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**AN EXPERIMENTAL ANALYSIS OF MEDIA IN
ANNUAL REPORTS**

A Dissertation

by

CURTIS EUGENE CLEMENTS

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

May 1999

Major Subject: Accounting

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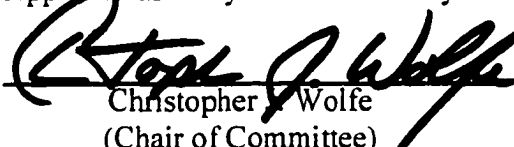
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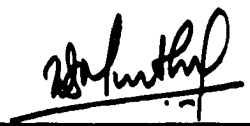
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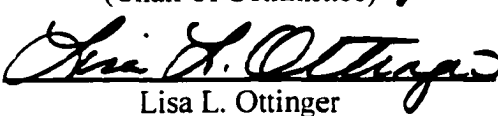
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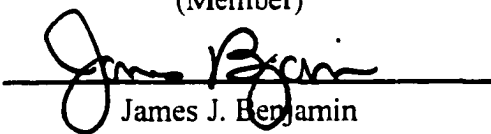
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ABSTRACT

An Experimental Analysis of Media in Annual Reports. (May 1999)

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In 1965, Marshall McLuhan coined the phrase “the medium is the message.” This statement suggests that the selected media affects the receipt of a message’s content. In line with this philosophy, annual reports have changed radically from a bland legalistic document to a vibrant high-tech multimedia presentation designed to influence investors and consumers. Employing an experimental approach, this research investigates the efficacy of the newest form of annual report: the multimedia annual report. Two experiments were conducted to extend the extant annual report literature by: 1) An examination of user effects across the multimedia and paper report offerings of two companies; and 2) An examination of video presentation of financial information and its interaction effects with source gender, and type of news.

The first experiment examines the report user effects of paper and multimedia annual reports within and between two companies (EDS and Macromedia). Experiment one also extends relevant accounting literature by using expert report users. The second experiment examines the effect of video on non-expert users of annual reports. Additionally, experiment two examines the

interaction effects of video with source gender and news type.

The results for experiment one indicate that expert and non-expert report users are affected differently by annual report attributes. Specifically, non-experts are influenced significantly more than expert report users. Non-experts also had a more favorable opinion of the annual report design than experts did. Recall results indicate that experts recall significantly more information when free recall is used. However, expert and non-expert subjects did not differ significantly in their ability to recall information when cued recall is used.

The results for experiment two indicate that video is an important determinant of overall attitude about a company. Subjects also judged a video presentation to be higher in quality than a paper presentation. In addition, subject believed the video presentation to a greater extent than they did the paper presentation. Experiment two found that paper reports induced greater recall of information regardless of the type of recall (free recall or cued recall).

In conclusion, some of the evidence in the experiments contains conflicting results. To clarify these results, additional research is needed in the area of media in annual reporting.

DEDICATION

This dissertation is dedicated to my loving family who has endured with me throughout the years.

To Aaron, who brightened my life with his birth while I was still in the Ph.D. program. Thank you so much for giving me a diversion from school. It was/is exciting to watch you grow and develop. I look forward to the father-son outings that are yet to come.

To Kimberly, my wonderful daughter; you are a sweet and wonderful little girl. Thank you for putting things in perspective for me by just wanting me to color with you. You are a special gift from God and I treasure the time we spend together.

Finally, I am most indebted to my wife Pam. Thank you so much for your undying love and support through the good times and the bad times. I don't know how I ever would have completed this degree without the love and encouragement that you continually gave me – sometimes that was all that kept me going. Thank you so much for being such a wonderful wife and mother. I thank God each and every day that he gave me someone like you. I eagerly look forward to our future together.

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I want to thank my family for all of the love and support they have given me over the years. To my mother, Sandra Clements, for her prayerful support of me; I love you. To my dad, Harlies Clements, who taught me useful skills (like how to change the oil in my car!). To my Grandmother, Ruth Phillips, you have always been my biggest supporter and I love you very much. To my Grandpa, Jasper Clements, thank you for spending time with me camping and fishing. Lastly, I want

to say thank you to my two grandparents that didn't live to see me complete this degree. To my Grandmother, Myrtle Clements, thank you so much for your love and care when we were little. And to my Granddad, Jess Phillips, who always slipped me a \$20 bill when we came to visit – you don't know how much that money helped us when I was in school. I miss you both.

Finally, I would like to thank my Lord and Savior Jesus Christ for his sacrifice on the cross for me. I also want to thank Him for His love and support that He gives me each and every day.

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CHAPTER I

INTRODUCTION

“Accounting is the information system that measures business activities, processes that information into reports, and communicates the results to decision makers.” (Harrison and Horngren 1998, 5) A key function of accounting is to communicate information to decision-makers. Companies communicate with the public via a number of channels. One of the most important communicative tools that companies use is the corporate annual report (Cato 1998a), and research has shown that the annual report is extremely informative to individual investors (Cready and Mynatt 1991). Given the importance of the annual report, it is surprising that Hopwood (1996) notes that the area of annual reports is largely unstudied in the accounting literature. This research focuses on the annual report by studying the effects of differing media on report users.

While the annual report made its debut in 1823 as a simple one-page handwritten document, in the last 35 to 40 years it has been undergoing a radical change from a bland legalistic paper document to a very complex high-tech multimedia presentation (McKinstry 1996). The complexity of annual reports has risen to such a level that most companies now employ outside consultants to help produce their annual reports. In 1996

This dissertation follows the style and format of *The Accounting Review*.

the average cost for an annual report was \$3.11 per copy, which translates into an \$8.4 billion industry (Cato 1998b).

Given the fact that enormous economic resources are dedicated to the production of an annual report, it is important to understand its objectives. The annual report has a two-fold purpose. First, the annual report fulfills a legal responsibility of reporting information to shareholders (Anderson and Imperia 1992). Studies by Hakansson (1977), Kaplan et al. (1990), Cready and Mynatt (1991), and Epstein and Pava (1993, 1995) indicate that annual reports do provide information that is acted upon by certain classes of investors and decision-makers. However, the modern annual report contains much more information than the required legal disclosures. The presence of this additional information suggests that the second purpose of the annual report is to persuade individuals. Research has shown that annual reports are viewed as marketing tools designed to communicate the firm's mission, objectives, strategies and performance (Dunk 1980; Gartner 1981; Jacobson 1988; Kohut and Segars 1992; Dröge et al. 1990). In fact, many of the radical changes that are currently taking place in the annual report industry focus on the report's ability to persuade decision-makers (Kohut and Segars 1992).

In 1993, in a continuing effort to provide information in innovative ways, a new form of annual report was born – the annual report on CD-ROM. Since its inception in 1993, a growing number of companies such as International Business Machines (IBM), Electronic Data Systems (EDS), Adobe Systems, R. R. Donnelly & Sons Co., Oracle Systems Corp., and Macromedia, have developed multimedia annual reports on CD-

ROM. These high-tech presentations combine several media — text, graphics, computer animation, still images, motion videos and sound — in a single highly professional presentation. As one investment analyst indicates, “There are things you can convey [with multimedia] that you can’t with paper...it is a cool way to give a sense of the company, its culture, how it thinks, what its strategy is.” (Deutsch 1994, 200).

In 1965, Marshall McLuhan coined the phrase “the medium is the message.”

This statement suggests that the selected media affects the receipt of a message’s content and studies have shown that media does induce differential effects in persuasion (e.g., Wilke 1934; Frandsen 1963; Croft et al. 1969; Andreoli and Worchel 1978; Chaiken and Eagly 1983; Ottinger 1993), satisfaction (e.g., Helms et al. 1991; Jensen and Sandlin 1992; Butler and Mautz 1996; Clements and Wolfe 1997), and recall (e.g., Wilson 1974; Furnham and Gunter 1985, 1987, 1989; Furnham et al. 1987, 1988, 1990; Clements and Wolfe 1997). It appears that companies assume that multimedia annual reports affect their users differently than traditional paper-based annual reports; why else would firms bear the burden of producing these reports?¹

That media affects annual report users is a largely untested assumption which leads to several interesting research questions. Are there any significant user differences between paper and multimedia annual reports for the same company? Are all companies preparing multimedia annual reports receiving the same benefit? If differences exist between paper and multimedia annual reports, what is the impact of each individual

¹ The additional cost of producing a multimedia annual report may exceed \$300,000 (Deutsch 1994).

media component of the presentation? Finally, does media interact with other attributes of the annual report such as type of news, source (i.e., presenter's) gender, race, age, etc.?

Employing an experimental approach, this research investigates the efficacy of the multimedia annual report format. Two experiments were conducted to extend the extant literature by: 1) An examination of user effects across the multimedia and paper report offerings of two companies; and 2) An examination of video presentation of financial information and its interaction effects with source gender, and type of news.

