Woodall et al., 1983). Copies of the descriptions used as an aid to recall are included in Appendix C of this report.

At the end of the reading period, subjects were first given sheets of paper that contained spaces for writing down the central theme for each item the subjects could recall reading, additional facts they could recall reading, and the information seeking scale. A sample of these sheets is included with the rest of the instrument in Appendix A. Enough sheets were provided for recall of up to 15 items. No subjects in the pre-test had recalled more than 12 items. Subjects were told to use as many or as few sheets as they needed. They were instructed to write down the central theme for each item they could recall reading and any additional facts they could recall, being as specific as possible. They were also instructed to put a check mark on a five-point, Likert-type scale representing the degree to which they were looking or not looking for the type of information that they expected to find in each item. Poles of the scale were labeled "I was looking for this type of information" and "I was not looking for this type of information." Subjects were given as much time as they needed for recall.

When subjects indicated that they had recalled about as much information as they could recall, they were asked to "answer some general questions related to their use of the media and some questions related to the way in which events in our society affect different people." The instrument (Appendix A) that was administered probed subjects' media use, locus of control, perceived benefits from using the respective media, and demographic characteristics, in that order.

Definition of Variables and Data Analysis

The data were coded by a graduate student in journalism at Marquette University and checked for errors by the researcher. The codebook included in Appendix D shows how the data were coded. Data were analyzed using SPSS^X. The operationalization of variables and statistical tests of the six hypotheses are described in this section.

Hypothesis 1: More information seeking behavior will be exhibited by readers of an electronic news service than by readers of a newspaper.

The independent variable for Hypothesis 1 is the medium -- the Dow Jones News/Retrieval Service or the Wall Street Journal. The dependent variable is information seeking behavior. Information seeking behavior was operationalized as a five-point, Likert-type, equal-appearing interval scale. Poles of the scale were labeled "I was looking for this information" and "I was not looking for this information." After subjects wrote down as much as they could recall about each story or item they read, they put a check mark on the space that represented the degree to which they were looking or not looking for the information they had expected to find in the item read. The scale was coded from 5 to 1, with 5 representing the highest level of information seeking and 1 representing the lowest level of not seeking.

An information seeking score was computed for each subject by summing each subject's responses and dividing the score by the total number of items read to get an average information seeking score. The average of all subjects in each group was computed to yield a group

mean. A t-test was used to determine if there was a significant difference between the information seeking means of those in the newspaper group and those in the electronic news service group. The significance level was set at $p < .05$. Menus and instructions read in the news retrieval service were not included in the computation of items read nor were headlines and indexes read in the newspaper group.

Hypothesis 2: More information will be processed by readers of a newspaper than by readers of an electronic news service.

The independent variable is the medium -- the newspaper or the electronic news service. The dependent variable is processing of information. "More information processed" was operationalized in two ways -- by the total inches read by each subject and by the total number of headlines read. An inch of copy in the electronic news service was equal to one-half inch of copy in the newspaper, and equivalent inches were coded for the analysis. Only inches of stories read by subjects in each group were included in the computation of inches read. Headlines and advertising in the newspaper and menus and instruction "pages" in the electronic news service did not lend themselves to an equivalent measurement. The number of headlines read was counted.

A t-test compared the mean number of inches read by those in the Wall Street Journal group with the mean number of inches read by those in the Dow Jones News/Retrieval group. A t-test was also used to compare the mean number of headlines read by each group. The significance level was set at $p < .05$.

Hypothesis 3: Media use will be inversely related to perceived benefits from using an electronic news service.

The independent variable for Hypothesis 3 is media use. The dependent variable is perceived benefits. Media use was operationalized as the subjects' self report of total time spent reading daily and weekly newspapers and newsmagazines, watching television after 5 p.m., and listening to the radio. If subjects said they usually read a daily newspaper, they were asked how many days a week they spend reading a daily newspaper and how much time they spend each day reading a daily newspaper. The time spent each day was multiplied by the number of days the subject reported reading a daily newspaper to get a total time spent each week reading a daily newspaper. Time spent watching television after 5 p.m. weekdays was multiplied by five as was daily radio listening time. Weekend viewing and listening time was not requested. Total weekly media use was the time spent each week reading daily newspapers, watching television, and listening to the radio, and reading weekly newspapers and newsmagazines.

Perceived benefits was operationalized as an index of statements adapted from a study by Ettema (1983) in which he investigated benefits perceived by users in a videotex trial. Subjects were to circle the response that best represented how they felt about each of seven statements. The responses were "extremely useful" (5), "somewhat useful" (4), "don't know" (3), "not very useful" (2), and "not at all useful" (1). The seven statements that comprised the index were:

> Overall, how useful do you think Dow Jones News/Retrieval is or might be in saving you time and energy?
>
> Overall, how useful do you think Dow Jones News/Retrieval is or might be in keeping you better informed?
>
> How useful do you think Dow Jones News/Retrieval is

or might be in saving you time and energy by bringing a variety of information together in a single place?

How useful do you think Dow Jones News/Retrieval is or might be in saving you time and energy by making information quickly available to you whenever you are read to use it?

How useful do you think Dow Jones New/Retrieval is or might be in helping you make various decisions in a more organized and rational way?

How useful do you think Dow Jones News/Retrieval is or might be in keeping you up-to-date on business news?

How useful do you think Dow Jones News/Retrieval is or might be in keeping you up-to-date on international news?

A Pearson Product Moment Correlation coefficient was computed to determine the relationship between media use and perceived benefits.

Hypothesis 4: Individuals who score lower on a locus of control scale will perceive more benefits from using an electronic news service than will individuals who score higher on a locus of control scale.

The independent variable for Hypothesis 4 is locus of control. The dependent variable is the perceived benefits derived from using the newspaper or the electronic news service. This index is the same as that described under Hypothesis 3. Locus of control was measured by using the Rotter (1966) I-E (internal-external) Scale. The locus of control instrument is comprised of 23 paired items, one item measuring internality and measuring externality plus five filler items. Only four of the fillers were included in the instrument used in this study. The locus of control scale and fillers begin with question 23 in the instrument in Appendix A. Responses representing internality were coded as 0 and responses representing externality were coded as 1. The responses were then summed to yield a total locus of control

score. Subjects were divided at the median for the analysis. Those who fell at or above the median were considered to be externals. Those who fell below the median were considered to be internals.

A Pearson Product Moment Correlation coefficient was computed to determine the relationship between locus of control and perceived benefits from using an electronic news service. The significance level was set at $p. < .05$.

Hypothesis 5: Readers of an electronic news service will recall proportionally more factual information than will readers of a newspaper.

The independent variable is the medium -- the newspaper or the electronic news service -- and the dependent variable is factual information recalled. Recall of information was operationalized as the number of correct facts recalled per inch of information read. Headlines, advertising, menus, and instructions were not included in the measurement of inches nor in the computation of facts recalled. Inches in the on-line service were converted to equivalent newspaper inches for the analysis. The coder fitted information recalled by subjects to the questions "who, what, where, when, why, and how." For each fact that was recalled correctly, subjects were given one point. A statement such as "Toyota will begin making cars in the United States in 1987," for example, was coded as four facts. The total number of facts recalled by each subject was divided by the total inches read to arrive at the mean number of facts recalled per inch of copy read. One-paragraph items contained in a column called "What's News" were counted as separate stories. "What's News" appears the same way in both the electronic news service and the newspaper and

subjects tended to read them as individual items, as indicated in a pre-test. The researcher checked all coding for errors in the computation of facts. Disagreements about what constituted a fact were resolved by discussion, however, there was almost no disagreement.

A t-test of the mean number of facts recalled per inch of copy read was used to determine if there was a significant difference in the means of each group. The significance level was set at $p < .05$.

Hypothesis 6: Readers of an electronic news service will understand more information recalled than will readers of a newspaper.

The independent variable is the medium -- the newspaper or the electronic news service. The dependent variable is comprehension. Comprehension was operationalized in several ways. First of all, it was the ability of the subject to reproduce the central theme of the items recalled (Reese, 1984). Central theme was defined as the main point or subject of a story. After themes were coded by the graduate student, they were reviewed by the researcher. Disagreements over central themes were resolved by discussion. Menu pages and instructions in the on-line service were not counted as items read. No theme is noted for headlines recalled. Responses for each story were coded as 1 if the subject was able to approximate the central theme and 0 if the subject was not able to approximate the central theme. The cumulative score for each subject was then divided by the total number of stories recalled by that subject to arrive at an average score for each subject. Group means were computed and a t-test determined whether there was a significant difference in the comprehension level of each group. The significance level was set at $p < .05$.

Another method of comprehension was to compare the absolute

number of central themes recalled, regardless of the number of stories read. A third measure of comprehension was the total number of errors in recall made by subjects in each group.

Limitations

The biggest threat to external validity or representativeness lies in the fact that the reading is not being done naturally. Even for those subjects who were tested in their work environments, the timing was an unnatural interruption in their work day. Also, in a natural setting a person might not read all of the newspaper or select content from the news/retrieval system during the same time period. An electronic news reader might, for example, call up information and save it to disk for later printout and reading. This could affect what and how much is read as well as what is remembered.

Even though the subjects in the present study were representative of the population that is expected to be adopters of videotex technology, the results of the study are not necessarily generalizable to current users of electronic services. Even though subjects were randomly assigned to treatment groups, they were not randomly selected, thereby decreasing the ability to generalize to a larger population.

CHAPTER IV

RESULTS

The present study examined information seeking and information processing behavior that obtains when reading an electronic news service and when reading a newspaper. An experiment was conducted with 50 volunteers who were randomly assigned to one of two treatment groups. Subjects in one treatment group read the Wall Street Journal and in the other group they read the Dow Jones News/Retrieval Service on-line. There was a significant differences between the treatment groups on age. Subjects in the Wall Street Journal group had a mean age of 39 compared to 32.5 in the Dow Jones group. However, there was no significant correlation between age and the dependent variables in each of the six hypotheses tested. This chapter reports the results of the tests of the hypotheses. Additional analyses relevant to the hypotheses were done and those results are reported here as well.

Hypothesis 1. More information seeking behavior will be exhibited by readers of an electronic news service than by readers of a newspaper. The null hypothesis tested was that there would be no difference between the group means on the information-seeking variable.

Information seeking was operationalized as the subjects' self-report of the degree to which they were looking or not looking for the items they recalled. Poles of the scale were labeled "I was looking for this type of information" and "I was not looking for this type of

information." Responses were coded from 5 to 1, with 5 representing the greatest degree of "looking" and 1 representing the least degree of "not looking." The information seeking score was computed by summing subjects' responses on the scale for each item they recalled. This score was then divided by the number of items read. The range of items recalled by subjects was from 1 to 13. As predicted by the alternative hypothesis, subjects in the Dow Jones group had a higher average information seeking score than those in the newspaper group. The results of a t-test comparison of the mean information seeking scores are reported in Table 3. The t was significant at the .001 level of confidence and the null hypothesis was rejected.

Table 3
A T-TEST COMPARISON OF INFORMATION SEEKING MEANS

Dow Jones		Wall Street Journal		
Mean	SD	Mean	SD	t
3.72	.85	2.89	.91	3.33

Because the results could also have been due to factors other than the variation in the medium, subjects were also asked to indicate how they usually read a newspaper. The choices were "I usually go through the newspaper looking for articles that are relevant to my personal or professional life, or which are about things that are important to society" and "I usually scan the newspaper just reading whatever happens to catch my eye, but not looking for anything in particular." Two subjects, one in each group, did not answer the question. The majority of the subjects (62 percent) said they usually look for relevant articles. The actual distribution on this measure is

reported in Table 4. A point-biserial correlation (Nunnally, 1978) was then computed to determine the strength of the relationship between what subjects said was their usual behavior and what they did in the present study. An r_{pb} of .08 indicates a negligible relationship between the two variables.

Table 4
HOW SUBJECTS USUALLY READ A NEWSPAPER

	Dow Jones	Wall Street Journal
Scan	9	8
Look For Articles	15	16

Although random assignment of subjects to treatment groups should have controlled for variations attributable to differences of subjects, multiple regression analyses were done to determine which, if any, demographic or media use variables might be useful as predictors of information seeking. Variables entered into the first equation were gender, marital status, education, age of subject, and exposure to the on-line service. Subjects exposed to the on-line service were coded 1 and those who were not exposed were coded 0. The results are reported in Table 11, Appendix E. Variables in the second equation included time spent watching television, listening to radio, and reading daily newspapers, weekly newspapers, and magazines in addition to exposure to the on-line service. The results are reported in Table 12, Appendix E. Neither the demographic variables nor the media use variables were significant predictors of information seeking. The best and only significant predictor variable in the equation was exposure.

Hypothesis 2. More information will be processed [read] by

readers of a newspaper than by readers of an electronic news service. The null hypothesis tested was that there would be no difference in the group means on amount of information processed [read] by the treatment groups.

"More information processed" was operationalized as the sum of inches read by each subject and by the total number of headlines read. Inches in the on-line service were converted to equivalent newspaper inches, and only inches of stories read were computed for the analysis.

Although the average number of stories read by Dow Jones readers (9.96) and Wall Street Journal readers (12.28) did not differ significantly, the difference in inches read represented by these stories was substantial. The results of a t-test comparison of stories read and inches read is reported in Table 5. The t was significant at the .000 level of confidence, and the null hypothesis was rejected.