The first experiment examines the report user effects of paper and multimedia annual reports within and between two companies (EDS and Macromedia). Clements and Wolfe (1997) analyzed the differences between paper and multimedia annual reports across the constructs of attitude, satisfaction, and recall for one company (EDS). They found that there is some benefit derived from the additional multimedia annual report (e.g., increased satisfaction). Experiment 1 examines the differences in attitude, satisfaction, and recall between multimedia and paper annual reports for EDS and Macromedia. Experiment 1 extends the literature in two important ways: 1) it compares differential effects created by report format across multiple firms; and 2) the experiment uses both expert and non-expert subjects in the determination of differential effects created by report format.

Experiment 2 examines the management's discussion and analysis (MD&A) section of a fictional company's annual report to determine the effects of video on attitude, satisfaction, and recall. Also, the interaction effects of media (video or paper)

with source gender (male or female) and the interaction effects of media (video or paper) with type of news (good news or bad news) are investigated. All experimental effects are analyzed across the constructs of attitude, satisfaction and recall. Heretofore, no research has studied the effect of a single media in annual reports. Given the prominence of video in the American culture, this appears a natural and important starting point.

To date, the user effects of multimedia annual reports are unknown, yet companies continue to dedicate substantial resources to the preparation of these annual reports. The results of this study begin to clarify the differences in reporting media. This research is of primary interest to companies publishing multimedia annual reports and companies selling tools and/or services to produce multimedia annual reports. Also, as companies begin to disseminate information through a number of different channels, in particularly the internet, standard-setters may become increasingly involved in the reporting of non-financial information contained in reports. Recently, the AICPA and the Auditing Standards Board have issued guidance to auditors concerning the reporting of non-financial data in an electronic site (AICPA Practice Alert 97-1, 1997). The guidelines suggest that auditors do not have additional responsibility for reviewing non-financial information published electronically. However, the guidelines suggest that companies may want to construct boundaries around audited financial information indicating when users hyperlink out of the audited sections. As technology improves and richer media are used in annual reports, information regarding the user effects of presentation mode is of potential importance to standard-setters.

The remainder of this dissertation is organized as follows. Chapter II reviews

previous research on annual reports, media and persuasion, media and satisfaction, media and recall, and media preferences. Chapter III describes a research framework and develops the research hypotheses and research questions. Chapter IV presents the experimental research methodology used to test the hypotheses and questions. Chapter V provides results of the two experiments. Chapter VI is the concluding chapter and discusses the experimental results, provides a summary, states limitations of the studies, and proposes extensions for future research.

CHAPTER II

LITERATURE REVIEW

Relevant literature regarding media, gender, and news type in annual reports comes from a variety of disciplines. The disciplines include accounting, journalism, social psychology, education, and communication. This chapter provides a review of the relevant literature from all disciplines, and is organized as follows. It begins with literature regarding the importance and use of annual reports. Next, literature related to gender in annual reports is reviewed followed by a discussion of literature regarding the impact of “good news” and “bad news” in annual reports. Finally, literature regarding media’s impact on attitude, satisfaction and recall is discussed in the context of annual reports.

Annual Reports

Annual reports are no longer the legalistic documents that only contain required disclosures. Unlike other regulatory disclosures, annual reports to shareholders are viewed as marketing tools communicating the firm’s mission, objectives, strategies, and financial performance (Kohut and Segars 1992; Dröge et al. 1990). In fact, Cooper et al. (1994) suggest that annual reports are a social construct, and the richness of the presentation is meant to influence opinion separate from the actual facts contained in the report.

While companies dedicate substantial resources to the production and distribution of annual reports, research in this area has been cursory at best (Kohut and Segars 1992; Hopwood 1996). Previous studies have examined user perceptions of various disclosures (e.g., Buzby 1974; Firth 1978; McNally et al. 1982; and Moizer and Arnold 1984), narrative components of annual reports (e.g., Ingram and Frazier 1983; McConnell et al. 1986; and Swales 1988), and graphs versus tabular presentation of information (DeSanctis 1984; DeSanctis and Jarvenpaa 1989).

Before studying the user effects of annual reports, it is beneficial to understand if annual reports are used and by whom. Hakansson (1977) suggests that "small" investors rely on public information (i.e., the annual report) while more wealthy investors rely on predisclosure sources (e.g., analysts) for decision-making purposes. Cready and Mynatt (1991) find empirical evidence indicating that annual reports do not affect price or volume of shares traded. However, they do find that the number of transactions significantly increases around annual report releases. In support of Hakansson (1977), this evidence indicates that annual reports are of greater value to smaller investors.

In an experimental study, Kaplan et al. (1990) determined that management comments in an annual report (president's letter) provided useful information to stockholders. They also found subjects' future expectations, support of management, and whether to hold or sell the stock were significantly influenced by the comments in the president's letter. Their findings indicate that the information contained in the management commentary sections of the annual report (e.g., president's letter,

management's discussion and analysis, etc.) provide information in addition to the information provided in the financial statements of the annual report.

Gender in Annual Reports

Very few studies have been conducted to analyze gender in annual reports. Three such studies examined pictures in annual reports to evaluate the portrayal of females in corporate annual reports. The fourth study experimentally examined whether the representation of females in annual reports significantly affected subjects' impressions of the overall corporate climate.

Kuiper (1986) analyzed pictures in the 1983 annual reports for 50 *Fortune 500* companies to evaluate the comparative visibility of men and women. Kuiper found that females are not highly visible as corporate officers. Of the 70 officers pictured, one was female. She also found that males were more visible than females in pictures of employees and/or consumers. Based on her analysis, she found that, relative to female-male labor force composition, females were underrepresented by approximately 27%, while males were overrepresented by approximately 39%. The results led her to the conclusion that while annual reports may tout the value of female employees, the underlying message of the pictures suggests that males contribute more to the company's success.

Tinker and Neimark (1987) conducted a longitudinal study of annual reports at General Motors (GM) where they examined managerial ideology regarding women. Their study is based on the political economy of accounting (PEA) approach. "[This] ...

approach is concerned with exploring and assessing the ways various social protagonists use information and corporate reporting to mediate, suppress, mystify, and transform social conflict.” (Tinker and Neimark 1987) Using this approach Tinker and Neimark analyzed General Motors (GM) annual reports from 1917 to 1977. They found that the GM annual reports target females in two distinct roles: as a labor force and as a tool to promote consumption.

During the World War II period (1940 – 1949) Tinker and Neimark find that GM reports portray women as valued employees. This is significant due to the male labor shortage resulting from World War II. During the post-World War II period (1950 – 1965), women were used as marketing tools. The pictures of women in GM’s annual reports reflected the company’s goal of constructing a new social consumption norm. They note that the females in the pictures were posed and dressed to accentuate the cars that they were standing by.

Overall, their findings indicate that corporate annual reports have a much broader use than just conveying financial information and public relations “fluff”. They conclude that corporate annual reports have tremendous political power and that “... these reports serve as coercive, ideological weapons in manipulating the social imagination about women.” (Tinker and Neimark 1987, 86).

Anderson and Imperia (1992) also studied gender portrayals in photographs of 119 corporate annual reports from 25 different publicly traded airlines from 1983 - 1989. Based on established measures (e.g., orientation, smiling, head and body cant, hands orientation) and using multiple raters, each photograph in an annual report was examined

and coded to detect indications of sexism. Overall, they found that photographs of females depicted them in a non-work setting and acting in a less serious manner than males. When examining photographs of officers and board members, the same underlying messages were detected. They conclude that the annual reports studied convey the message that males are dominant, more competent, and more important than females in corporate culture.

In a follow-up to her 1986 study, Kuiper (1988) performed an experiment to evaluate how gender representation in annual reports influence subjects' attitudes regarding the corporate climate. Using the companies from her 1986 sample, she computed male and female representation indices for each company's 1985 annual report. She found that female were underrepresented by 25% and males were overrepresented by 35%. In her study, subjects were given 10 minutes to examine an annual report. After examining the annual report, subjects completed a nine-question survey pertaining to the company's corporate climate. The nine questions contained three areas of consideration within the corporate climate: labor relations, social responsibility, and desirability as an employer. The nine questions were also averaged to create an overall perception score. The results indicate that the female representation index was positively correlated with three of her four corporate climate measures. Kuiper's findings indicate that the greater the visibility of females in annual reports, the more positive the perception of the overall corporate climate. Finally, the male representation index did not correlate with any of the corporate climate measures

suggesting that increased male visibility does not increase the perception of the corporation's climate.

These studies suggest that there has been a pattern of showing females in less important roles in the corporate organization. But as Kuiper's 1988 experimental study indicated, the positive representation of females in the annual report can have a significantly positive impact on the overall impressions of the company.

Information Content and Annual Reports

Several studies have been conducted to show that annual reports contain relevant information for decision making. Wilson (1987) found that the annual report does contain information beyond the information conveyed in earnings releases. Specifically, he found that the market reacts to the cash from operations and the total accrual components of earnings contained in the annual report.

McConnell et al. (1986) examined the president's letter of annual reports to determine if it contains relevant information. Using content analysis, nine themes were identified as commonly used in president's letters. The nine themes were compared for companies experiencing a substantial increase in stock price and those companies experiencing a substantial decline in stock price. The results indicate that the constructs (themes) were able to classify potential poor performers and exceptional performers with a high degree of accuracy.

Cready and Mynatt (1991) also found that the annual report contains relevant information beyond earnings. In their study, they found that there was no price reaction

to the annual report release. While the absence of a price reaction suggests there is no change in overall market expectations, it does not suggest how individuals react to the information contained in the annual report. To address how individuals react to the information, trading volume was examined. By stratifying the transactions by size, the results indicate that smaller investors react to the information content of annual reports.

While not specifically addressed by the previous studies, any significant incremental information provided by the annual report should coincide with Ball and Brown's (1968) seminal work that established the relationship between accounting information and the market. In their study they examine "good news" and "bad news" firms. "Good news" is defined as earnings performance exceeding expectations while "bad news" is defined as earnings performance falling short of expectations. By examining their graph (Ball and Brown 1968, 169) of the reaction to "good news" and "bad news", two factors are apparent. First, the cumulative reaction to "good news" is positive and the cumulative reaction to "bad news" is negative. Second, the cumulative reaction to "bad news" is significantly stronger than the cumulative reaction to "good news".

As previously mentioned, Cready and Mynatt (1991) have shown that small individual investors trade shares based on information contained in the annual report. However, it is difficult to determine a price reaction to the news in an annual report because the vast majority of investors (large individual and institutional investors) trade on earnings announcements rather than annual report information. If the market primarily consisted of small individual investors, a reaction similar to what Ball and

Brown (1968) observed would take place. In other words, within the small, individual investor strata, a positive (price) reaction would be noted for “good news” and a negative (price) reaction would be observed for “bad news”.

Multimedia and Persuasion in Annual Reports

Kohut and Segars (1992) found that annual reports are more than a disclosure of financial information – it is a marketing tool used to disclose important non-financial information about the company. In a sense, the annual report is an advertising vehicle for the company and by its very nature is meant to persuade individuals.

As early as 1934, Wilke had discovered that live presentations evoked greater attitude change than written or audiotaped messages. Later studies (Frandsen 1963; Croft et al. 1969) confirmed Wilke’s finding that a live presentation was the most persuasive. Studies involving television (Weiss 1969), rather than a live presentation, suggest that television is a more “involving” medium than radio or newspaper and therefore is more effective in generating attitude change than radio or newspaper.

Andreoli and Worchel (1979) and Chaiken and Eagly (1983) performed similar studies designed to analyze the interaction of presentation media with source trustworthiness and source likability, respectively. Both studies determined that there was a significant interaction of source characteristics and the presentation media. The trustworthy/likable source was most effective using the video medium. The untrustworthy/unlikable source was most effective using written messages.

Wiegman (1989) studied the persuasiveness of communication modality in a very realistic experimental setting. Using an interview with a political leader, Wiegman determined that there was no difference in the persuasiveness between television, radio, and newspaper. He determined that all communication modalities did induce persuasiveness, but the differences between the modalities were insignificant.

Very little research has been done on the persuasiveness of a multimedia presentation where several media are combined. Ottinger (1993) studied the effectiveness of multimedia technology as a persuasive tool. In her experiment, she evaluated the persuasiveness of a multimedia kiosk and a printed recruiting brochure. She determined that multimedia presentations have a more positive effect on attitude change than printed brochures regardless of subject interest in the message topic. Clements and Wolfe (1997) included attitude change as one of the dependent variables of interest in a pre-test/post-test design comparing paper and multimedia annual reports. Consistent with Wiegman, they find that while annual reports do change attitudes, there is no difference in persuasion between multimedia and paper annual reports.

Most studies regarding persuasion rely on Petty and Cacioppo's (1986a, 1986b) and Chaiken's (1980; Eagly and Chaiken 1993) well-accepted theoretical models of persuasion. Petty and Cacioppo's Elaboration Likelihood Model (ELM) and Chaiken's Heuristic-Systematic Model (HSM) each contain two routes to persuasion. The first route to persuasion is known as "the central route to persuasion" under the ELM and "systematic processing" under the HSM. The central idea underlying the first route to persuasion is that subjects perform a careful, logical, and detailed evaluation of the

message arguments. The second route to persuasion is known as the “peripheral route to persuasion” under the ELM and “heuristic processing” under the HSM. The idea underlying this second approach to persuasion postulates that instead of evaluating the message arguments, subjects focus on peripheral cues such as message length, source attractiveness, or media.

Several assumptions underlie both the ELM and the HSM. One assumption is that people are cognitive misers. That is to say that people will only expend enough energy as necessary to arrive at a solution. Additionally, message recipients must be motivated and have adequate cognitive ability to employ the cognitive response route (i.e., the first route) to persuasion (Petty and Caccioppo 1986a, 1986b; Eagly and Chaiken 1993). Therefore, as motivation and cognitive ability decrease, the effect of peripheral cues increases. For expert users the media should be irrelevant because they have a well-developed schema to analyze reports.

Cooper et al. (1994) suggest that annual reports impose a substantial cognitive load due to their highly-complex nature. Since individuals are “cognitive misers” (Petty and Caccioppo 1986a, 1986b), this substantial cognitive load should cause non-expert users to follow the peripheral route of persuasion. That is to say that the peripheral cues should have more influence than the actual message arguments.

Multimedia and Satisfaction in Annual Reports

Steinbart and Accola (1994) point out that user attitudes regarding a system are an important factor to consider when evaluating the system. This premise is also

supported by the fact that user satisfaction is the most common measure of an information systems' success (DeLone and Maclean 1992; Davis 1989, 1993; Davis et al. 1989). Increased satisfaction with an annual report should lead to increased use and thus increased exposure to the company's marketing strategies.

A major component of the preference for multimedia may stem from the fact that it is perceived to be more entertaining. However, the value of entertaining materials is very unpredictable. Entertaining materials may arouse curiosity and in turn motivate individuals to learn more about a subject (Malone 1981). On the other hand, entertaining materials may represent a novelty effect that inhibits the learning process (Malone 1981; Clark 1983). Butler and Mautz (1996) and Clements and Wolfe (1997) determined that subjects were more entertained with a multimedia presentation of accounting information than they were with a more traditional approach. However, entertainment is but one component of overall user satisfaction.

Using a factor analytic approach, Butler and Mautz (1996) identified three other factors that relate to user satisfaction in a classroom setting. They found that understandability, perceived learning, and interest in the topic was greater with multimedia presentation than with a traditional approach. Clements and Wolfe (1997) also used factor analysis to identify two additional measures of satisfaction with annual reports: design quality and clarity. They found that the multimedia report was rated slightly higher on design quality and the two types of reports were judged equal with respect to clarity.

Multimedia and Recall in Annual Reports

Journalism, advertising and psychology literature contain numerous studies of the effects of media modality on information consumers' ability to recall information.

However, multimedia's effect on recall is theoretically and empirically unclear.

Evidence exists that working memory has separate processing streams for auditory and visual information (Penney 1989), and tapping the multiple processing streams can actually increase working memory (Frick 1984; Martin 1980). In a multimedia annual report, voice is often combined with a visual image, thereby exercising memory processing streams for both auditory and visual information. Through this dual processing, subjects are able to store more information in short-term memory. However, it may be important to determine what is being communicated through the different modalities. Parallel processing models indicate that a person can engage in multiple tasks such as reading and hearing (Wickens 1984). However, this ability is dependent on whether the task uses separate or common processing resources. Multiple resource theory (Wickens 1984) makes the prediction that two tasks will be subject to greater interference if they are similar and utilize common resources.

In particular, whether modalities have message congruence or not seems to have a significant impact on whether recall from a multimedia presentation differs from a single media presentation (Leigh 1991). Multimedia presentations with highly related media components would be encoded as a whole and therefore enhance recall. However, a multimedia presentation where the media present complementary or unrelated information will compete for common resources, thus reducing recall ability.

On the other hand, factors may be at work causing text to produce greater recall. Multimedia presentations may provide sources of interference of one modality on the other due to selective attention and thus disrupt a user's encoding and cognitive elaboration (Warshaw 1978; Bucholz and Smith 1991). This interference and disruption is one plausible explanation of the print media's superior recall ability. Evidence in journalism indicates that recall of information is greater with print media than with radio or television (e.g., Wilson 1974; Furnham and Gunter 1985, 1987, 1989; Furnham et al. 1987, 1988, 1990; Gunter and Furnham 1986; Gunter et al. 1984a, 1984b, 1986).