Table 5
A T-TEST COMPARISON OF AVERAGE NUMBER OF INCHES READ AND STORIES READ

	Dow Jones		Wall Street Journal		
	Mean	SD	Mean	SD	t
Inches	21.8	10.0	94.8	65.12	5.54*
Stories	9.96	5.70	12.28	8.74	1.11

*Significant at $p < .000$

As might have been expected, subjects read more headlines than stories. All headlines and ads that were marked by Wall Street Journal subjects were summed as were headlines that appeared in menus of the

Dow Jones News/Retrieval Service. A t-test comparison of headlines read by each group are reported in Table 6. Wall Street Journal readers read an average of almost 20 headlines and Dow Jones readers read an average of about 15 headlines, but the difference was not significant. In addition, newspaper readers read an average of 3.4 ads. So newspaper readers did read more headlines and they also read advertising, which was not available in the on-line service.

Table 6
A T-TEST COMPARISON OF AVERAGE NUMBER OF HEADLINES READ

Dow Jones		Wall Street Journal		
Mean	SD	Mean	SD	t
15.24	12.31	19.76	13.13	1.26

Additional multiple regression analyses were done using demographic and media use as predictor variables and inches read as the criterion variable. Entered into the first equation were the variables gender, marital status, education, age of subject, and exposure to the on-line service. Media variables entered into the equation were time spent watching television and reading daily newspapers, weekly newspapers, and newsmagazines. Time spent reading weekly newspapers and weekly newsmagazines had almost no predictive power and were omitted from the analysis. Sex and time spent watching television were significant predictor variables in addition to exposure to the on-line service. The results of these analyses are displayed in Tables 7 and 8.

A multiple regression analysis was also run using headlines read as the criterion variable and the demographic variables age, gender,

marital status, education, and age as predictor variables. Exposure to the on-line service was also entered into the equation. None of the predictor variables were significant and accounted for only 8 percent of the total variance.

Table 7
MULTIPLE REGRESSION ANALYSIS
FOR THE CRITERION VARIABLE INCHES READ

VARIABLE	BETA WEIGHT	T	SIG T
Exposure	-0.624	-4.894	.000
Sex	.237	-2.076	.04
Marital Status	-0.049	-0.394	.70
Education	-0.042	.348	.73
Age	-0.117	-0.912	.37
Constant		2.965	.005

R=.683 R^2=.467

Table 8
MULTIPLE REGRESSION ANALYSIS
FOR THE CRITERION VARIABLE INCHES READ

VARIABLE	BETA WEIGHT	T	SIG T
Exposure	-0.692	-6.385	.000
Radio	-0.04	-0.379	.70
Television	.380	3.471	.001
Dailies	-0.107	-0.938	.35
Constant		5.228	.000

R=.722 R^2=.522

Hypothesis 3. Media use will be inversely related to perceived benefits from using an electronic news service. The null hypothesis tested was that the correlation coefficient of media use and perceived benefits will be equal to 0. This hypothesis applies only to subjects in the news retrieval group.

Benefits perceived was measured by an index comprised of seven statements adapted from an index used by Ettema (1983). The

statements in the index were presented in Chapter III and are also displayed in the instrument in Appendix A.

Media use was operationalized as time spent reading daily and weekly newspapers and newsmagazines, watching television, and listening to the radio. A detailed account of subjects' media use was presented in Chapter III as part of the description of the sample. Time spent by subjects with all media were totaled for a media use score. Subjects spent an average of about 24 hours with the media each week, not counting weekend television viewing or weekend radio listening.

A Pearson Product Moment Correlation coefficient was computed to determine the strength of the relationship between media use and perceived benefits. The coefficient of -0.08 was very weak and not significant (p=.36), providing no support for the hypothesis.

Hypothesis 4. Individuals who score lower on a locus of control scale will perceive more benefits from using an electronic news service than will individuals who score higher on a locus of control scale. The null hypothesis tested was that the correlation coefficient of locus of control and perceived benefits would be equal to 0. This hypothesis was tested only with subjects in the news retrieval group.

The same benefits index used to test Hypothesis 3 was used to test Hypothesis 4. Locus of control was measured using a scale developed by Rotter (1966). Rotter's I-E (internal-external) scale consists of 23 paired statements plus six fillers. One filler item was omitted from the instrument used in this study. This item was: "There is too much emphasis on athletics in high school. Team sports are an excellent way to build character." Statements in each item indicating externality were coded as 1 and statements indicating internality were

coded as 0. A reliability analysis of the locus of control scale in this study yielded a combined internal consistency coefficient (Kuder-Richardson) of .82.

Not all researchers who have used the locus of control scale as a variable have reported how they distinguished between externals and internals. Minor and Roberts (1984) labeled subjects who scored between 2 and 8 as internals and those who scored between 14 and 20 as externals. Wesley, Krockover, and Hicks (1985) labeled subjects who scored in the upper third and lower third as externals and internals, respectively. Pines and Julian (1972) had used a median split in their locus of control study. Because each of these methods for discriminating between internals and externals seems somewhat arbitrary, no attempt was made in the present study to divide Dow Jones subjects into internal and external groups. The range of scores on the internal-external scale for those in the Dow Jones group was 1 to 18 with a mean of 8.4 (s.d.=5.58).

A Pearson Product Moment Correlation coefficient was computed to test for a relationship between internality and perceived benefits. Although the coefficient of -0.13 was in the expected direction, it was not significant (p=.27).

The literature had not indicated what, if any, relationship there might be between internals and externals in the newspaper group and the benefits they perceived from using a newspaper. Therefore, no hypothesis was proposed. However, the researcher suggested that externals might be more satisfied with a newspaper because they would not have to make information seeking decisions. They could peruse the newspaper relying on the editor's ordering of information. A Pearson

Product Moment Correlation coefficient of .30 was in the expected direction and was approaching significance (p=.08).

Hypothesis 5. Readers of an electronic news service will recall proportionally more factual information than will readers of a newspaper. The null hypothesis tested was that there would be no difference between the means of factual information recalled.

Recall of information was operationalized as the number of correct facts recalled per inch of information read. Headlines, advertising, menus, and instructions were not included in the measurement of inches nor in the computation of facts recalled. Inches read by subjects in the Dow Jones group were converted to equivalent newspaper inches for the analysis. Facts were determined by fitting responses to the questions "who, what, where, when, why."

Although newspaper readers recalled more facts overall (550) than did news/retrieval readers (515), they recalled far less when facts were compared on the basis of total inches read. A t-test comparison of the mean number of facts recalled per inch is presented in Table 9. The difference in the group means was significant at the .000 level of confidence and the null hypothesis was rejected.

Table 9
A T-TEST COMPARISON OF MEAN NUMBER OF FACTS RECALLED PER INCHES READ

Dow Jones		Wall Street Journal		
Mean	SD	Mean	SD	t
1.06	.58	.25	.156	6.73

Additional multiple regression analyses were done using

demographic variables, media use variables, and exposure to the on-line service as predictors of facts recalled per inches read. None of the demographic or media use variables were significant predictors. As already demonstrated by the t-test, exposure to the on-line service was a significant predictor. Total variance accounted for was 55 percent when demographic variables were entered into the equation and 49 percent when media use variables were entered into the equation. The results of these regression analyses are included in Tables 13 and 14, Appendix E.

An analysis of facts recalled regardless of inches read showed age to be the best predictor variable. The t-value for age approached significance. These results are reported in Table 10.

Table 10
MULTIPLE REGRESSION ANALYSIS
FOR THE CRITERION VARIABLE CORRECT FACTS RECALLED

VARIABLE	BETA WEIGHT	T	SIG T
Exposure	-0.082	-0.514	.61
Gender	.194	1.360	.18
Marital Status	-0.022	.141	.89
Education	-0.189	1.199	.24
Age	-0.320	-2.002	.052
Constant		3.120	.003
R=.406	R^2=.165		

Because Gunter et al. (1983, 1984) found some differences in recall at various times of day, subjects in the present study were divided into those who were tested before noon and those who were tested after noon. Thirty subjects were in the morning group and 20 subjects were in the afternoon group. A t-statistic was computed to determine if there were significant differences on inches read or facts

recalled between the morning and afternoon groups. Those who were tested in the morning recalled more facts on average (23) than those who were tested after noon (19). The difference in the mean number of facts recalled, however, was not significant. Curiously, subjects who were tested after noon, though, read more (about 61 inches) than those tested before noon (about 56.4 inches), but again the difference was not significant. Those tested after noon also spent an average of one minute more in attempted recall than did those tested before noon. This difference was not significant.

Hypothesis 6. Readers of an electronic news service will understand more information recalled than would readers of a newspaper. The null hypothesis tested was that there would be no difference in the means of comprehension.

Several measures were planned to test this hypothesis. The first test of comprehension was the ability of subjects to reproduce the central theme of items recalled. Menu pages and instructions in the Dow Jones service were not counted as items read. No theme was noted for headlines recalled. If the subject was able to approximate the central theme of the item recalled, a response was coded as 1. If no theme or an incorrect theme was recalled, the response was coded as 0. The cumulative score for each subject was then divided by the total number of stories recalled by that subject to arrive at an average comprehension score. A t-test of the difference in means of the Dow Jones group and the Wall Street Journal group was not significant.

A second measure compared the means of the two groups on the absolute number of central themes recalled. The newspaper group mean was slightly larger (2.88) than the electronic news service group

(2.40), but this difference also was not significant. A regression analysis of themes recalled did not reveal any significant predictor variables among the demographic variables or the media use variables. Demographic variables accounted for a scant 2 percent of the variance and media use variables accounted for only 4 percent of the variance.

Finally, the average number of errors in recall of themes and recall of facts made by each treatment group were compared. Too few subjects made errors in recall to allow for an adequate analysis. It is also interesting to note, though, that some subjects recalled information that was not present anywhere in the information that was read. Six electronic news readers and three newspaper readers had errors in recall, recalled facts from the "twilight zone," or both.

The next chapter will discuss these results and their implications.

CHAPTER V

SUMMARY AND DISCUSSION

This pilot study was undertaken to explore information seeking and information processing behavior when reading a newspaper and when reading an electronic news service. A post-test only experimental design was used to test six hypotheses with 50 subjects. The subjects were predominantly college-educated, print news-oriented, professional persons. The primary analytic techniques used to test the hypotheses were the t-test and Pearson Product Moment Correlation. Four of the hypotheses were related to comparisons of seeking (H_1), processing (H_2), remembering (H_5), and understanding (H_6) information in two treatment groups -- print and electronic print. Two additional hypotheses focused on the relationship of media use (H_3) and locus of control (H_4) to benefits perceived from using an electronic news service.

It was expected that an electronic news service would more likely be used for purposive information seeking than for pleasure reading or scanning. Browsing is not easily done in an electronic news service, and even when browsing does take place it seems to be for the purpose of information seeking. Although a newspaper reader might seek out information, that reader could also be drawn to information that was not being sought. Editor's cues such as story placement and headlines draw the reader's eye to information that the reader might not have been seeking. Therefore, newspaper readers were expected to do more

scanning and less seeking of information.

The first two hypotheses, then, predicted that electronic news service readers would seek information more so than would newspaper readers, but that newspaper readers would process more information overall because more scanning would take place. Specifically, Hypothesis 1 stated that "more information seeking behavior will be exhibited by readers of an electronic news service than by readers of a newspaper." Hypothesis 2 stated that "more information will be processed by readers of a newspaper than by readers of an electronic news service."

The study did show that more information seeking took place in the electronic text environment than in the newspaper environment and the first hypothesis was supported. Naturally, this difference must be attributed in part to the novelty effect of the electronic text medium. On the other hand, subjects in this study did not seem to be selecting information just to see what was available in the electronic medium. They could have simply called up news and other categories; instead, they selected information that seemed to have some utilitarian purpose in their lives. For example, one person who was planning a trip to Florida checked on flight schedules and fares. A person with a thyroid disorder requested information from the medical database to find out more about her disorder. A stockbroker checked stock quotes and other financial information.

Subjects in the electronic print group had a wider variety of information from which to choose than did the newspaper group. The offerings, however, were what would be available to any subscriber, thereby simulating reality as nearly as possible in a laboratory setting.

An analysis of the categories selected by subjects revealed that just slightly more than a third (36%) of the categories selected by subjects were from news, weather, and sports categories. Other time was spent reading the Official Airline Guide (12.4%), medical information (9%), news about specific companies (8%), movie reviews (7%), and the encyclopedia (4.9%). The remaining time was spent selecting information from various financial information databases such as Standard & Poor's, money markets, Merrill Lynch, and stock market quotes and averages.

A large proportion of subjects described themselves as information seekers when they read the newspaper, but the proportion was almost equal in both groups. All of us at some time may be information seekers while at other times we may be "hunters" or "grazers," as Heyer (1986) has observed. One might also suggest that because of the variety of information offered in the news/retrieval service, it was easier for people to seek specific types of information. A pre-test and the present study, however, showed that information seeking also takes place when reading a newspaper like the Wall Street Journal. Although the Wall Street Journal functions as a general newspaper for the business reader, it is well designed as a reference newspaper. Categorization of stories is substantial and various industries are well flagged, making it a handy reference for the business reader. Therefore, the Wall Street Journal provided a severe test of the hypothesis.

Nevertheless, more scanning than seeking likely takes place when reading the newspaper, even one like the Wall Street Journal. For instance, one newspaper reader said he would "normally scan the whole paper." On that day, though, he had read the first page of the

newspaper because a story about a company in which he held stock caught his eye. Another subject said he usually glances at every headline when reading the newspaper. The subject was instructed to mark only those headlines which he actually read. So some light scanning of headlines and, perhaps, stories may not have been recorded by the subjects. It should be remembered, too, that a substantial number of the subjects were regular Wall Street Journal readers who would know where to look for certain items.