There are several additional postulated explanations of why print media produces greater recall than other forms of media. One argument is that reading is self-paced while the speed of television is determined by the producer (Furnham et al. 1988). The self-paced nature of print media may also allow the reader to go back over material that he or she found difficult to understand. The viewer of a television presentation has only one chance to comprehend the information (Gunter 1980). It is also argued that the greater the mental effort involved in an activity, the greater the recall. Reading involves greater mental processing since the reader must visualize what they read. However, the television viewer has the information (pictures and sound) arranged in a form which requires a more passive type of attention (Singer 1980).

The way that information is presented in print media may provide a possible explanation of the superiority of print media. Paragraphing and other textual chunking available to print readers may facilitate the encoding of material (Furnham et al. 1990).

Additionally, paper-based reports may benefit from the fact that learning traditionally comes from printed materials (e.g., manuals, newspapers, textbooks, etc.).

In a study of paper and multimedia annual reports, Clements and Wolfe (1997) found that recall was significantly greater with paper annual reports than with multimedia annual reports. Interestingly, they discovered that subjects covered more material and remembered more of the information with a paper annual report. However, when a question-by-question analysis was performed on the recall instrument, they discovered that the majority of the questions from the multimedia report were based on textual sections. Their findings also indicate that paper-based textual information outperforms audio presentation of information as well. Video was the only medium that outperformed paper-based textual information (although the difference was insignificant).

In the above mentioned studies, non-expert subjects were used to recall information. It is important to note that the role of expert schemata also plays a role in the recall of information. Schemata are used to categorize information (Low and Over 1990, 1992; Low et al. 1994) in long-term memory and the acquisition of schemata defines expertise (Sweller 1993). Therefore, schema theory indicates that modalities in annual reports are irrelevant for recall of information by experts, because regardless of format, the report information is associated with an easily retrievable schema. However, for non-experts, analyzing an annual report represents a demanding cognitive task for which no previously stored schema exists (Mousavi et al. 1995). Therefore, non-experts must process the report's financial information in a bounded working memory that can

manage only a limited number of items simultaneously (Baddeley 1992; Simon and Gilmarin 1973; Sweller and Cooper 1985).

CHAPTER III

RESEARCH FRAMEWORK, HYPOTHESES AND QUESTIONS

Framework

Figure 1 represents a research framework for analyzing the user effects of annual report attributes. The framework is adapted from Clements and Wolfe (1997), Bamber (1993), and Ferris and Dillard (1988). The framework suggests that there are three annual report attributes of interest to researchers – media, source attributes, and information attributes.

As shown in Figure 1, the aforementioned attributes affect a user's decision-making process. However, the effect is an indirect one and can take two different paths. An annual report attribute or combination of attributes (e.g., media, source, or information attribute) can affect the user's physiological traits (e.g., working memory capacity). On the other hand, an annual report attribute (or combination of attributes) can also affect a user's psychological characteristics (e.g., attitude, perception, motivation, etc.). It is important to note that a single report attribute may affect a user's decision-making process through *both* paths. Also, as shown in Figure 1, salient user characteristics (e.g., gender, age, race, etc.) interact with the annual report attributes to affect a user's decision-making process through either path.

In this study, experiment 1 evaluates differences in presentation media (multimedia and paper) between two companies (EDS and Macromedia) using two

Figure 1
A Framework for the Analysis of Annual Report Attributes

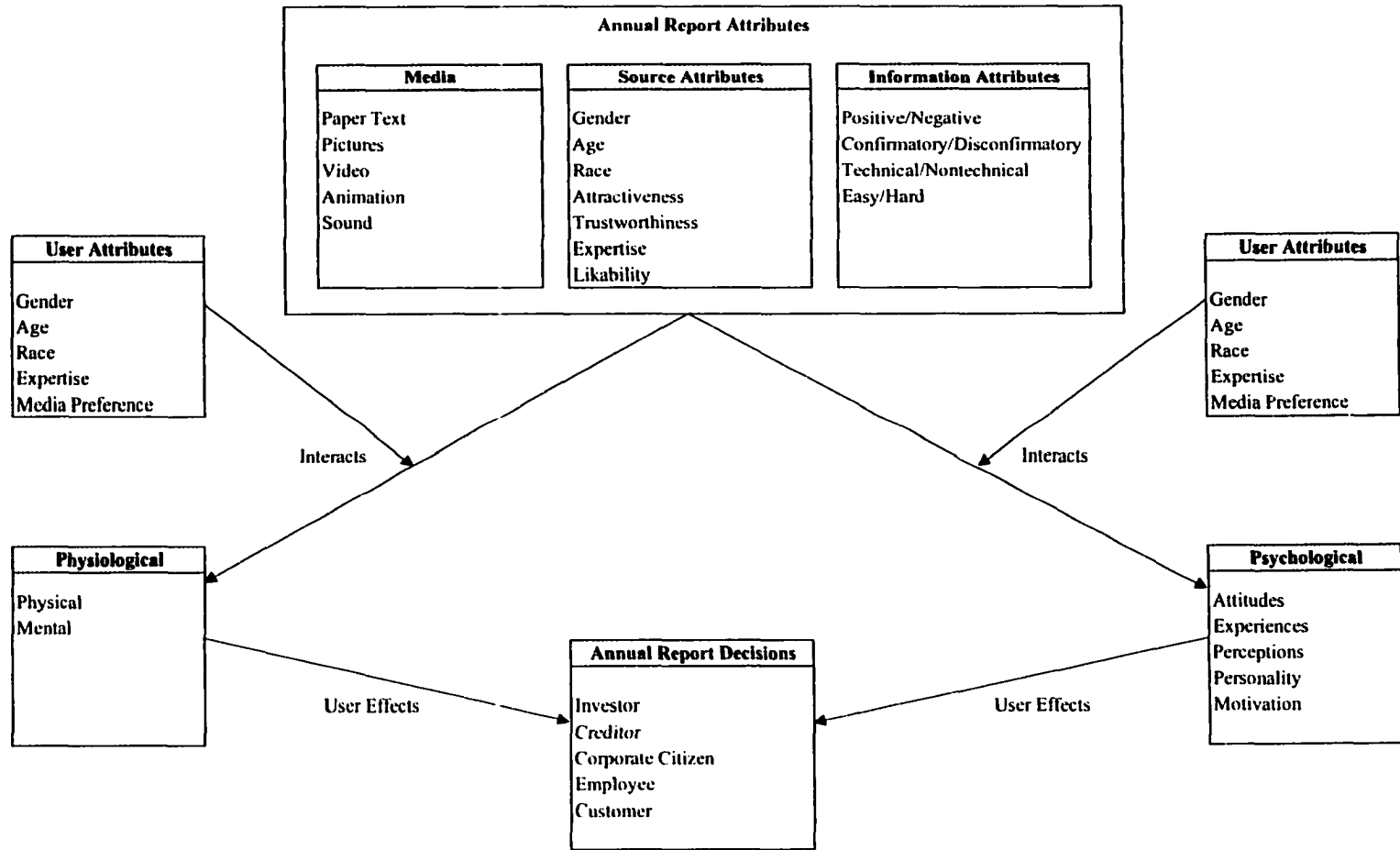
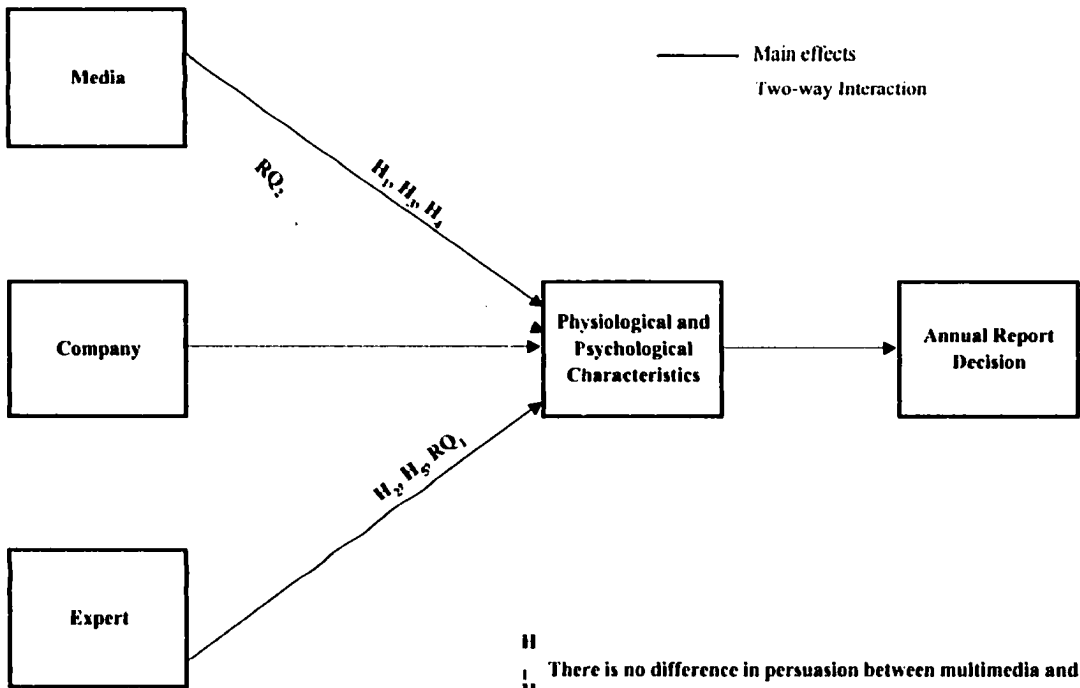


Figure 2
Experiment I Analysis of Annual Report Attributes



— Main effects
 = Two-way Interaction

- H₁ There is no difference in persuasion between multimedia and paper annual reports.
- H₂ There is no difference in persuasion between expert and non-expert annual report users.
- H₃ There is no difference in user satisfaction between multimedia and paper annual reports.
- RQ₁ Is the difference in satisfaction user satisfaction the same for expert and non-expert annual report users?
- H₄ There is no difference in recall of information between multimedia and paper annual reports.
- H₅ There is no difference in recall of information between expert and non-expert annual report users.
- RQ₂ Is the difference in user effects between the multimedia and paper annual reports the same for EDS and Macromedia?

subject groups (experts and non-experts). In experiment 2, media (i.e., video or paper), source (i.e., source gender) and information (i.e., positive or negative news) attributes are analyzed. To relate Figure 1 to the two experiments, Figure 1 is decomposed into two additional figures. Figure 2 graphically depicts the analysis of annual report attributes and the associated hypotheses being tested in experiment 1. Figure 3 graphically depicts the analysis of annual report attributes and the associated hypotheses being tested in experiment 2.

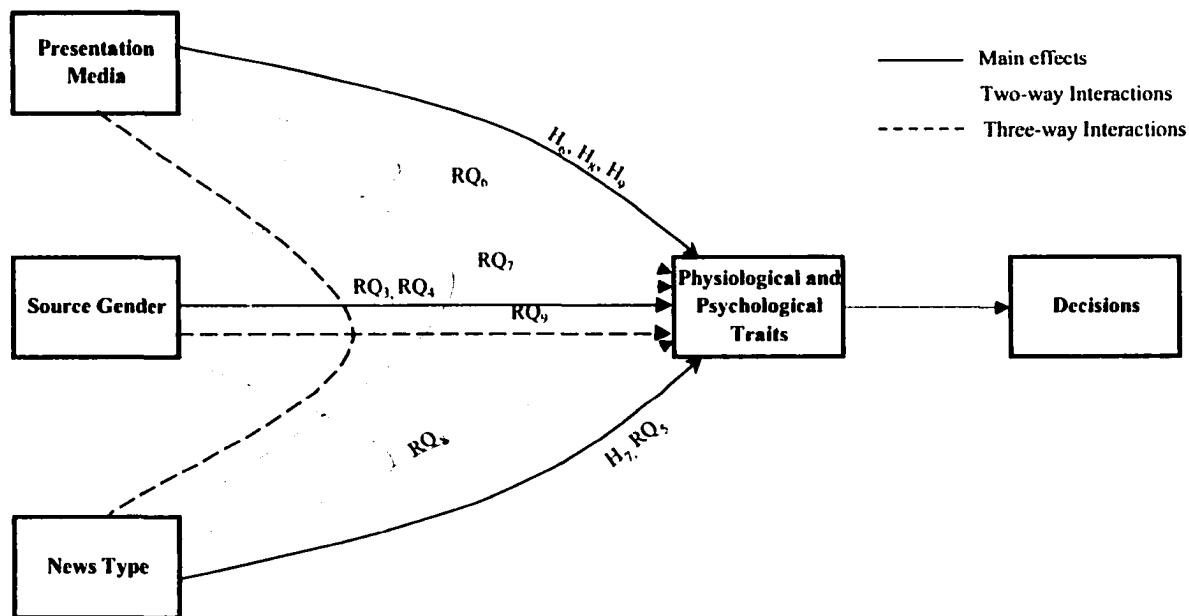
Experiment 1

As previously stated, experiment 1 extends the literature in two important ways: 1) it compares differential effects created by report format across multiple firms; and 2) the experiment uses both expert and non-expert subjects in the determination of differential effects created by report format. Experiment 1 also replicates and extends the work of Clements and Wolfe (1997). Following Clements and Wolfe (1997), persuasion, satisfaction, and recall are the dependent variables analyzed in experiment 1. The analyses of these dependent variables are graphically depicted in Figure 2.

Media

As shown in Figure 2, one of the relationships of interest in experiment 1 is the effect of media on the annual report user. Several studies suggest that media has an effect on attitudes (Chaiken and Eagly 1976; Ottinger 1993; Petty and Caccioppo 1986a, 1986b) and perceptions (Clements and Wolfe 1997; Butler and Mautz

Figure 3
Experiment 2 Analysis of Annual Report Attributes



- H_6 There is no difference in attitude between video and paper MD&A.
- H_7 There is no difference in attitude after receiving "good news" or "bad news" in an MD&A.
- H_8 There is no difference in user satisfaction between video and paper MD&A.
- H_9 There is no difference in recall of information between video and paper MD&A.
- RQ_3 Does source gender have a persuasive effect in the report MD&A?
- RQ_4 Does source gender in the report MD&A significantly affect user satisfaction?
- RQ_5 Does news type in the report MD&A significantly affect user satisfaction?
- RQ_6 Is the interaction of media and source gender significant for attitude, satisfaction or recall?
- RQ_7 Is the interaction of media and news type significant for attitude, satisfaction or recall?
- RQ_8 Is the interaction of source gender and news type significant for attitude, satisfaction or recall?
- RQ_9 Is the interaction of media, source gender and news type significant for attitude, satisfaction or recall?

1996; Ottinger 1993). Also, presentation media has been shown to have a significant effect on information recall (e.g., Clements and Wolfe 1997; Wilson 1974; Furnham and Gunter 1987, 1989; Furnham et al. 1988, 1990; Gunter and Furnham 1986; Gunter et al. 1984a, 1984b, 1986). Finally, evidence exists indicating that presentation media interacts with a user's media preference to influence the user's psychological (e.g., attitude, perceptions, motivation, etc.) and physiological (e.g., working memory capacity, comprehension, etc.) characteristics (e.g., Paivio 1991; Paivio 1986; Clark and Paivio 1991; Marschark and Paivio 1977; Clements and Wolfe 1997; Butler and Mautz 1996).

Persuasion

Attitudes are an important part of any decision-making process. Attitudes may act as decision schema (Chaiken and Eagly 1983). Persuasion involves changing attitudes. If attitudes can be changed (persuasion), then the associated decision schema will change resulting in a different decision. As previously mentioned, one of the primary objectives of an annual report is to persuade interested users (Dunk 1980; Gartner 1981; Jacobson 1988).

Cooper et al. (1994) suggest that annual reports impose a substantial cognitive load on non-expert users due to their highly-complex nature. Since individuals are "cognitive misers" (Petty and Caccioppo 1986a, 1986b), this substantial cognitive load should cause non-expert users to follow the peripheral route of persuasion. That is to say that the peripheral cues should have more influence than the actual message arguments. Since expert users have well-developed schema for analyzing annual reports, the cognitive load is reduced. Therefore, expert users should follow the central route of

persuasion and the peripheral cues will have less persuasive effect.

Theoretically, the ELM and HSM theories of persuasion suggest that the multimedia annual report should be more adept at persuading non-expert users than a paper annual report. However, some experimental evidence (using non-expert subjects) indicates that there is no persuasive difference or that paper is more persuasive (e.g., Clements and Wolfe 1997; Wiegman 1989). The experimental evidence notwithstanding, it is anticipated that non-expert subjects using a multimedia annual report will be more persuaded than non-expert subjects using a paper annual report. Additionally, it is anticipated that media will have no persuasive effect for experts.

To evaluate the persuasive impact of media in annual reports, the following hypothesis is proposed (stated in null form).²

H₁: There is no difference in persuasion between subjects viewing a multimedia annual report and subjects viewing a traditional paper annual report.

To evaluate the persuasive impact of annual reports on expert and non-expert report users, the following hypothesis is proposed.

H₂: There is no difference in persuasion between expert annual report users and non-expert annual report users.