Even more information seeking might have taken place in the news/retrieval group if subjects had known in advance what they would be doing. As one subject put it, "If I had known ahead of time, I would have milked it!" Other comments from subjects that were indicative of their recognition of the information-seeking value of the service were: "Isn't that wonderful. I can sit in my office and call up the Japan stock market" and "That [medical database] is really good because it's so hard to find medical information."

Almost two-thirds of the subjects had indicated that they usually look for relevant articles when they read the newspaper, but that was not what they did in this study. Perhaps saying they usually look for articles was perceived by these subjects as a more socially acceptable response and not necessarily what they usually do. As previous research (Devito et al., 1982) has shown, subjects' intent to do something is not the same as their doing it. If these subjects were used to scanning a newspaper, they might find it difficult to make the transition to seeking information rather than browsing with no particular target in mind, particularly on their first attempt to use the service.

The second hypothesis also received support. Subjects in the newspaper group did, in fact, read far more information in the 20-minute period than did the electronic news readers. Part of the difference in the amount of information read, of course, could be due to unfamiliarity with the electronic system and how to access information. Some time undoubtedly was wasted by electronic news readers as they fumbled (as some of them did) through the system attempting to follow instructions on the screen. Even though the researcher was nearby and offered assistance, few subjects asked for help even when it was clearly needed. The subjects preferred to puzzle the system out for themselves. After an instruction screen has been read once or twice, however, additional readings are generally not needed and the instructions can be quickly scanned. The difference in the quantity of information read during the testing period was so great, however, that another explanation is suggested. It could be that the more one is seeking information, the less one reads in a given period of time. Presumably, if one is seeking information and that information is located, the interest level is higher than it would be for other types of information. Therefore, one is more likely to read sought-after information more slowly and carefully. On the other hand, if someone is simply scanning pages to see what is there, more rapid and less careful reading may be taking place.

Although the different treatment groups was the best predictor of inches read, multiple regression analyses did show that sex was a significant predictor of total inches read. The negative $\underline{t}$ value indicates that as the number of males increased the inches read also increased. But this could have been an artifact of the unequal

distribution of men and women in the study. Men outnumbered women about two to one. It is difficult to explain the fact that time spent watching television was also a significant predictor of inches read. Perhaps those who tend to watch more television tend to scan rather than closely read the newspaper. Scanning or reading very lightly would have enabled subjects to get through more of the newspaper than if they were reading stories for their content.

Reading more did not mean remembering more. Although newspaper readers had a much larger pool of information from which to remember, that apparently was not an advantage. They read more and they recalled more, but not in proportion to the amount of information read. Therefore, Hypothesis 6 was also supported. This hypothesis stated that "readers of an electronic news service will recall proportionally more factual information than will readers of a newspaper." A rival explanation may be that newspaper readers did not have sufficient cues for recall because retrieval cues are necessary to provide adequate access to information stored in memory (Woodall et al., 1983). The description of databases might have been more helpful as an aid to recall for the news/retrieval readers than was the list of columns and types of stories that usually appear in the newspaper (See Appendix C). Then, too, subjects might have read some items so lightly that reading was not remembered as in the study by Graber (1984).

Some evidence suggests that the newspaper format lends itself more to learning than does the broadcast format, but there also may be an inverse relationship between length of stories read and quantity recalled. Whereas newspaper readers indicated that they read far more inches, on average they read only two more items than did the

news/retrieval readers. So if one were to analyze the number of facts recalled per story rather than per inch, the differences are not great. Obviously, though, longer stories contain more information so it would be misleading to compare facts per story rather than facts per inch.

An individual with good general knowledge would also be better able to recall information than readers with poor general knowledge. Information stored in memory does determine the extent to which news stories are meaningful to a person and whether that person is likely to pay attention to those stories. This study made no attempt to measure general knowledge, but random assignment to treatment groups should have controlled for differences in general knowledge. In addition, motivation has been shown to make a difference in recall in some research. Implied in the motivation to seek out information would be prior knowledge stored in memory. Given the educational level of the subjects, their use of the media generally, and newspapers particularly, differences in general level of knowledge should not have been a confounding variable.

Sometimes information is learned from the media even when there is no motivation to do so. People pay attention to and learn from the media simply because the information is available and attracts their attention, not because of any particular motivation to do so. Being exposed to information does not mean that the information will be learned, though, especially if the learning is not reinforced. At the same time, what is learned could lead to an increased interest in certain issues and events in the news. The point was made in earlier chapters that some information from the media may be learned incidentally and because there is no reason not to learn it. In this study, readers

recalled a substantial number of stories for which they were not looking. At least one-fourth of the subjects recalled stories that they said they were either not looking for or which they were neutral about. Newspaper readers recalled a slightly greater number of stories they were not looking for than did on-line readers.

Support for the sixth hypothesis was not found, but this may be due more to method of measurement than to theory. Previous studies of recall of television news have not been clear as to whether the research dealt with memory processes, understanding processes, or both (Woodall et al., 1983). Unfortunately, what had been designed as a measure of understanding in this study turned out to be a test of memory. What was not foreseen by the pre-test was that some items, particularly in the Dow Jones News/Retrieval Service, did not lend themselves to recall of a central theme. The pre-test had not suggested that subjects in the study would call up specialty databases to the degree that they did. It was not possible for subjects to recall more than a generic theme, for example, from the Official Airline Guide. Therefore, many (28%) themes recalled by the electronic news readers were generic in nature as were 6 percent of the themes recalled by the newspaper readers. "Stock market quotes" was an example of a generic theme in the newspaper condition. When these generic themes were tallied along with specific themes, the Dow Jones group recalled an average of 100 specific and generic themes and the newspaper readers recalled 81. But, recall of a generic theme is an example of remembering, not of understanding.

Part of the difficulty with trying to measure understanding is that the term implies a complex set of cognitions. Understanding

encompasses the way that people process, retain, and remember information and are then able to use it. After an individual processes incoming information and combines it with information already stored in memory, new meaning results. Subjects in this study were asked to recall the central theme of items they read. That implies only that the subject has a grasp of what the story is about, but it does not necessarily connote understanding in a broader sense. Therefore, it may have been inaccurate to use the term understanding in this study, even though other researchers have operationalized understanding in that way. As Findahl and Hoijer (1985) have suggested, researchers need to examine "the relationship between subjects' personal experiences and knowledge and the comprehension of news information" (p. 392). Examining such a relationship is easier said than done.

Based on a study by Ettema (1983), Hypothesis 3 predicted that: "media use will be inversely related to perceived benefits from using an electronic news service." This hypothesis was not supported. Again, though, it may be that this group was too homogeneous in terms of media use. Subjects in this study were very much oriented toward newspaper reading. For the most part, subjects were heavy consumers of newspapers and they indicated that newspapers were their primary source of information for many types of news. One subject noted, however, that "too much effort was required to access the news [from the electronic news service]. I'd rather sit in front of a TV and watch the news." Another subject said he would feel more comfortable with a newspaper. "Even though I've worked steadily with computers for the last couple of years, it still feels unnatural, although I felt more comfortable with the encyclopedia."

The literature had indicated that there was a relationship between locus of control and information seeking. It was expected that if the electronic news service was used for information seeking, "those who score lower on a locus of control scale will perceive more benefits from using an electronic news service than those who score higher on a locus of control scale." Hypothesis 4 was not supported. The locus of control variable does not seem to be useful when examining its relationship to information seeking.

Hypothesis 4, of course, was based only on what has generally shown to have been true about internals and externals and how they deal with information. It may be that even though the internal consistency of the locus of control scale was very good, the subjects in this study were too homogenous on this measure to adequately measure differences. Different results could emerge if such a test were done with a larger and more heterogeneous sample. On the other hand, perhaps locus of control cannot be used to predict information seeking with the media. Studies that have dealt with specific information seeking tasks have shown internals to be more efficient processors of information, but perhaps this does not extend to their use of various media.

Nothing in the literature suggested that locus of control would be a predictor of satisfaction or perceived benefits from using a newspaper. Because newspaper reading may serve some utilitarian purpose or it may be done for pleasure, no direction for a hypothesis could be predicted so no hypothesis was proposed. It was expected that externals would be more satisfied with a newspaper because they could rely on editor's cues to guide their reading, but the literature

did not provide any guidance in this regard. Internals, however, were also likely to be satisfied with the newspaper if they were reading for pleasure and not necessarily seeking information.

Conclusion

A major premise of this study has been that electronic text services will be used more for information seeking than for browsing. Therefore, it is not too far-fetched to suggest that electronic text services could become a medium through which people find out what is going on in the world. With so much information available and too few hours in a day, people may find that such services allow them to find out about information in a more efficient and satisfactory way than do the mass media. If information-seeking is the goal, then people will be able to use these services to locate information at the precise moment they want it. A major attraction of these services is that they allow people to structure their information environment to suit their needs (Smith, 1980) and to accomplish certain goals (Dozier & Rice, 1984; Grunig, 1983).

Electronic text services are likely to be used for a variety of reasons and be part of a mix of other media. Although people are grazers, browsers, and hunters when using other media, it will be more difficult for them to be all of those things when using an electronic news service. As they realize the vast amount of information that is available from these services, though, they may adapt the services to their need for finding out about the world. Even though some subjects said they felt uncomfortable with the medium as a source for news, more than a third of the information that was accessed in this study

was news. All but one of the subjects in this study were newspaper readers, and many indicated amazement at the amount of information available at their fingertips. They seemed to derive pleasure not from reading but from having great quantities of information available to them. This may be the feature that those desiring to market videotex should emphasize, that is, that great quantities of information are available.

In the future, electronic news services may not necessarily be confined to a "small nonpleasure elite" who use these services for goal-directed objectives (Dozier & Rice, 1984). Most subjects in the present study used the news/retrieval service to retrieve very specific information. But future users may not be such a small nonpleasure elite. As more and more information bombards people daily, it becomes increasingly difficult to keep up with all of it. Electronic news retrieval services would allow people to better manage the copious quantities of information available to them.

There has been a trend toward increased reliance on television and less reliance on newspapers for news about the world. Relying on electronic print and broadcasting could mean that people might not be as well informed about important social issues, for example, as they ought to be in a democratic society. This and other studies suggest that people are more likely to scan a newspaper and be attracted to stories because of cues presented. As every student of newspaper design knows, newspaper pages are arranged precisely to draw the reader's attention to certain stories and to draw the reader's eye across the page. As readers scan the pages, they will remember a portion of what they scanned. Researchers have not fully explored the

extent to which incidental learning takes place from exposure to the media and newspapers in particular. Information that might be acquired by scanning and learned incidentally is not likely to be as prevalent in an electronic text environment as it would seem to be in a newspaper environment. For example, when each of the items that subjects recalled was analyzed, a greater proportion of newspaper readers recalled items for which they said they had not been looking.

Previous research also has shown that it is possible to design electronic services so as to attract attention to certain stories. Kerr (1986) suggests that many of the design principles that apply to print can also be applied to electronic text. At the same time, other research has shown that to do so may be at the expense of other items. Therefore, such design devices may not be particularly useful. In addition, people will be using these services in combination with other media and, perhaps, other electronic services. Learning the purpose of each element of the mix is something that could be pursued in future research.

Because each electronic database provides different services, the needs they will fulfill will be strongly related to the services they provide. Most of these services do provide news, weather, and sports information that can be found in other media. If this study and other studies of how videotex services are used are an indication, electronic services may be used as much for other kinds of information as they are used for news, weather, and sports. Additional studies that allow repeated use of the database may be more telling in that regard. Once people grow accustomed to what is offered and how to retrieve it, the types of information they retrieve could change. Knowing something

about how these services are used, how learning takes place, and knowing what is learned can help guide those who offer these services as well as those who provide information through other media.

In a world in which each of us seems to have less control over our environment, these electronic services have the potential to return the locus of control to the individual, at least in terms of the individual's information environment. Being able to be selective about information is certainly a desirable individual goal, particularly if it can be accomplished without loss of social cohesion. One of the questions raised about electronic text services has been whether reliance on such services would make people more or less informed. Obviously, this study cannot answer that question, but it does provide some insight. It seems that reliance on these systems might enable people to be better informed about their own world but less informed about the larger world.

Implications

This study has compared differences between the way in which people use two different media and what they remember having read. Clearly, there are differences that can be attributed at least in part to the medium itself. But there is still a great deal to learn about how electronic text services are and will be used. Kerr (1986) suggests that it is important to know how people find their way through electronic text. He points out that "wayfinding" is a matter of "problem recognition," problem solving," and "context: the urgency with which the user needs the information, prior experience in using electronic materials, tolerance for delay and uncertainty,...and the

degree of precision required in the solution to the original problem" (p. 327). It seems that it is also important to study this topic within the context of other media use and also as it fits with interpersonal communication.

The present study was a small step in that direction. Further research suggests that the medium be studied from a uses and gratifications perspective. It is important to know what the user brings to the experience as well as what the user takes away from it. The present study is useful in that it did show that differences exist between the way in which print is used vis a vis electronic print. But the study is limited in the sense that it did not allow subjects repeated access to an electronic database at their convenience. Repeated use of such systems would undoubtedly result in different behavior at different times. Use of an electronic text system would be driven by the gratifications that people derive from their use. Therefore, once people grow accustomed to what is offered and how to retrieve it, the types of information retrieved could change. The fact that some subjects said they would have planned what to do if they had known they would be using the service is deserving of exploration in future research.