Satisfaction

User satisfaction is the single most important indicator of a system's success (DeLone and Maclean 1992; Davis 1989, 1993; Davis et al. 1989). As evident in Figures

² While theory may be present to indicate an alternative hypothesis, all hypotheses are stated in null form for consistency.

1 and 2 and in the related discussion, media has the ability to affect a user's perceptions. Empirically, media has been shown to affect user satisfaction (Clements and Wolfe 1997; Butler and Mautz 1996; Ottinger 1993; Helms et al. 1991; Jensen and Sandlin 1992). In these studies, subjects were more satisfied with a multimedia presentation of information than with traditional presentations. Based on this evidence, the following hypothesis is proposed across the two companies (EDS and Macromedia).

H₃: There is no difference in satisfaction with the annual report between subjects viewing a multimedia annual report and subjects viewing a traditional paper-based annual report.

Hypothesis H₃ was also evaluated by Clements and Wolfe (1997) using a single company. In their study they determined that multimedia annual reports were more entertaining and of higher quality. As in their study, multiple measures of satisfaction will be used. It is anticipated that the results of experiment 1 will confirm their findings indicating that users are more satisfied with a multimedia annual report than they are with a traditional paper annual report.

Neither theory or empirical evidence exists indicating that expert and non-expert report users should be different in their satisfaction levels with annual reports. To evaluate whether or not expert and non-expert report users are equally satisfied with annual reports, the following research question is posed.

RQ₁: Is there a difference in satisfaction between expert and non-expert report users?

Recall

One of the primary objectives of annual reports is to inform interested users (Anderson and Imperia 1992). One measure of a report's ability to inform is the amount of information users recall. As the research framework in Figure 1 indicates, media may significantly affect a user's ability to recall information. While there is some evidence indicating multimedia annual reports would produce greater recall (Penny 1989; Mousavi et al. 1995), the majority of the literature indicates the reverse is true (Clements and Wolfe 1997; Wilson 1974; Furnham and Gunter 1985, 1987, 1989; Furnham et al. 1987, 1988, 1990; Gunter and Furnham 1986; Gunter et al. 1984a, 1984b, 1986). To evaluate report media's effect on recall, the following hypothesis is proposed in experiment 1.

H₁: There is no difference in information recall between subjects viewing a multimedia annual report and subjects viewing a traditional annual report.

The majority of the experimental evidence indicates that paper reports will generate greater recall than multimedia reports will. Therefore, it is anticipated that the results of experiment 1 will confirm Clements and Wolfe's findings that paper annual reports provide greater recall than the multimedia CD-ROM reports.

It is important to note that the role of expert schemata plays a role in the recall of information. Schemata are used to categorize information (Low and Over 1990, 1992; Low et al. 1994) in long-term memory and the acquisition of schemata defines expertise (Sweller 1993). Therefore, schema theory indicates that expert report users should be able to recall more information than non-expert report users because the report

information is associated with an easily retrievable schema. However, for non-experts, analyzing an annual report represents a demanding cognitive task for which no previously stored schema exists (Mousavi et al. 1995). Therefore, non-experts must process the report's financial information in a bounded working memory that can manage only a limited number of items simultaneously (Baddeley 1992; Simon and Gilmarin 1973; Sweller and Cooper 1985). To evaluate the effect of expertise on recall of information, the following hypothesis is proposed.

H₄: There is no difference in information recall between expert and non-expert report users.

Media Type

Experiment 1 begins to answer the question as to whether the type, combination, and/or quantity of media matter. The EDS and Macromedia annual reports are very different. The EDS multimedia annual report contains a number of different media (e.g., video, sound, animation, and text) while the Macromedia report primarily employs text with sound. The paper annual reports are quite different as well. The Macromedia report is smaller in shape and patterned after a novel. The EDS paper report is produced on slick glossy paper, is larger in shape, and is filled with numerous photographs.

While substantial economic resources are dedicated to the production of annual reports, the most effective presentation media is an untested empirical question. While theory may suggest a preference for specific media (e.g., video, text, audio, animation, etc.) for some constructs, when multimedia is used, the effects are not as clear. A multimedia presentation is born when several media are combined to produce the

presentation. For example, the EDS multimedia report combines video, text, audio, and animation in its multimedia report while Macromedia relies on text, sound and animation for its multimedia report. The exploratory nature of this research attempts to determine whether the combination of media matters. Therefore, the following research question is considered.

RQ₂: Is the difference in user effects (i.e., persuasion, satisfaction, recall) between the multimedia annual report and the paper annual report the same for EDS and Macromedia?

In other words, research question RQ₂ tests the interaction of presentation media and company. This research question is analyzed across all three constructs of interest (persuasion, satisfaction, and recall). The purpose of this research question is to evaluate the differential effects of the media across two companies who prepared very different multimedia and paper annual reports. It is unknown how subjects will perceive the individual annual reports.

Experiment 2

Three of the annual report attributes shown in Figure 1 are selected for analysis in Experiment 2. From the media section, video and paper reports are compared. From source attributes, gender was selected as an experimental factor. Finally, news type (good news or bad news) was selected from the information attributes section. The interaction of these attributes is also of interest in Experiment 2. The relationships and associated hypotheses being tested in experiment 2 are presented in Figure 3.

Media and Persuasion

Arnett's (1990) describes multimedia as the delivery of information in intuitive, multi-sensory ways. Video, by its very nature is multimedia since it combines full motion video with sound. Therefore, Arnett's (1990) description would suggest that, *ceteris paribus*, a video presentation would have more peripheral cues than a paper-based presentation. The ELM and HSM theories of persuasion and the Cooper et al. (1994) proposition suggest that increasing the quantity and quality of peripheral cues in an annual report through the use of video could enhance its persuasive capability. Ottinger (1993) found empirical evidence supporting multimedia's (including video) superior persuasive capabilities. However, Wiegman (1989) and Clements and Wolfe (1997) found no persuasive differences between different media. To analyze media's ability to persuade individuals, the following hypothesis is proposed.

H₆: There is no difference in attitude about the company for subjects using a video MD&A than for those using a paper-based textual MD&A.³

Given the conflicting nature of the empirical evidence regarding media and persuasion, it is difficult to anticipate the outcome of hypothesis H₆. However, based on the ELM and HSM theories of persuasion, it is anticipated that the video MD&A will induce greater persuasion than the paper-based MD&A will.

Gender and Persuasion

Source attributes may also influence a user's physiological and psychological characteristics. Source gender has been shown to have a significant impact on attitudes

³ As in experiment 1, all hypotheses are stated in null form for consistency.

and perceptions of users (Eagly et al. 1992, 1995). Several studies suggest that gender influences the evaluation of a manager's abilities or performance (Heilman et al. 1989; Russell et al. 1988; Schein 1973, 1975). Kuiper (1988) found that the visibility of females in an annual report was highly correlated with subjects' evaluation of the company's corporate climate. In a longitudinal study, Tinker and Neimark (1987) found that General Motors often used source gender to influence target audiences. Source age (Anderson & Imperia 1992), race (Anderson & Imperia 1992), attractiveness (Wilson and Sherrell 1993; DeBono and Harnish 1988), trustworthiness (Andreoli and Worchel 1978), expertise (Wilson and Sherrell 1993; DeBono and Harnish 1988), and likability (Chaiken and Eagly 1983) have been shown to significantly influence users' attitudes and perceptions. Evidence also exists suggesting that source attributes may influence recall of information. Wood and Kallgren (1988) found that source expertise and source likability affected subjects' ability to recall attitude relevant information.

As shown in Figure 3 and previously discussed, source gender can significantly affect a user's attitudes and perceptions (Eagly et al. 1992, 1995; Kuiper 1988; Tinker and Neimark 1987). However, the conflicting nature of the evidence and lack of a theoretical basis leads to the following research question.

RQ₃: Does source gender have a persuasive effect in the annual report MD&A?

The answer to this research question and the associated evidence may provide some insight into the role of source gender in attitude development. Additionally, the results should provide guidance to companies on the use of gender in preparing annual

reports.

News Type and Persuasion

The final annual report attribute analyzed in experiment 2 and depicted on Figure 3 relates to the information being communicated. Several studies have shown that the annual report does contain relevant information to decision makers (Cready and Mynatt 1991; Wilson 1987; McConnell et al. 1986). The type of information being communicated can significantly impact a user's psychological state. Early accounting research has shown that positive and negative information can affect users' attitudes and perceptions of the company (Ball and Brown 1968; Brown et al. 1988). In fact, these studies have shown that investors react negatively to a company's failure to meet earnings expectations (i.e., "bad news") and positively to a company exceeding earnings expectations (i.e., "good news"). Furthermore, the negative reaction to "bad news" has been shown to be stronger than the positive reaction to "good news" (Ball and Brown 1968; Brown et al. 1988).

Overall, these studies strongly indicate that sections of the annual report provide relevant information for decision-making purposes and that this information provokes a psychological reaction from investors. However, it is unknown if subjects will react to "good news" and "bad news" in a similar fashion in an experimental environment. Therefore, the following hypothesis is proposed to determine the effect of news type on attitudes towards the company.

H₇: There is no difference in attitude about the company for subjects receiving "good news" in an MD&A than for those receiving "bad news" in an MD&A.

Based on the Ball and Brown (1968) study and Brown et al. study, it is strongly anticipated that subjects receiving a “good news” MD&A will have a significantly higher attitude than those receiving a “bad news” MD&A.

Media and Satisfaction

As previously discussed in the framework section, satisfaction is an important consideration related to system use (DeLone and Maclean 1992). Figures 1 and 3, along with the related discussion, suggest that media have a significant effect on users’ perceptions. Graves et al. (1996) indicate that modern society is predominated by a television epistemology. This epistemology implies that information must be presented via video before people will digest it. Previous studies have shown that subjects are more satisfied with a multimedia or video presentation than with a traditional one (Ottinger 1993; Butler and Mautz 1996; Clements and Wolfe 1997; Helms et al. 1991; Jensen and Sandlin 1992). Based on Davis (1993), increased satisfaction should lead to increased report use.

To analyze the effect of report media on user satisfaction the following hypothesis is proposed.

H₈: There is no difference in satisfaction with the annual report between subjects using a video MD&A and those using a paper-based textual MD&A.

As in previous studies (Clements and Wolfe 1997; Butler and Mautz 1996; Helms et al. 1991; Jensen and Sandlin 1992), it is anticipated that video will produce greater satisfaction than paper.

Source Gender and Satisfaction

Theoretically, source gender is not associated with user satisfaction. While there is evidence suggesting that source attributes affect user perceptions (Wood and Kallgren 1993; Andreoli and Worchel 1979; Chaiken and Eagly 1983), the attributes studied (expertise, trustworthiness, and likability, respectively) are quite different from the physical trait of source gender. However, the effect of source gender on user perceptions is pragmatically interesting. It is plausible that some individuals would prefer receiving information from a female source while others would prefer to receive their information from a male source. It is also important for companies to understand the effect, if any, that source gender has on user satisfaction. To aid in the understanding of this relationship, the following research question is considered.

RQ₄: Does source gender significantly affect user satisfaction?

Since no theory or empirical evidence exists that links source gender to satisfaction, no prediction is made regarding the outcome of research question RQ₄.

News Type and Satisfaction

Similar to source gender, news type may also affect user perceptions (other than attitude regarding the company). However, there is no theoretical link between attitude and satisfaction. It is prudent for companies to understand the effect that news type has on user satisfaction. There may be differential effects on satisfaction from reporting “good news” than when reporting “bad news”. To test the effect of news type on satisfaction, the following research question is posed.

RQ₅: Does news type significantly affect user satisfaction?

While news type (“good news” or “bad news”) should have a significant effect on attitude, there is no theory suggesting that news type should affect user satisfaction. Therefore, the effect of news type on user satisfaction cannot be anticipated.

Media and Recall

As previously mentioned, one of the primary objectives of an annual report is to inform interested users (Anderson and Imperia 1992). There have been suggestions that subjects viewing a multimedia (e.g., video) presentation should recall more information due to dual processing channels being utilized (Mousavi et al. 1995; Frick 1984; Martin 1980; Penney 1989). However, an additional body of literature suggests otherwise. A substantial number of experimental studies have found that recall of information is greater for print media than for video (e.g., Wilson 1974; Furnham and Gunter 1985, 1987, 1989; Furnham et al. 1987, 1988, 1990; Gunter and Furnham 1986; Gunter et al. 1984a, 1984b, 1986). In a study of annual report media, Clements and Wolfe (1997) determined that a paper-based text treatment induced greater recall of material than computer-based text and audio. Interestingly, when examining specific sections of the annual report, they also found that video presentation of information produced greater recall than paper-based textual information (although the difference was insignificant). To test media’s effect on recall, the following hypothesis is proposed.

H₉: There is no difference in recall of information between subjects using a video presentation of information and subjects using a paper-based textual presentation of information.

Consistent with prior research, it is anticipated that paper-based text will outperform video with respect to recall of information.

Interaction Effects

As shown in Figure 3, all of the interaction effects are evaluated through the use of research questions. While no theory exists that specifically indicates an interaction among the three variables of interest (media, source gender, news type), evidence exists suggesting that there may be some interaction effects of the three variables. As previously mentioned, Chaiken and Eagly (1976) found interaction effects between media and information attributes (technical/non-technical). Wood and Kallgern (1993) found interaction effects between source attributes (expertise) and information attributes (complexity). Finally, Andreoli and Worchel (1979) and Chaiken and Eagly (1983) found interaction effects between source attributes (trustworthiness and likability, respectively) and presentation media.

Each of the interaction effects is pragmatically interesting. For companies preparing annual reports, it is to their advantage to understand which combination of factors produces the greatest benefit for the company. A greater understanding of the interaction effects will allow the company to select the optimal combination of media and source gender for a given type of news. This optimal combination will produce the greatest desired benefit for the company (i.e., change in attitude, satisfaction, or recall).

Based on Andreoli and Worchel's (1979) and Chaiken and Eagly's (1983) findings, it is anticipated that for some measures of attitude the interaction of media and source gender will be a significant source of variation. Theory and evidence are lacking to suggest a relationship between the interaction of media and source gender and the dependent satisfaction or recall measures. While the interaction effects of media and

source gender on satisfaction and recall are interesting, no prediction is made regarding the significance of the effect.

To test the interaction effects of media and source gender, the following research question is considered across the constructs of attitude, satisfaction, and recall.

RQ₆: Is the interaction effect of media with source gender a significant source of variation in the dependent variable (attitude, satisfaction, or recall)?

The interaction of media and information attributes (news type) is an important factor to consider in preparation of an annual report. It is important to understand which media will present the company in the most positive light given the type of news to be presented (i.e., “good news” or “bad news”).

Chaiken and Eagly (1983) found that there was an interaction between media and information attributes for recall. The nature of the information attribute (technicality) studied by Chaiken and Eagly (1983) is quite different from the information attribute considered in this study (news type). Based on the fact that no theory or evidence exists directly linking media to news type, any predicted outcome for research question RQ₄ would be tenuous at best. However, the understanding of the relationship of media and news type is beneficial in the preparation of annual reports. One media may provide greater benefit (i.e., attitude, satisfaction, or recall) for “good news” while another media may provide greater benefit when presenting “bad news.” To evaluate this possible interaction, the following research question is posed.

RQ₇: Is the interaction effect of media with news type a significant source of variation in the dependent variable (attitude, satisfaction, or recall)?

Similar to the interaction of media and news type, it is important to understand the interaction of source gender and type of news when choosing a spokesperson to present a given type of news. It is possible that one gender may invoke a better impression or greater recall for “good news” while the other gender is preferred for bad news.

Wood and Kallgren’s (1993) findings indicate that some source attributes (e.g., expertise) do interact with information attributes (e.g., message complexity). No theory or evidence exists that would indicate an interaction between source gender and news type (“good news” or “bad news”) for any of the constructs of interest. Therefore, no prediction is made regarding the analysis of the interaction of source gender and news type. However, to better understand the relationship between source gender and news type, the following research question is considered (as shown on Figure 3).

RQ₈: Is the interaction effect of source gender with news type a significant source of variation in the dependent variable (attitude, satisfaction, or recall)?

Finally, analysis of the three-way interaction of the experimental factors (media, source gender, and news type) will yield a better understanding of the relationship among the three factors. The goal of the analysis is to determine the optimal combination of the three factors to produce the greatest benefit for the company. The greatest benefit is construed to mean the best impression (attitude and satisfaction) or the greatest recall of information (recall). The following research question is considered to aid in understanding the relationship among the three factors.

RQ: Is the interaction effect of media, source gender and news type a significant source of variation in the dependent variable (attitude, satisfaction, or recall)?

Given the exploratory nature of this research and the lack of theory and empirical evidence, no prediction is made regarding the significance of the three-way interaction. However, the results are interesting when determining how to best combine the three factors in the preparation of an annual report.

A summary of all hypotheses and research questions is presented in Table 1.