One of the interesting findings in this research was the fact that some subjects recalled information that was not present anywhere in the material that they read. Certainly, no sweeping conclusions can be drawn from such a limited finding. It does suggest, as does common sense, that information learned from one medium or from interpersonal sources may be stored in memory and then activated by exposure to related information, regardless of the source of the information.

Obviously, subjects were recalling previously known information. Although it might be difficult to accomplish, further research in this area might prove interesting. Research that helps to explain how and what people learn from exposure to various media and interpersonal communication and how it interacts would be helpful to information providers as well.

Clearly, more research is warranted in the area of understanding from the media. Previous research and this study shows that it is a difficult variable to test. Nevertheless, it is an area that should be pursued. If people can recall information but they do not understand it, then the information is of much less value.

This study also looked at the relationship of locus of control to information seeking in the media. This is another area that has not previously been adequately examined. It is odd that other research has shown the variable to be a meaningful predictor of information seeking in situations other than those involving media use. The present study suggests that the variable is inappropriate for use with an older population. Subjects in previous studies have been relatively young adults. In the present study, one person refused to complete that portion of the instrument. Another subject questioned its value. So it could also be that locus of control is not a good predictor of information seeking when the variable is applied to an older population.

Locus of control, in fact, may not be an effective predictor of information seeking in the media. Exposure to media is not an either/or experience. Sometimes information is sought from the media and at other times people passively accept what is offered. Perhaps people with an internal locus of control tend to use all media more. But such

issues have not been previously addressed in any satisfactory way and further research in the area may provide some insight in this area. There is some evidence that other variables such as education, occupation, psychographics, and goal-orientation may be more useful in predicting media use. The sample in this study was too homogeneous in terms of education and occupation, for example, to adequately explore the role of these variables in information seeking. These variables could be explored in future research with a sample from a more diverse population.

Another area which this study did not pursue was whether subjects would be willing to subscribe to an electronic text service. Consumers must be willing to pay for the content provided by electronic text providers, and there is evidence that home consumers are not yet willing to do so. Companies like Knight-Ridder Newspapers, Times Mirror Company, and Keycom abandoned their efforts to market videotex to home consumers because too few people were willing to pay for videotex. Companies like Dow Jones, though, are finding it profitable to market such services to business consumers. The difference, of course, is that business consumers find such services to be worth the expense; home consumers have yet to see their value. An analogy might be in the decision to subscribe to cable television. In a metropolitan area in which there are a multitude of broadcast television channels, cable television would be nice to have, but it may not be worth the cost to some consumers. Similarly, videotex services might be nice to have and there is no question of their utility, but the information available can be obtained from other sources at less cost.

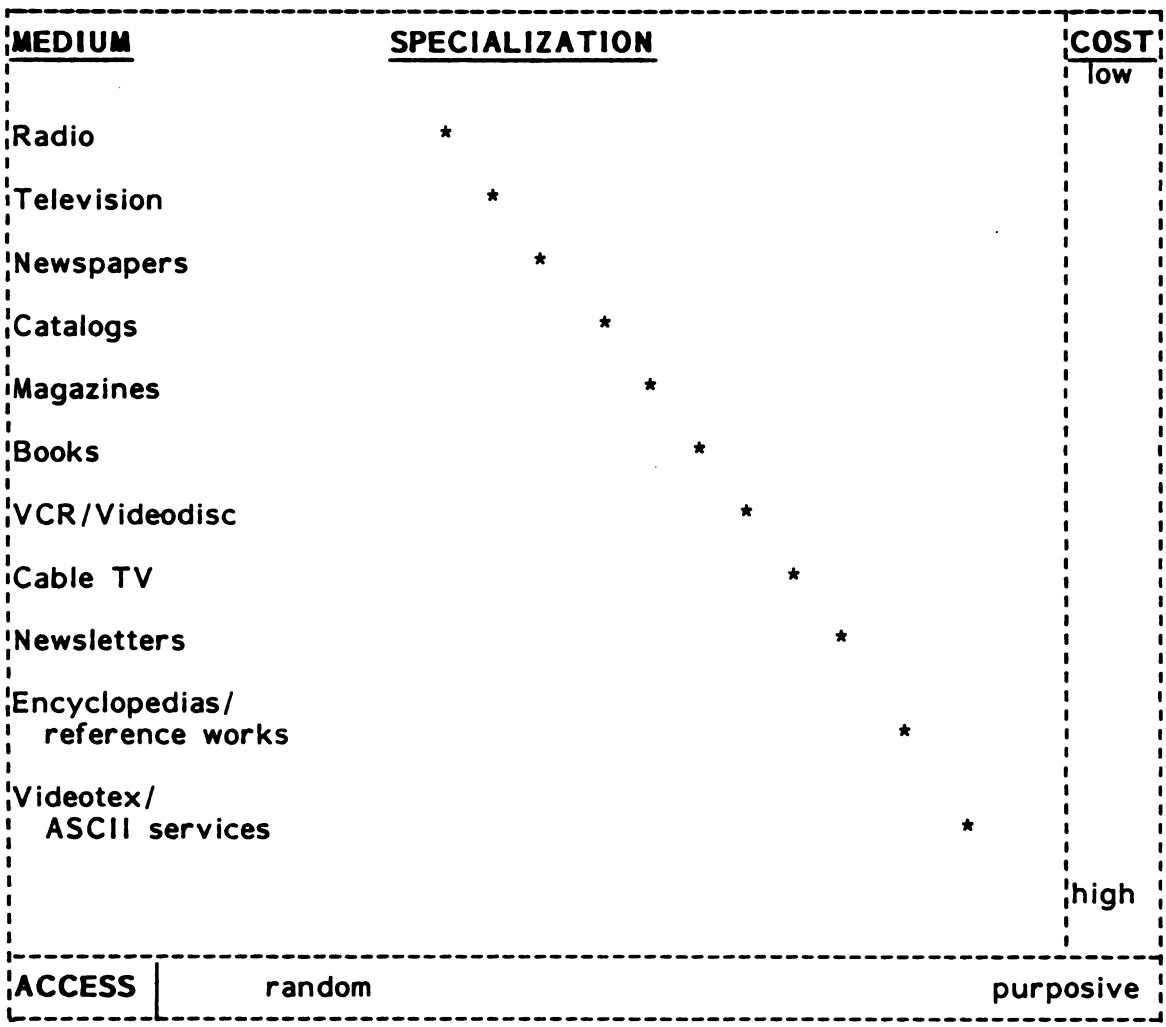
Videotex or ASCII text services could be one of several media in

the home. Although other media can provide the same kinds of information available from ASCII text and videotex services, no other medium can provide as much information in one location to consumers at the precise moment the information is desired. The type and quantity of information available is limited only by the size of the databases in the service. Gateways make access to other databases virtually unlimited.

Although subjects in this study were impressed with the quantity and variety of information available in the Dow Jones service, their willingness to pay for access to that information was not pursued. Could consumers afford the service and and would they use it in their home? Certainly some of them would and some of them do -- two of the people in this study were subscribers to the Dow Jones service. Decisions to adopt the technology will be made by weighing the reward for using such services against the time, money, energy, and mental ability required to use them. Given the fact that people have only so many dollars to spend on various media, the value of electronic text services must be worth the cost.

Figure 2 lists the variety of media that might be found in the home, from mass to specialized. Each medium competes for the consumer's dollar and the consumer's time. The consumer's cost for using mass media like radio and television is hidden or negligible. Once a consumer has purchased a radio or television receiver, there is no apparent additional cost when using those media. Consumers rarely consider the cost of electricity used to operate the set or the hidden cost of higher prices paid for advertised products. After purchasing videotex-ready television components or a personal computer, however,

FIGURE 2
MEDIA AVAILABLE IN THE HOME



the subscriber to an electronic text service may have to pay a monthly charge plus a charge for every minute of connect time. Because of the negligible cost when using a medium such as radio, the consumer can afford to be random or non-purposive when using it. As a medium becomes more specialized in its purpose, it becomes more costly to acquire or to use. Therefore, whether the use of various media will be purposive or random will be dictated to some extent by the degree of specialization and the cost. This study has demonstrated that access to an electronic text service is likely to be more purposive. The structure of the medium dictates purposiveness to some extent. But, also, when a consumer has to pay for every minute of use, the individual is likely to be more judicious in selecting information. This suggests that as the degree of specialization increases, cost increases, and access progresses from random to purposive use.

Additional research is needed to determine how these various media are used by consumers. Exploring how videotex and ASCII services fit into the entire media mix would help the industry market services that would be worth the consumer's dollar. Specifically, knowing more about the motivation for selecting various types of information from electronic text services and the benefits derived would be useful. Research conducted with current subscribers to such services would be a starting point for such exploration.

SELECTED BIBLIOGRAPHY

SELECTED BIBLIOGRAPHY

Appel, V., Weinstein, S., & Weinstein, C. (1979). Brain activity and recall of TV advertising. Journal of Advertising Research, 19, 7-15.

Atkin, C. (1971). How imbalanced campaign coverage affects audience exposure patterns. Journalism Quarterly, 48, 235-244.

Atkin, C. (1973) Instrumental utilities and information-seeking. In P. Clarke (Ed.), New models for communication research, Beverly Hills, Calif.: Sage Publications, Inc.

Atwater, T., Heeter, C., & Brown, N. (1985, February). Foreshadowing the electronic publishing age: first exposures to Viewtron. Report No. 1 of the Communication Technology Laboratory, Michigan State University, East Lansing.

Bar-Tal, D., & Bar-Zohar, Y. (1977). The relationship between perception of locus of control and academic achievement. Contemporary Educational Psychology, 2, 181-199.

Baer, W. S. (1985). Information technology comes home. Telecommunications Policy, 9, 3-22.

Becker, L. B. & Dunwoody, S. (1982). Media use, public affairs knowledge and voting in an election. Journalism Quarterly, 59, 212-218, 255.

Berry, C. (1983). Learning from television news: a critique of the research. Journal of Broadcasting, 27, 359-370.

Blumler, G. (1980). Information overload: is there a problem? In E. Witte (Ed.), Human Aspects of Telecommunication. New York: Springer-Verlag.

Bolton, T. (1982). Perceptual factors that influence the adoption of videotex technology: results of the Channel 2000 field test. In Videotex--key to the information revolution, Middlesex, United Kingdom: Online Publications Limited.

Bowes, J. E. (1980). Mind vs. matter -- mass utilization of information technology in B. Dervin and M. J. Voigt (Eds.) Progress in Communication Sciences, Vol. II. Norwood, N. J.: Ablex Publishing Corp.

Brown, N. A. (1986, May). More, faster and easier? A comparative analysis of news on three videotex services and in their companion newspapers. Paper presented to the International Communication Association annual convention, Chicago, Ill.

Brown, N., Heeter, C., Salwen, M., Soffin, S., & Stanley, C. (1985, April). Electronic text: using the medium for news. Report #6, Communication Technology Laboratory, Michigan State University, East Lansing.

Butler, J. K., & Kent, K. E. M. (1983). Potential impact of videotex on newspapers. Newspaper Research Journal, 5, 3-12.

Calvert, S., & Watkins, B. (1979). Recall of television content as a function of content type and level of production feature use. Spencer Foundation, Chicago, Ill. (ERIC Document Reproduction Service, ED 178 180.)

Centel's Keycom unit will cease marketing home-use videotex. Wall Street Journal, June 17, 1985, from Dow Jones News/Retrieval Service.

Chaffee, S. H., & McLeod, J. M. (1973). Individual vs. social predictors of information seeking. Journalism Quarterly, 50, 237-245.

Collins, A. M., & Quillian, M. R. (1969). Retrieval time from semantic memory. Journal of Verbal Learning and Learning Behavior, 8, 240-248.

Collins, J., & Abel, J.D. (1985). Activation as news exposure predictor. Journalism Quarterly, 62, 316-320.

CompuServe on the rise: subscribers top 235,000. (1985, Sept. 18) American Banker, p. 1+.

Comstock, G. (1978). Trends in the study of incidental learning from television viewing. National Institutes of Education, Washington, D.C. (ERIC Document Reproduction Service, ED 168 605.)

Crowder, R. G. (1976). Principles of learning and memory. Hillsdale, N. J.: Lawrence Erlbaum Associates, Publishers.

Culbertson, H. M., & Stempel, G. H. III. (1985, August). Media use and reliance -- how do they interact in affecting knowledge level. Paper presented to the Association for Education in Journalism and Mass Communication annual convention, Memphis, Tennessee.

Davis, W. L., & Phares, E. J. (1967). Internal-external control as a determinant of information-seeking in a social influence situation. Journal of Personality, 35, 547-561.

Davison, W. P.; Boylan, J.; & Yu, F. T. C. (1982). Mass media systems & effects, 2nd edition. New York: Holt, Rinehart & Winston.

Devito, A. J.; Bogdanowicz, J.; & Reznikoff, M. (1982). Actual and intended health-related information seeking and health locus of control. Journal of Personality Assessment, 46, 63-69.

Dimmick, J., & Rothenbuhler, E. W. (1984). Competitive displacement in the communication industries: new media in old environments. In R. E. Rice & Associates, The new media: communication research and technology. Beverly Hills, Calif.: Sage Publications.

Donohew, L., & Tipton, L. A. (1973). A conceptual model of information seeking, avoiding, and processing. In P. Clarke (Ed.), New Models for Communication Research, Beverly Hills, Calif.: Sage Publications, Inc.

Donohew, L., Tipton, L., & Haney, R. (1978). Analysis of information-seeking strategies. Journalism Quarterly, 55, 25-31.

Donohue, G. A., Tichenor, P. J., & Olien, C. N. (1975). Mass media and the knowledge gap: a hypothesis reconsidered. Communication Research, 2, 3-23.

Dozier, D. M., & Hellweg, S. A. (1984, May). Consumer age as a predictor of videotex adoption. Paper presented to the International Communication Association annual convention, San Francisco.

Dozier, D. M., & Rice, R. E. (1984). Rival theories of electronic newsreading. In R.E. Rice & Associates, The new media: communication research and technology. Beverly Hills, Calif.: Sage Publications.

Edeani, D. O., & Jacoubovitch, M. D. (1980, August). Selectivity in exposure to information channels during a gubernatorial election. Paper presented at the annual meeting of the Association for Education in Journalism, Boston, Mass. (ERIC Document Reproduction Service, ED 191 021.)

Edwardson, M., Kent, K., & McConnell, M. (1985). Television news information gain: videotex versus a talking head. Journal of Broadcasting, 29, 367-378.

Estes, W. K. (Ed.). (1978). Handbook of learning and cognitive processes, Vol. 3: approaches to human learning and motivation. Hillsdale, N. J.: Lawrence Erlbaum Associates.

Ettema, J. S. (1983, August). Information equity and information technology: some preliminary findings from a videotex field trial. Paper presented to the Association for Education in Journalism annual convention, Corvallis, Oregon.

Ettema, J. S. (1984a, May). Defining videotex: an empirical comparison of business and consumer information retrieval applications. Paper presented to the International Communication Association annual convention, San Francisco.

Ettema, J. S. (1984b). Three phases in the creation of information inequities: an empirical assessment of a prototype videotex system. Journal of Broadcasting, 28, 383-395.

Ettema, J. S. (1985). Videotex for news and business data: comparison of user response to two information retrieval applications. Telecommunications Policy, 9, 41-48.

Festinger, L. A. (1957). A theory of cognitive dissonance. Stanford, Calif.: Stanford University Press.

Findahl, O., & Hoijer, B. (1981). Studies of news from the perspective of human comprehension. In G. Cleveland Wilhoit (Ed.) Mass communication review yearbook, Vol. 2. Beverly Hills, Calif.: Sage Publications, Inc.

Findahl, O., & Hoijer, B. (1985). Some characteristics of news memory and comprehension. Journal of Broadcasting, 29, 379-396.

Fisher, A. B. (1984, Dec. 24). Dow Jones is still better than average. Fortune, p. 38+.

Frey, D. (1982). Different levels of cognitive dissonance, information seeking, and information avoidance. Journal of Personality and Social Psychology, 43, 1175-1183.

Gantz, W. (1978). How uses and gratifications affect recall of television news. Journalism Quarterly, 55, 664-672, 681.

Garramone, G. M. (1984). Motivational models: replication across media for political campaign content. Journalism Quarterly, 61, 537-541, 691.

Gaziano, C. (1984). Neighborhood newspapers, citizen groups and public affairs knowledge gaps. Journalism Quarterly, 61, 556-566, 599.

Genova, B. K. L., & Greenberg, B. S. (1979). Interests in news and the knowledge gap. Public Opinion Quarterly, 43, 79-91.

Glasser, T. L. (1982). Play, pleasure and the value of newsreading. Communication Quarterly, 30, 101-107.

Graber, D. (1984). Processing the news: how people tame the information tide. New York: Longman.

Graber, D. A. (1982a). The impact of media research on public opinion studies. In D.C. Whitney & E. Wartella (Eds.), Mass communication review yearbook (Vol. 3). Beverly Hills, Calif.: Sage Publications, Inc.

Graber, D. A. (1982b). Have I heard this before and is it worth knowing? Variations in political information processing. Paper presented to the American Political Science Association, Denver. (ERIC Document Reproduction Service, No. ED 223 493).

Grotta, G. L., & Newsom, D. (1982). How does cable television in the home relate to other media use patterns? Journalism Quarterly, 59, 588-591, 609.

Grunig, J. E. (1983). Communication behaviors and attitudes of environmental publics: two studies. Journalism Monographs, No. 81.

Gunter, B. (1979). Recall of brief television news items: effects of presentation mode, picture content and serial position. Journal of Educational Television and Other Media, 5, 57-61.

Gunter, B.; Clifford, B. R.; & Berry, C. (1980). Release from pro-active interference with television news items: evidence for encoding dimensions within televised news. Journal of Experimental Psychology, 6, 216-223.

Gunter, B., Furnham, A., & Jarrett, J. (1984) Personality, time of day and delayed memory for TV news. Personality and Individual Differences, 5, 35-39.

Gunter, B., Jarrett, J., & Furnham, A. (1983). Time of day effects on immediate memory for television news. Human Learning, 2, 261-267.

Haanstad, M. J. (1978). The effects of locus of control and self-monitoring on behavior and information processing. Unpublished doctoral dissertation, Southern Illinois University.

Harris, R. J. (1983). Information Processing Research in Advertising. Hillsdale, N. J.: Lawrence Erlbaum Associates, Publishers.

Heeter, C., Atwater, T., Stanley, C., & Baldwin, T. (1985). Videotex: creating and examining experienced users. Report No. 2, Communication Technology Laboratory, Michigan State University, East Lansing.

Heikkenen, K. J., & Reese, S. D. (1986). Newspaper readers and a new information medium: information need and channel orientation as predictors of videotex adoption. Communication Research, 13, 19-36.

Heyer, M. (1986). The creative challenge of CD ROM. In S. Lambert & S. Ropiequet (Eds.). CD ROM: the new papyrus. Redmond, Wash.: Microsoft Press.

Hofstetter, C. R., & Buss, T. F. (1981). Motivation for viewing two types of TV programs. Journalism Quarterly, 58, 99-103.

Holmlov, P. G. (1982). Motivation for reading different content domains. Communication Research, 9, 313-320.

Housel, T. J. (1981). Understanding and recall of TV news. Journalism Quarterly, 61, 505-508, 741.

Hurley, P. (1985). Assessing videotex in the marketplace. Videotex World, 1 (4), 15-19.

Hurley, P. (1985, April). The promises and perils of videotex. The Futurist, 7-13.

Hyatt, D., Riley, K., & Sederstrom, N. (1978). Recall of television weather reports. Journalism Quarterly, 55, 306-310.

Jarvis, D. J. (1977). The perceived utility of the content of over-the-counter drug commercials: a uses and gratifications perspective. Unpublished doctoral dissertation, Southern Illinois University.

Katz, E., Adoni, H., & Parness, P. (1977). Remembering the news: what the picture adds to recall. Journalism Quarterly, 54, 231-239.

Katzman, N. (1974). The impact of communication technology: promises and prospects. Journal of Communication, 24, 47-58.

Kellermann, K. (1985). Memory process in media effects. Communication Research, 12, 83-131.

Kerr, S. T. (1986). Transition from page to screen. In S. Lambert & S. Ropiequet (Eds.). CD ROM: the new papyrus. Redmond, Wash.: Microsoft Press.

Keycom videotex service refocuses toward business market. (1985, June 22). Editor & Publisher, p. 23.

Klatzky, R. L. (1980). Human memory: structures and processes, 2nd edition. San Francisco: W. H. Freeman.

Kline, G. F., Miller, P. V., & Morrison, A. J. (1974). Adolescents and family planning information: an exploration of audience needs and media effects. In J. Blumler and E. Katz (Eds.), The uses of mass communications. Beverly Hills: Sage Publications, Inc.

Knight-Ridder pulls plug on Viewtron. (1985, March 24). Broadcasting, p. 45.

Lane, M. (1986). Another year, another forecast. Videotex World, 2 (2), 6-10.

Lane, M. (1986). Is there life after Viewtron and Gateway? Videotex World, 2 (4), 12-15.

Lefcourt, H. M. (1982). Locus of control: current trends in theory and research, 2nd edition. Hillsdale, N. J.: Lawrence Erlbaum Associates, Publishers.

Mantooth, S. S. (1982). The electronic newspaper: its prospects and direction for future study. Unpublished doctoral dissertation, University of Tennessee. [The abstract for this dissertation is listed incorrectly in Journalism Abstracts under Sara Mantooth Stone.]

McCombs, M., & Poindexter, P. (1983). The duty to keep informed: news exposure and civic obligation. Journal of Communication, 33, 88-96.

McGuire, W. J. (1974). Psychological motives and communication gratification. In J. G. Blumler & E. Katz (Eds.), The uses of mass communications. Beverly Hills, Calif.: Sage Publications, Inc.

McLeod, J. M.; Bybee, C. R.; & Durall, J. A. (1982). Evaluating media performance by gratifications sought and received. Journalism Quarterly, 59, 3-12, 59.

McLeod, J. M., & McDonald, D. G. (1985). Beyond simple exposure: media orientations and their impact on political processes. Communication Research, 12, 3-33.

Minor, S. W., & Roberts, A. M. (1984). Effects of congruence between locus of control and task instructions on self-efficacy. Psychological Reports, 54, 39-42.

Montgomery, D. J. (1980). A criterion for characterizing the quality of life in assessing social impacts of technology. Unpublished manuscript, Department of Metallurgy, Mechanics and Materials Science, Michigan State University.

Nelson, D. L., Bajo, M. T., & Casanueva, D. (1985). Prior knowledge and memory: the influence of natural category size as a function of intention and distraction. Journal of Experimental Psychology: Learning, Memory and Cognition, 11, 94-105.

Neuman, W. R. (1976). Patterns of recall among television news viewers. Public Opinion Quarterly, 40, 115-123.

Neustadt, R. M. (1982). The birth of electronic publishing: legal and economic issues in telephone, cable and over-the-air teletext and videotex. White Plains, N.Y.: Knowledge Industry.

Nunnally, J. C. (1978). Psychometric theory. New York: McGraw-Hill Book Co.

Ohlsson, K., Nilsson, L. G., Ronnberg, J. (1983). Text processing and attentional factors in a videotex system. Umea Psychological Reports, University of Umea, Sweden.

Olien, C. N., Donahue, G. A., & Tichenor, P. J. (1982). Structure, communication and social power: evolution of the knowledge gap hypothesis. Massacommunicatie, 10, 81-87.

Organ, D. W. (1976). Locus of control, anxiety, and cognitive functioning. Psychological Reports, 39, 1090-1098.

Ortony, A. (1978). Remembering, understanding and representation. Cognitive Science, 2, 53-69.

Paisley, W., & Chen, M. (1982). Children and electronic text: challenges and opportunities of the "new literacy": an exploratory study. Stanford, Calif.: Institute for Communication Research, Stanford University. (ERIC Document Reproduction Service No. ED 225 530.)

Peter, D. (1985). What does the market really want? Videotex World, 1 (4), 42-43.

Pezdek, K., Lehrer, A., & Simon, S. (1984). The relationship between reading and cognitive processing of television and radio. Child Development, 55, 2072-2082.

Perloff, R. M., Wartella, E. A., & Becker, L. B. (1982). Increasing learning from TV news. Journalism Quarterly, 59, 83-86.

Pines, H. A., & Julian, J. W. (1972). Effects of task and social demands on locus of control differences in information processing. Journal of Personality, 40, 407-416.

Prociuk, T. J., & Breen, L. J. (1977). Internal-external locus of control and information-seeking in a college academic situation. Journal of Social Psychology, 101, 309-310.

Ray, M. L., & Ward, S. (1976). Communicating with consumers: the information processing approach. Beverly Hills, Calif.: Sage Publications.

Reagan, J. (1984). Effects of cable television on news use. Journalism Quarterly, 61, 317-324.

Reed, S. K. (1982). Cognition: theory and applications. Monterey, Calif.: Brooks/Cole Publishing Co.

Reese, S. D. (1984). Visual-verbal redundancy effects on television news learning. Journal of Broadcasting, 28, 79-87.

Reymer, A. S. (1982). What consumer research tells us about marketing videotex. In Videotex--Key to the Information Revolution. Middlesex, United Kingdom: Online Publications Limited.

Rice, R. E., & Paisley, W. (1982). The Green Thumb videotex experiment: evaluation and policy implications. Telecommunications Policy, 6: 223-235.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 80 (Whole No. 609).

Rotter, J. B. (1982). The development and application of social learning theory. New York: Praeger Publishers.

Rubin, A.M. (1981). A multivariate analysis of '60 Minutes' viewing motivations. Journalism Quarterly, 58, 529-534.

Rumelhart, D.E. (1977). Introduction to Human Information Processing. New York: John Wiley & Sons.

Sahin, H., Davis, D. K., & Robinson, J. P. (1981, August). Television news as a source of information: what gets across and what doesn't. Presented to the Association for Education in Journalism annual convention, East Lansing, Mich. (ERIC Document Reproduction Service, ED 205 967.)

Sahin, H., Davis, D. K., & Robinson, J. P. (1981). Improving the TV news. Irish Broadcasting Review, 11, 50-55.

Salomon, G. (1984). Television is "easy" and print is "tough": the differential investment of mental effort in learning as a function of perceptions and attributions. Journal of Educational Psychology, 76, 646-658.

Seeman, M., & Evans, J. W. (1962). Alienation and learning in a hospital setting. American Sociological Review, 27, 772-783.

Sellers, P. (1986, April 14). Two publishers give up on videotex. Fortune, p. 11.

Singh, S. N., & Rothschild, M. L. (1983). Recognition as a measure of learning from television commercials. Journal of Marketing Research, XX, 235-248.

Smith, A. (1980). Goodbye Gutenberg. New York: Oxford University Press, 1980.

Smith, A. (1982). Information technology and the myth of abundance. Daedalus, (Fall), pp. 1-16.

Stamm, K.R., & Jacoubovitch, M.D. (1980). How much do they read in a daily newspaper: a measurement study. Journalism Quarterly, 57, 234-242.

Stauffer, J.; Frost, R.; & Rybolt, W. (1978). Literacy, illiteracy, and learning from television news. Communication Research, 33, 29-38.,

Stauffer, J.; Frost, R.; & Rybolt, W. (1983). The attention factor in recalling network television news. Journal of Communication, 33, 29-38.

Stephenson, W. (1964). The ludenic theory of newsreading. Journalism Quarterly, 41, 367-374.

Stephenson, W. (1967). The play theory of communication. Chicago: University of Chicago Press.

Sullivan, D. J., Jr., & Noll, M. A. (1982). Viewpoint: a Bell system view of videotex. Telecommunications Policy, 6, 237-241.

Tichenor, P. J., Donahue, G. A., & Olien, C. N. (1970). Mass media flow and the differential growth of knowledge. Public Opinion Quarterly, 34, 159-170.

Tillinghast, D. S., & Visvanathan, N. (1983, August). The electronic newspaper: building a profile of potential users. Paper presented to the Association for Education in Journalism and Mass Communication annual convention, Corvallis, Oregon.

Toggerson, S. K. (1981). Media coverage and information-seeking behavior. Journalism Quarterly, 58, 89-93.

Travis, K. M. (1974). Internal vs. external control and media consumption behavior. Unpublished doctoral dissertation, Claremont Graduate School.

Tulving, E. (1972). Episodic and semantic memory. In E. Tulving & W. Donaldson (Eds.), Organization and memory. New York: Academic Press.

Wallston, K. A., Maides, S., & Wallston, B. S. (1976). Health-related information seeking as a function of health-related locus of control and health value. Journal of Research in Personality, 10, 215-222.

Warshaw, P. R. (1978). Application of selective attention theory to television advertising displays. Journal of Applied Psychology, 3, 366-372.

Weaver, D. H. (1983a). The effects of videotex on news and information in three "information societies." Paper presented to an international conference on Information Societies, Tokyo, Japan.

Weaver, D. H. (1983b). Videotex Journalism: Teletext, Viewdata and the News. Hillsdale, N. J.: Lawrence Erlbaum Associates.

Webb, P. H. (1979). Consumer initial processing in a difficult media environment. Journal of Consumer Research, 6, 225-236.

Weiner, M. J., & Daughtry, T. (1975). Locus of control as a determinant of information seeking. Personality and Social Psychology Bulletin, 1, 505-508.

Wesley, B. E., Krockover, G. H., & Hicks, C. R. (1985) Locus of control and acquisition of computer literacy. Journal of Computer-Based Instruction, 12, 12-16.

Westley, B. H., & Barrow, L. C. Jr. (1959). An investigation of news-seeking behavior. Journalism Quarterly, 36, 431-438.

Wilson, C. E. (1974). The effect of medium on loss of information. Journalism Quarterly, 51, 111-115.

Wolk, S., & DuCette, J. (1974). Intentional performance and incidental learning as a function of personality and task dimensions. Journal of Personality and Social Psychology, 29, 90-101.

Woodall, W. G., Davis, D. K.: & Sahin, H. (1983). From the boob tube to the black box: television news comprehension from an information processing perspective. Journal of Broadcasting, 27, 1-23.

Zukin, C., & Snyder, R. (1984). Passive learning: when the media environment is the message. Public Opinion Quarterly, 48, 629-638.

APPENDIX A

SAMPLE PAGE OF RECALL AND INFORMATION SEEKING INSTRUMENT

ITEM #1--CENTRAL THEME:

ADDITIONAL FACTS:

I was looking for this type of information.

I was not looking for this type of information.

_____ _____ _____ _____ _____

ITEM #2--CENTRAL THEME:

ADDITIONAL FACTS:

I was looking for this type of information.

I was not looking for this type of information.

_____ _____ _____ _____ _____

ITEM #3--CENTRAL THEME:

ADDITIONAL FACTS:

I was looking for this type of information.

I was not looking for this type of information.

_____ _____ _____ _____ _____

QUESTIONNAIRE -- Wall Street Journal

Please place an X in the space provided or fill in the blanks that apply to the ways in which you use the mass media.

1. Do you usually read a daily newspaper?

   _____ yes

   _____ no [Go to question no. 6]

2. Which daily newspaper(s) do you usually read?

   ____Milwaukee Sentinel

   ____Milwaukee Journal

   ____Wall Street Journal

   ____USA Today

   ____Chicago Tribune

   ____Other [Which one?_____]

3. About how many days a week do you read a daily newspaper? _____

4. About how much time do you spend each day reading a daily newspaper? _____

5. Which of the following statements best describes the way that you usually read a newspaper.

   _____I usually go through the newspaper looking for articles that are relevant to my personal or professional life, or which are about things that are important to society.

   _____I usually scan the newspaper just reading whatever happens to catch my eye, but not looking for anything in particular.

6. Do you usually read a weekly newspaper?

   _____ yes

   _____ no [Go to question no. 9]

7. Which weekly newspaper(s) do you read?

8. About how much time do you spend each week reading a weekly newspaper? _____

9. Do you read any weekly newsmagazines?

   ____yes

   ____no [Go to question no. 12]

10. Which weekly newsmagazines do you read?

____Time ____U.S. News & World Report

____Newsweek ____Other [Which one?_____]

11. About how much time do you spend each week reading newsmagazines?_____

12. Is cable television available where you live?

_____ yes

_____ no [Go to question no. 14]

13. Do you subscribe to cable TV?

_____ yes _____ no

14. What would you say is the average number of hours you watch TV after 5 p.m. on a weeknight?_____

15. Do you usually watch national news programs? _____ yes _____ no

16. Do you usually watch local news broadcasts? _____ yes _____ no

17. What would you say is the average number of hours you listen to the radio each day?_____

18. What is your primary source of information for news about state and government affairs?

____Newspapers ____Friends, relatives, co-workers

____Radio ____Other

____Television

19. What is your primary source of information for news about international affairs?

____Newspapers ____Friends, relatives, co-workers

____Radio ____Other

____Television

20. What is your primary source of information for news about business and the economy?

____Newspapers ____Friends, relatives, co-workers

____Radio ____Other

____Television

21. What is your primary source of information for news about federal government and politics?

____Newspapers ____Friends, relatives, co-workers

____Radio ____Other

____Television

22. What is your primary source of information for news about local government and politics?

____Newspapers ____Friends, relatives, co-workers

____Radio ____Other

____Television

The following questions are related to the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives lettered (a) or (b). Please select the one statement of each pair which you more strongly believe to be the case as far as you're concerned. Be sure to select the statement you actually believe to be more true rather than the one you think you should choose or the one you would like to be true.

Please answer each item carefully and choose an answer for every item. Select your answer by placing an X in the space provided next to the item.

In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you're concerned. Also, try to respond to each item independently when making your choice; do not be influenced by your previous choices.

23. ____(a) Children get into trouble because their parents punish them too much.
____(b) The trouble with most children nowadays is that their parents are too easy with them.

24. ____(a) Many of the unhappy things in people's lives are partly due to bad luck.
____(b) People's misfortunes result from the mistakes they make.

25. ____(a) One of the major reasons why we have wars is because people don't take enough interest in politics.
____(b) There will always be wars, no matter how hard people try to prevent them.

26. ____(a) In the long run people get the respect they deserve in this world.
____(b) Unfortunately, an individual's worth often passes unrecognized no matter how hard he/she tries.

27. ____(a) The idea that teachers are unfair to students is nonsense.
____(b) Most students don't realize the extent to which their grades are influenced by accidental happenings.

28. ____(a) Without the right breaks one cannot be an effective leader.
____(b) Capable people who fail to become leaders have not taken advantage of their opportunities.

29. ____(a) No matter how hard you try some people just don't like you.
____(b) People who can't get others to like them don't understand how to get along with others.

30. ____(a) Heredity plays the major role in determining one's personality.
____(b) It is one's experiences in life which determine what one is like.

31. ____(a) I have often found that what is going to happen will happen.
____(b) Trusting to fate has never turned out as well for me as making a decision and taking a definite course of action.

32. ____(a) In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
____(b) Many times exam questions tend to be so unrelated to course work that studying is really useless.

33. ____(a) Becoming a success is a matter of hard work; luck has little or nothing to do with it.
____(b) Getting a good job depends mainly on being in the right place at the right time.

34. ____(a) The average citizen can have an influence in government decisions.
____(b) This world is run by the few people in power, and there is not much the little person can do about it.

35. ____(a) When I make plans, I am almost certain that I can make them work.
____(b) It is not always wise to make plans too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

36. ____(a) There are certain people who are just no good.

____(b) There is some good in everybody.

37. ____(a) In my case, getting what I want has little or nothing to do with luck.
____(b) Many times we might just as well decide what to do by flipping a coin.

38. ____(a) Who gets to be the boss often depends on who was lucky enough to be in the right place first.
____(b) Getting people to do the right thing depends on ability, luck has little or nothing to do with it.

39. ____(a) As far as world affairs are concerned, most of us are the victims of forces we can neither understand nor control.
____(b) By taking an active part in political and social affairs the people can control world events.

40. ____(a) Most people don't realize the extent to which their lives are controlled by accidental happenings.
____(b) There really is no such thing as luck.

41. ____(a) One should always be willing to admit mistakes.
____(b) It is usually best to cover up one's mistakes.

42. ____(a) It is hard to know whether or not a person really likes you.
____(b) How many friends you have depends on how nice a person you are.

43. ____(a) In the long run the bad things that happen to us are balanced by the good ones.
____(b) Most misfortunes are the results of ability, ignorance, laziness, or all three.

44. ____(a) With enough effort we can wipe out political corruption.
____(b) It is difficult for people to have much control over the things politicians do in office.

45. ____(a) Sometimes I can't understand how teachers arrive at the grades they give.
____(b) There is a direct connection between how hard I study and the grades I get.

46. ____(a) A good leader expects people to decide for themselves what they should do.
____(b) A good leader makes it clear to everybody what their jobs are.

47. ____(a) Many times I feel that I have little influence over the things that happen to me.
____(b) It is impossible for me to believe that chance or luck plays an important role in my life.

48. ____(a) People are lonely because they don't try to be friendly.
____(b) There's not too much use in trying too hard to please people, if they like you, they like you.

49. ____(a) Sometimes I feel that I don't have enough control over the direction my life is taking.
____(b) What happens to me is my own doing.

50. ____(a) In the long run the people are responsible for bad government on a national as well as on a local level.
____(b) Most of the time I can't understand why politicians behave the way they do.

Please circle the response that best represents how you feel about each of the following statements.

51. Overall, how useful do you think the Wall Street Journal is or might be in saving you time and energy?

extremely useful	somewhat useful	don't know	not very useful	not at all useful

52. Overall, how useful do you think the Wall Street Journal is or might be in keeping you better informed?

extremely useful	somewhat useful	don't know	not very useful	not at all useful

53. How useful do you think the Wall Street Journal is or might be in saving you time and energy by bringing a variety of information together in a single place?

extremely useful	somewhat useful	don't know	not very useful	not at all useful

54. How useful do you think the Wall Street Journal is or might be in saving you time and energy by making information quickly available whenever you are ready to use it?

extremely useful	somewhat useful	don't know	not very useful	not at all useful

55. How useful do you think the Wall Street Journal is or might be in helping you make various decisions in a more organized and rational way?

extremely useful	somewhat useful	don't know	not very useful	not at all useful

56. How useful do you think the Wall Street Journal is or might be in keeping you up-to-date on business news?

extremely useful	somewhat useful	don't know	not very useful	not at all useful

57. How useful do you think the Wall Street Journal is or might be in keeping you up-to-date on international news?

extremely useful	somewhat useful	don't know	not very useful	not at all useful

Please fill in the following information about yourself.

Your Age: _____

____Female ____Male

____Married ____Single

Your Occupation: _____

Highest Degree Earned:_____

Are you currently studying for an advanced degree? ____yes ____no

Do you use a personal computer at home, work or school? ____yes ____no

Do you use any computer database services at home, work or school?

____yes ____no

Which of the following databases services do you now use?

____ The Source

____ CompuServe

____ Dow Jones News/Retrieval

____ NewsNet

____ Other [Which one(s)_____]

THANK YOU VERY MUCH

QUESTIONNAIRE -- Dow Jones News/Retrieval

Please place an X in the space provided or fill in the blanks that apply to the ways in which you use the mass media.

1. Do you usually read a daily newspaper?

   _____ yes

   _____ no [Go to question no. 6]

2. Which daily newspaper(s) do you usually read?

   ____Milwaukee Sentinel

   ____Milwaukee Journal

   ____Wall Street Journal

   ____USA Today

   ____Chicago Tribune

   ____Other [Which one?_____]

3. About how many days a week do you read a daily newspaper? _____

4. About how much time do you spend each day reading a daily newspaper? _____

5. Which of the following statements best describes the way that you usually read a newspaper.

   _____I usually go through the newspaper looking for articles that are relevant to my personal or professional life, or which are about things that are important to society.

   _____I usually scan the newspaper just reading whatever happens to catch my eye, but not looking for anything in particular.

6. Do you usually read a weekly newspaper?

   _____ yes

   _____ no [Go to question no. 9]

7. Which weekly newspaper(s) do you read?

8. About how much time do you spend each week reading a weekly newspaper? _____

9. Do you read any weekly newsmagazines?

   ____yes

   ____no [Go to question no. 12]

10. Which weekly newsmagazines do you read?

____Time ____U.S. News & World Report

____Newsweek ____Other [Which one?_____]

11. About how much time do you spend each week reading newsmagazines?_____

12. Is cable television available where you live?

_____ yes

_____ no [Go to question no. 14]

13. Do you subscribe to cable TV?

_____ yes _____ no

14. What would you say is the average number of hours you watch TV after 5 p.m. on a weeknight?_____

15. Do you usually watch national news programs? _____ yes _____ no

16. Do you usually watch local news broadcasts? _____ yes _____ no

17. What would you say is the average number of hours you listen to the radio each day?_____

18. What is your primary source of information for news about state and government affairs?

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____Radio ____Other

____Television

19. What is your primary source of information for news about international affairs?

____Newspapers ____Friends, relatives, co-workers

____Radio ____Other

____Television

20. What is your primary source of information for news about business and the economy?

____Newspapers ____Friends, relatives, co-workers

____Radio ____Other

____Television

21. What is your primary source of information for news about federal government and politics?

____Newspapers ____Friends, relatives, co-workers

____Radio ____Other

____Television

22. What is your primary source of information for news about local government and politics?

____Newspapers ____Friends, relatives, co-workers

____Radio ____Other

____Television

The following questions are related to the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives lettered (a) or (b). Please select the one statement of each pair which you more strongly believe to be the case as far as you're concerned. Be sure to select the statement you actually believe to be more true rather than the one you think you should choose or the one you would like to be true.

Please answer each item carefully and choose an answer for every item. Select your answer by placing an X in the space provided next to the item.

In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you're concerned. Also, try to respond to each item independently when making your choice; do not be influenced by your previous choices.

23. ____(a) Children get into trouble because their parents punish them too much.
____(b) The trouble with most children nowadays is that their parents are too easy with them.

24. ____(a) Many of the unhappy things in people's lives are partly due to bad luck.
____(b) People's misfortunes result from the mistakes they make.

25. ____(a) One of the major reasons why we have wars is because people don't take enough interest in politics.
____(b) There will always be wars, no matter how hard people try to prevent them.

26. ____(a) In the long run people get the respect they deserve in this world.
____(b) Unfortunately, an individual's worth often passes unrecognized no matter how hard he/she tries.

27. ____(a) The idea that teachers are unfair to students is nonsense.
____(b) Most students don't realize the extent to which their grades are influenced by accidental happenings.

28. ____(a) Without the right breaks one cannot be an effective leader.
____(b) Capable people who fail to become leaders have not taken advantage of their opportunities.

29. ____(a) No matter how hard you try some people just don't like you.
____(b) People who can't get others to like them don't understand how to get along with others.

30. ____(a) Heredity plays the major role in determining one's personality.
____(b) It is one's experiences in life which determine what one is like.

31. ____(a) I have often found that what is going to happen will happen.
____(b) Trusting to fate has never turned out as well for me as making a decision and taking a definite course of action.

32. ____(a) In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
____(b) Many times exam questions tend to be so unrelated to course work that studying is really useless.

33. ____(a) Becoming a success is a matter of hard work; luck has little or nothing to do with it.
____(b) Getting a good job depends mainly on being in the right place at the right time.

34. ____(a) The average citizen can have an influence in government decisions.
____(b) This world is run by the few people in power, and there is not much the little person can do about it.

35. ____(a) When I make plans, I am almost certain that I can make them work.
____(b) It is not always wise to make plans too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

36. ____(a) There are certain people who are just no good.

____(b) There is some good in everybody.

37. ____(a) In my case, getting what I want has little or nothing to do with luck.
____(b) Many times we might just as well decide what to do by flipping a coin.

38. ____(a) Who gets to be the boss often depends on who was lucky enough to be in the right place first.
____(b) Getting people to do the right thing depends on ability, luck has little or nothing to do with it.

39. ____(a) As far as world affairs are concerned, most of us are the victims of forces we can neither understand nor control.
____(b) By taking an active part in political and social affairs the people can control world events.

40. ____(a) Most people don't realize the extent to which their lives are controlled by accidental happenings.
____(b) There really is no such thing as luck.

41. ____(a) One should always be willing to admit mistakes.
____(b) It is usually best to cover up one's mistakes.

42. ____(a) It is hard to know whether or not a person really likes you.
____(b) How many friends you have depends on how nice a person you are.

43. ____(a) In the long run the bad things that happen to us are balanced by the good ones.
____(b) Most misfortunes are the results of ability, ignorance, laziness, or all three.

44. ____(a) With enough effort we can wipe out political corruption.
____(b) It is difficult for people to have much control over the things politicians do in office.

45. ____(a) Sometimes I can't understand how teachers arrive at the grades they give.
____(b) There is a direct connection between how hard I study and the grades I get.

46. ____(a) A good leader expects people to decide for themselves what they should do.
____(b) A good leader makes it clear to everybody what their jobs are.

47. ____(a) Many times I feel that I have little influence over the things that happen to me.
____(b) It is impossible for me to believe that chance or luck plays an important role in my life.

48. ____(a) People are lonely because they don't try to be friendly.
____(b) There's not too much use in trying too hard to please people, if they like you, they like you.

49. ____(a) Sometimes I feel that I don't have enough control over the direction my life is taking.
____(b) What happens to me is my own doing.

50. ____(a) In the long run the people are responsible for bad government on a national as well as on a local level.
____(b) Most of the time I can't understand why politicians behave the way they do.

Please circle the response that best represents how you feel about each of the following statements.

51. Overall, how useful do you think Dow Jones News/Retrieval is or might be in saving you time and energy?

extremely useful	somewhat useful	don't know	not very useful	not at all useful

52. Overall, how useful do you think Dow Jones News/Retrieval is or might be in keeping you better informed?

extremely useful	somewhat useful	don't know	not very useful	not at all useful

53. How useful do you think Dow Jones News/Retrieval is or might be in saving you time and energy by bringing a variety of information together in a single place?

extremely useful	somewhat useful	don't know	not very useful	not at all useful

54. How useful do you think Dow Jones News/Retrieval is or might be in saving you time and energy by making information quickly available whenever you are ready to use it?

extremely useful	somewhat useful	don't know	not very useful	not at all useful

55. How useful do you think Dow Jones News/Retrieval is or might be in helping you make various decisions in a more organized and rational way?

extremely useful	somewhat useful	don't know	not very useful	not at all useful

56. How useful do you think Dow Jones News/Retrieval is or might be in keeping you up-to-date on business news?

extremely useful	somewhat useful	don't know	not very useful	not at all useful

57. How useful do you think Dow Jones News/Retrieval is or might be in keeping you up-to-date on international news?

extremely useful	somewhat useful	don't know	not very useful	not at all useful

Please fill in the following information about yourself.

Your Age: _____

____Female ____Male

____Married ____Single

Your Occupation: _____

Highest Degree Earned:_____

Are you currently studying for an advanced degree? ____yes ____no

Do you use a personal computer at home, work or school? ____yes ____no

Do you use any computer database services at home, work or school?

____yes ____no

Which of the following databases services do you now use?

____ The Source

____ CompuServe

____ Dow Jones News/Retrieval

____ NewsNet

____ Other [Which one(s)_____]

THANK YOU VERY MUCH

APPENDIX B

APPENDIX B

INTERVIEWER COMMENTS--Wall Street Journal

INITIAL INSTRUCTIONS

First of all, I'd like to thank you for taking the time to help with this research and to assure you that all responses will be held in strictest confidence. To assure your anonymity, your responses will be identified only by an identification number.

As you read the newspaper, put a check mark on all headlines and ads that you read and draw a line down the righthand (or lefthand) column as you read. You will have up to 20 minutes to read the paper freely, but you may stop at any time before the 20 minutes are up. If you finish reading before I tell you that 20 minutes have passed, please let me know.

AFTER READING HAS BEEN COMPLETED

Here is a list of various types of columns or stories that appear in the Wall Street Journal. You may use this list to help you recall what you have read.

On this questionnaire, please list the central theme for each story or item that you can recall reading. Also list as many facts as you can recall, whether or not you can recall the central theme. Then for each item or story that you can recall, please indicate the degree to which you were looking or not looking for the general type of information that you expected to find in each item. Select your answer by placing an X in one of the spaces provided. Use as many of these pages as you need.

AFTER COMPLETING RECALL PORTION

Now I would like you to answer some general questions related to your use of the media and some questions related to the way in which events in our society affect different people. Please let me know if you have any questions.

PARTING COMMENTS

THANK YOU AGAIN FOR TAKING THE TIME TO PARTICIPATE IN THIS STUDY.

APPENDIX C

APPENDIX C

WALL STREET JOURNAL COLUMNS
Monday

What's News--Business and Finance

What's News--World Wide

Economic Outlook

Front page news features

Leisure and Arts

Bookshelf

Editorials and Commentary

Letters to the Editor

Second section, front page features

Your Money Matters

International business news

International coporate report

Financing business

Credit Markets

Business Briefs

Abreast of the Market

Heard on the Street

Politics and Policy

Stocks, Bonds, Money Market Funds, Treasury Issues

WALL STREET JOURNAL COLUMNS
Tuesday

What's News--Business and Finance

What's News--World Wide

Labor Letter

Front page news features

Leisure and Arts

Bookshelf

Editorials and Commentary

Letters to the Editor

Second section, front page features

Your Money Matters

International business news

International coporate report

Financing business

Credit Markets

Business Briefs

Abreast of the Market

Heard on the Street

Politics and Policy

Stocks, Bonds, Money Market Funds, Treasury Issues

WALL STREET JOURNAL COLUMNS
Wednesday

What's News--Business and Finance

What's News--World Wide

Tax Report

Front page news features

Leisure and Arts

Bookshelf

Editorials and Commentary

Letters to the Editor

Second section, front page features

Your Money Matters

International business news

International coporate report

Financing business

Credit Markets

Business Briefs

Abreast of the Market

Heard on the Street

Politics and Policy

Stocks, Bonds, Money Market Funds, Treasury Issues

WALL STREET JOURNAL COLUMNS
Thursday

What's News--Business and Finance

What's News--World Wide

Business Bulletin

Front page news features

Leisure and Arts

Bookshelf

Editorials and Commentary

Letters to the Editor

Second section, front page features

Your Money Matters

International business news

International coporate report

Financing business

Credit Markets

Business Briefs

Abreast of the Market

Heard on the Street

Politics and Policy

Stocks, Bonds, Money Market Funds, Treasury Issues

WALL STREET JOURNAL COLUMNS
Friday

What's News--Business and Finance

What's News--World Wide

Washington Wire

Front page news features

Leisure and Arts

Bookshelf

Editorials and Commentary

Letters to the Editor

Second section, front page features

Your Money Matters

International business news

International coporate report

Financing business

Credit Markets

Business Briefs

Abreast of the Market

Heard on the Street

Politics and Policy

Stocks, Bonds, Money Market Funds, Treasury Issues

SUMMARY OF DATABASES

General News and Information Services

//NEWS — News/Retrieval World Report
Foreign and national news compiled from the Associated Press newswire; continuously updated.

//SPORTS — News/Retrieval Sports Report
Scores, stats, standings, stories and schedules for most major sports; includes professional, major college and top amateur teams.

//WTHR — News/Retrieval Weather Report
Weather tables for more than 50 major cities; national weather summary and forecasts by geographic region.

//OAG — Official Airline Guide
Includes 820,000 direct and connecting schedules for domestic and international airline flights; complete fare information for major North American and international flights.

//MOVIES — Cineman Movie Reviews
Reviews of current movies; previews of coming attractions; reviews of movies released between 1926 and 1985; top current movies ranked by box office sales.

//ENCYC — Academic American Encyclopedia
More than 32,000 articles

//SCHOOL — Peterson's College Selection Service
Peterson's Guide to Undergraduate STudy online; search by geographic location, major, enrollment, entrance difficulty and by specific college name.

//MEDX — Medical and Drug Reference
A non-diagnostic reference covering more than 1,000 illnesses and their medical and surgical treatments; information on drug side-effects, food interaction and precautionary measures.

//SYMBOL — News/Retrieval Symbols Directory
Listing of 15,000 symbols used to access News/Retrieval Information.

//DJNEWS — Dow Jones News
News from the Wall Street Journal, Barron's and the Dow Jones News Service; stories 90 seconds to 90 days old.
CONSULT //SYMBOL FOR NEWS CATEGORIES FOR THIS SERVICE.

//WSJ — Wall Street Journal Highlights Online
Headlines and summaries of major stories; includes front-page news, front- and back-page features, market pages, editorial columns and commentary.

Business and Investor Services

//UPDATE — Weekly Economic Update
A review of the week's top economic events and a glimpse of the week's top economic news.

//MMS — Economic and Foreign Exchange Survey
Weekly survey of economists and money market dealers of 50 leading financial institutions in the U.S.; includes median forecasts of domestic monetary and economic indicators; weekly consensus analysis and forecasts of foreign exchange rates by 30 foreign-exchange dealers.

//SP — Standard & Poor's Online
Financial profiles of more than 4,600 companies. Major categories include financial overview, projected earnings, dividends and company operations.

//KYODO — Japan Economic Daily
Same-day coverage of major business, economic and political news from Japan; includes daily Japanesefinancial market wrap-up.

//DEFINE — Words of Wall Street
A comprehensive lexicon of investment terminology.

//MLYNCH — Merrill Lynch Research Service
Compiled from research comments issued by Merrill Lynch's Securities Research Division; market analysis and recommendations for investment action; QRQ investment ratings on stocks.

//MEDGEN — Media General Financial Services
Detailed corporate financial information on 4,300 companies, 180 industries; major categories include revenue, earnings, dividends, volume, ratios and price changes.

//CQE — Enhanced Current Quotes
Delayed quotes on common and preferred stocks and bonds, mutual funds, options and U.S. Treasury issues.

//HQ — Dow Jones Historical Quotes
Daily volume, high, low and close for stock quotes and composites; monthly summaries to 1979; quarterly summaries to 1978.

//RTQ — Real-Time Quotes
Quotes with no delay for stocks trading on the New York, American, Pacific and Midwest stock exchanges.

//DJA — Historical Dow Jones Averages
Daily high, low, close and volume for the last trading year; historical data for industrials, transportation, utilities and 64 stock composites; by specific date or 12-day period.

//DSCLO — Disclosure II
10-K extracts, company profiles and detailed data on more than 10,000 companies; from SEC filings.

//EARN — Corporate Earnings Estimator
Latest earnings-per-share forecasts by top Wall Street analysts.

Symbols for News Categories

Category	Symbol
Industries	
Accounting	.I/FIN
Acquisitions	.I/TNM
Advertising	.I/MKT
Aerospace	.I/ARO
Airlines	.I/AIR
Apparel	.I/TEX
Appliances	.I/ELE
Autos, Auto Parts	.I/AUT
Bankruptcies	.I/BCY
Banks	.I/BNK
Broadcasting	.I/TEL
Casinos & Gambling	.I/CNO
Chemicals	.I/CHM
Computers	.I/EDP
Construction Materials	.I/CON
Cosmetics	.I/FAB
Electric, Electronics	.I/ELE
Environment	.I/ENV
Farm Equipment	.I/FAR
Farm Products	.I/CMD
Financial	.I/FIN
Food & Beverage	.I/FAB
Foreign Exchange	.I/MON
Gold	.I/PCS
Hospital Supplies	.I/PHA
Household Products	.I/FAB
Industrial Equipment	.I/IND
Insurance	.I/FIN
International Money Flows, Trade	.I/MON
Land Development	.I/REL
Leasing	.I/FIN
Machine Tools	.I/IND
Marketing	.I/MKT
Mergers	.I/TNM
Mining, Metals (non-precious)	.I/MIN
Movies	.I/FLX
Mutual Funds	.I/FIN
Natural Gas, Pipelines	.I/LNG
Nuclear Power, Fuel	.I/NUK
Office Equipment	.I/OFF
Packaging (all types)	.I/PUL
Petroleum	.I/PET
Pharmaceuticals	.I/PHA
Photography	.I/PIX
Plastics	.I/CHM
Precious Metals, Stones	.I/PCS
Publishing	.I/PUB
Pulp, Paper	.I/PUL
Railways	.I/TRA
Real Estate, Reits	.I/REL
Records, Recording Studios	.I/FLX
Restaurants	.I/FAB
Retailing	.I/RET
Rubber	.I/RUB
Securities Industry	.I/SCR
Ship Lines, Builders	.I/TRA
Supermarkets	.I/FAB
Telecommunications	.I/TEL
Telephone, Telegraph	.I/TEL
Tender Offers	.I/TNM
Textiles	.I/TEX
Thrift Institutions	.I/BNK
Tobacco	.I/FAB
Transportation (not airlines or autos)	.I/TRA
Truck Lines	.I/TRA
Utilities	.I/UTI
General News	
Current-Day General News	.I/GEN
All Current-Day Ticker News	.A/
Barron's News	.BRRNS
Corporate Interviews	.I/CEO
Daily Calendar	.I/CAL
Executive Changes	.WNEWS
Headlines of the Hour	.I/HOH
"Hot" Business News	.H/
Labor News	.LABOR
Foreign Area News	
General Foreign News	.FORGN
Africa	.AFRIC
Canada	.CANDA
Europe	.EUROP
Far East	.FREST
Japan	.JAPAN
Latin America	.LATAM
Mideast	.MDEST
U.S. Government News	
General Government News	.GOVMT
Agriculture Department	.G/AGD
Congressional News	.G/CNG
Defense Department	.G/DEF
Energy Department	.G/ERG
Executive Branch News	.G/ERG
Labor Department	.G/LBR
Justice Department	.G/JUS
Internal Revenue Service	.G/IRS
Supreme Court	.G/SUP
Taxes	.TAXES
Transportation Department	.G/TRN
Federal Regulatory Agencies	
Environmental Protection Agency	.G/EPA
Federal Communications Commission	.G/FCC
Federal Reserve Board	.G/FED
Federal Trade Commission	.G/FTC
Food and Drug Administration	.G/FDA
Interstate Commerce Commission	.G/ICC
Securities and Exchange Commission	.G/SEC
Treasury Department	.G/TRE
Economic News	
General Economic News	.I/ECO
Bond Market News	.I/BON
Commodities News	.I/CMD
Economic Indicators	.I/EMI
Monetary News	.I/MON
Stock Market News	
General Stock Market News and Comment	.I/STK
Active Stocks	.I/ACT
Stock Market Indexes	.I/NDX
Bankruptcies	.I/BCY
Block Trades	.I/BLK
Buybacks, Swap Offers	.I/BBK
Dividend Actions	.I/DIV
Dow Jones Average	.I/DJA
Earnings Reports	.I/ERN
Heard on the Street	.I/HRD
Initial Equity Offerings	.I/INI
Tender Offers, Mergers, and Acquisitions	.I/TNM

Example: Type .I/EDP 01 for headlines on computer industry.

NOTE: To locate most current symbols for Dow Jones Business and Economic News, Dow Jones Quotes, and Financial and Investment Services, type /SYMBOL.

APPENDIX D

APPENDIX D

CODEBOOK

A COMPARISON OF INFORMATION SEEKING AND INFORMATION PROCESSING IN TWO MEDIA — PRINT AND ELECTRONIC PRINT

RECORD #1

COLUMN	VARIABLE	
1-3	ID	Subject ID Number 100-125 = Dow Jones 200-225 = Wall Street Journal
4	READDLY	Q1. Do you usually read a daily newspaper? 1 = yes 0 = no
5-11	DAILIES	Q2. Which daily newspaper(s) do you usually read? 1 = Milwaukee Sentinel 2 = Milwaukee Journal 3 = Wall Street Journal 4 = USA Today 5 = Chicago Tribune 6 = New York Times 7 = One "other" 8 = More than one "other"
12	#DAILIES	Total number of dailies usually read
13	DALYDAYS	Q3. How many days a week do you read a daily newspaper?
14-16	DALYTIME	Q4. Time spent each day reading a daily newspaper? (in minutes)
17	READBEH	Q5. How do you usually read a newspaper? 1 = look for relevant articles 0 = scan the newspaper
18	READWKLY	Q6. Do you usually read a weekly newspaper? 1 = yes 0 = no
19-20	WEEKLIES	Q7. Which weekly newspapers do you read? 1 = Sunday Milwaukee Journal 2 = Milwaukee Business Journal 3 = Barron's 4 = Church weekly 5 = Suburban weekly 6 = Other 7 = More than one suburban weekly 8 = More than one "other"
21-23	WKLYTIME	Q8. Time spent each week reading a weekly newspaper? (in minutes)
24	READMAGS	Q9. Do you read any weekly newsmagazines? 1 = yes 0 = no

25-27	NEWSMAGS	Q10. Which weekly newsmagazines do you read? 1 = Time 2 = Newsweek 3 = U.S. News & World Report 4 = One "other" 5 = More than one "other"
28-30	MAGTIME	Q11. Time spent each week reading newsmagazines? (in minutes)
31	CABLE	Q12. Is cable TV available where you live? 1 = yes 0 = no
32	CABLESUB	Q13. Do you subscribe to cable TV? 1 = yes 0 = no
33-35	TVTIME	Q14. Time spent watching TV after 5 p.m. on a weeknight? (in minutes)
36	NATLNEWS	Q15. Do you usually watch national news programs? 1 = yes 0 = no
37	LOCLNEWS	Q16. Do you usally watch local news broadcasts? 1 = yes 0 = no
38-40	RADIOMIN	Q17. What is the average number of hours you listen to the radio each day? (code in minutes)
41	STATNEWS	Q18. Primary source of news about state & govt affairs 1 = newspapers 2 = radio 3 = television 4 = friends, relatives, co-workers 5 = other
42	INTLNEWS	Q19. Primary source of news about int'l affairs 1 = newspapers 2 = radio 3 = television 4 = friends, relatives, co-workers 5 = other
43	BIZNEWS	Q20. Primary source of news about business & the economy 1 = newspapers 2 = radio 3 = television 4 = friends, relatives, co-workers 5 = other

44	POLNEWS	Q21. Primary source of news about federal govt. & politics 1 = newspapers 2 = radio 3 = television 4 = friends, relatives, co-workers 5 = other
45	LOCNEWS	Q22. Primary source of news about local govt. & politics 1 = newspapers 2 = radio 3 = television 4 = friends, relatives, co-workers 5 = other
46-68	LOCUS	Q23-50. Locus of control scale EXCLUDE FILLER ITEMS FROM QUESTIONNAIRE 1 = external 0 = internal
69-75	SATISFAX	Q51-57. Index of satisfaction 5 = extremely useful 4 = somewhat useful 3 = don't know 2 = not very useful 1 = not at all useful

RECORD #2

1-2	AGE	Age
3	GENDER	Gender 0 = Male 1 = Female
4	MARITAL	Marital status 0 = Single 1 = Married
5	OCCUPATN	Occupation 1 = Student 2 = Business 3 = Industry 4 = Government 5 = Education 6 = Other, unemployed
6	EDUC	Highest degree earned 0 = high school 1 = bachelor's 2 = master's 3 = Ph.D.

7	STUDENT	Currently studying for an advanced degree? 1 = yes 0 = no
8	COMPUTER	Use a personal computer at home, work or school? 1 = yes 0 = no
9	WEEKDAY	Day of the week testing was done 1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday
10	TIMEDAY	Time of day testing was done 1 = before 12 noon 2 = 12 noon - 5 p.m. 3 = after 5 p.m.
11-12	READTIM	Total time spent reading
13-14	RECTIME	Time spent recalling items (in minutes)
15-16	STORYRED	Total number of stories read
17-18	STORYREC	Total number of stories recalled
19-20	HEADREC	Total number of headlines or instruction lists recalled
21-33	THEMEREC	Central theme recalled 3 = specific theme recalled accurately 2 = generic theme recalled accurately 1 = insufficient, inaccurate theme recalled 0 = no theme recalled
34-36	FAXREC	Total number of facts recalled accurately
37-38	FAXERRS	Total number of facts recalled inaccurately
39-40	FAXTZ	Facts recalled, but not present in items read
41-53	ISIPSCAL	Information seeking/information processing scale 5 = looking for information 4 = looking for information 3 = neutral 2 = not looking for information 1 = not looking for information
54-56	INCHREAD	Total inches read
57-58	HEADREAD	Total number of headlines read

APPENDIX E

APPENDIX E

MULTIPLE REGRESSION ANALYSES

Table 11

MULTIPLE REGRESSION ANALYSIS FOR THE CRITERION VARIABLE INFORMATION SEEKING

VARIABLE	BETA WEIGHT	T	SIG T
Exposure	.379	2.431	.019
Sex	-0.010	-0.068	.95
Marital Status	-0.068	-0.450	.66
Education	-0.084	-0.573	.57
Age	-0.031	-0.199	.84
Constant		4.389	.000

R=.450 R^2=.202

Table 12

MULTIPLE REGRESSION ANALYSIS FOR THE CRITERION VARIABLE INFORMATION SEEKING

VARIABLE	BETA WEIGHT	T	SIG T
Exposure	.435	3.027	.004
Television	-0.105	-0.731	.469
Magazine	.037	.273	.789
Weekly	.182	1.324	.192
Daily	-0.089	-0.615	.542
Constant		9.973	.000

R=.482 R^2=.233

Table 13

MULTIPLE REGRESSION ANALYSIS FOR THE CRITERION VARIABLE FACTS RECALLED PER INCH READ

VARIABLE	BETA WEIGHT	T	SIG T
Exposure	.716	6.086	.000
Sex	.063	.598	.55
Marital Status	-0.165	-1.443	.16
Education	-0.183	1.652	.11
Age	-0.038	-0.323	.75
Constant		.609	.55

R=.739 R^2=.546

Table 14

MULTIPLE REGRESSION ANALYSIS FOR THE CRITERION VARIABLE FACTS RECALLED PER INCH READ

VARIABLE	BETA WEIGHT	T	SIG T
Exposure	1.695	6.208	.000
Radio	-0.032	-0.297	.76
TV	-0.048	-0.426	.67
Daily	-0.017	-0.149	.88
Constant		2.078	.04

R=.700 R^2=.490