Table 1
Summary of Hypotheses and Research Questions

Experiment 1:	
H ₁	No difference in persuasion due to media.
H ₂	No difference in persuasion due to annual report expertise.
H ₃	No difference in satisfaction due to media.
RQ ₁	Is there a difference in satisfaction due to annual report expertise?
H ₄	No difference in recall due to media.
H ₅	No difference in recall due to annual report expertise.
RQ ₂	Does the interaction of company and media affect persuasion, satisfaction, or recall?
Experiment 2:	
H ₆	No difference in persuasion due to media.
H ₇	No difference in persuasion due to news type.
H ₈	No difference in satisfaction due to media.
H ₉	No difference in recall due to media.
RQ ₃	Does source gender affect persuasion?
RQ ₄	Does source gender affect user satisfaction?
RQ ₅	Does news type affect user satisfaction?
RQ ₆	Does the interaction of presentation media and source gender affect persuasion, satisfaction, or recall?
RQ ₇	Does the interaction of presentation media and news type affect persuasion, satisfaction, or recall?
RQ ₈	Does the interaction of source gender and news type affect persuasion, satisfaction, or recall?
RQ ₉	Does the interaction of presentation media, source gender and news type affect persuasion, satisfaction, or recall?

CHAPTER IV

EXPERIMENTAL METHODOLOGY

Experiment 1

Task and Experimental Design

The experimental task uses the published 1995 Electronic Data Systems (EDS) and 1996 Macromedia annual reports. EDS and Macromedia made their annual reports available in two media forms: the traditional printed annual report and a CD-ROM version for play on a personal computer. For each company, the CD-ROM and paper annual reports are almost identical in content with only slight wording differences existing between the two media forms. However, EDS and Macromedia CD-ROM annual reports are quite different from each other. EDS makes use of voice, text, video, music, animation, sound and graphics. Macromedia primarily uses voice, text and music in its multimedia annual report. Table 2 provides a detailed list of sections of the annual reports and the associated media.

There are three experimental factors in the design of experiment 1. As in Clements and Wolfe (1997), the first experimental factor is media. One treatment group will receive a multimedia (i.e., CD-ROM) annual report while the other group will receive a traditional paper annual report. The second experimental factor is company. There are two different companies used in experiment 1. Some subjects will receive EDS' annual report while others will receive a Macromedia annual report. The final

Table 2
Experiment 1
Analysis of Annual Report Sections

EDS		Macromedia	
Section	Media used on CD-ROM	Section	Media used on CD-ROM
Letter From the Chairman	Video, Voice	Financial Highlights	Voice, Text, Graphics, Animation
Introduction/It's All in How You Look at Things	Voice, Animation, Video	Letter From the Chairman	Voice, Text
Who We Are & What We Do	Voice, Animation, Video	Macromedia Studios	Animation, Music, Graphics
Change the Room, Not the Rug	Voice, Music, Animation, Text	The Platform, The Pipe, & The People	Voice, Text
Learning Like You've Never Learned Before	Music, Voice, Animation, Video	The Promise	Voice, Text
EDS in Driver's Seat at Australian Grand Prix	Sound, Voice, Pictures, Animation, Graphics	Awards	Voice, Animation, Music, Graphics
Keeping on Track	Sound, Music, Voice, Animation	The Proof	Voice, Text
indow on the World of Magazines	Voice, Animation, Text, Sound	Made with Macromedia	Animation, Music, Graphics
Change Equals Opportunity	Music, Voice, Animation	To The Future	Voice, Text
'95 in Review	Music, Text, Pictures	Financial Report	Text, Music
Financial Report	Video, Graphics, Voice, Text, Music	Shocking True Story	Voice, Text, Graphics

experimental factor is whether the subject is an expert or non-expert. A full-factorial design with three experimental factors yields eight (2^3) treatment cells.

Subjects

Subjects in experiment 1 consist of expert and non-expert annual report users. The expert subjects consist of students enrolled in an executive MBA (EMBA) program in a large metropolitan area of the Southwest. Participation was voluntary. However, as an incentive to the EMBA students to participate, all participants were entered in a drawing for \$50. Non-expert subjects consist of undergraduate students enrolled in accounting courses at a large state university in the Southwest. Participation in the experiment was voluntary, although academic incentives (i.e., extra credit points) were provided to undergraduate students to encourage participation.

Executive MBAs proxy for expert annual report users. Table 3 presents the demographic data collected for the expert (EMBA) subjects. The demographic data provides a basis for considering the EMBA students as expert subjects. As shown, the mean age is 34.97 and the mean work experience is almost fifteen years (14.87). The age and experience of these students suggest that they are much more mature than the non-expert (undergraduate) subjects. Furthermore, the expert subjects have had more training than the non-expert subjects. The subjects average almost four hours of graduate accounting and two hours of graduate finance coursework. The majority of the subjects are currently investors (93.8%)⁴ and have taken a course in financial statement

⁴ All analyses were also run with only subjects currently investing. The results are not qualitatively different, except as noted in footnotes 13 and 14.

analysis (90.6%). The additional maturity, experience and training indicate that EMBA subjects are suitable proxies for expert annual report users.

Undergraduate students are deemed acceptable proxies for non-expert annual report users because they have a working knowledge of the financial statements but do not have a highly complex system for analyzing annual reports. Since the majority of actual users of annual reports are non-experts, it is acceptable to use students as subjects without impairing the generalizability of the study. As Borthick et al. (1990, 53) point out, students are acceptable subjects when non-expert behavior is being studied and personal variables such as work experience and academic achievement are controlled for, as in this study. Table 4 contains non-expert subject demographic data.

Experimental Procedures

The experiment was conducted over several days in several sessions each day. Before arriving at the appointed time, each subject completed an Individual Differences Questionnaire (IDQ) to measure subject presentation preference. Upon arrival, the IDQs were collected, subjects completed an informed consent document, a demographic survey and a pre-test attitude assessment survey. (Appendix A contains copies of all instruments for experiment 1). Next, subjects were randomly assigned to a treatment group, and those in the multimedia treatment group were taken to a computer lab.⁵

⁵ Subjects were not informed of treatment differences to protect against biases resulting from their selection into either the paper-based or CD-ROM-based groups.

Table 3
Experiment I
Expert (EMBA) Demographic Information

Panel A: Means and Medians

		N	Age	Work	Undergraduate		Graduate		Trade
				Experience	Acct. Hrs.	Finance Hrs.	Acct. Hrs.	Finance Hrs.	Activity/Yr.
EDS	CD-ROM	4	33.75 (33.50)	14 25 (14.00)	16.25 (10.00)	3.75 (4.50)	4.50 (4.00)	1.75 (1.50)	3.50 (3.50)
	Paper	10	36.30 (34.00)	15 20 (12.50)	4.70 (0.00)	4.10 (0.00)	5.70 (4.00)	1.80 (2.50)	3.80 (3.00)
Macromedia	CD-ROM	6	31.83 (32.00)	13 17 (13.00)	8.50 (8.50)	8.67 (4.00)	3.83 (4.00)	2.33 (3.00)	5.17 (5.50)
	Paper	10	36.00 (36.00)	15 80 (14.50)	6.10 (3.00)	4.80 (0.00)	3.40 (4.00)	1.80 (1.00)	2.90 (2.50)
Overall		30*	34.97 (34.00)	14 87 (13.50)	7.47 (6.00)	5.20 (0.00)	3.96 (4.00)	1.90 (2.00)	3.73 (3.00)

Panel B: Counts and Percentages

		Male	Currently	Invests in		Financial Statement	Invests with a(n)		
			Invests	Mutual Funds	Individual Stocks	Analysis Training	Discount Broker	Full Service Broker	Internet Service
EDS	CD-ROM	4 (12.5%)	4 (12.5%)	1 (3.3%)	4 (13.3%)	5 (15.6%)	2 (6.7%)	2 (6.7%)	1 (3.3%)
	Paper	8 (25.0%)	10 (31.3%)	9 (30.0%)	10 (33.3%)	9 (28.1%)	4 (13.3%)	6 (20.0%)	5 (16.7%)
Macromedia	CD-ROM	6 (18.8%)	6 (18.8%)	6 (20.0%)	6 (20.0%)	6 (18.8%)	5 (16.7%)	0 (0.0%)	6 (20.0%)
	Paper	8 (25.0%)	10 (31.3%)	9 (30.0%)	6 (20.0%)	9 (28.1%)	6 (20.0%)	1 (3.3%)	2 (6.7%)
Overall		26 (81.3%)	30 (93.8%)	25 (83.3%)	26 (86.7%)	29 (90.6%)	17 (56.7%)	9 (30.0%)	14 (46.7%)

* The actual sample of experts consisted of 33 subjects. However, due to missing data the number of usable observations was between 30 and 32.

Table 4
Experiment 1
Non-Expert Demographic Information

Panel A: Age and GPA*

	EDS			Macromedia			Total		
	N	Age	GPA	N	Age	GPA	N	Age	GPA
CD-ROM	23	20.04 (20.00)	2.75 (2.70)	41	21.71 (22.00)	2.80 (2.75)	64	21.11 (21.00)	2.78 (2.73)
Paper	22	20.91 (20.00)	2.58 (2.50)	22	20.09 (20.00)	2.80 (2.73)	44	20.50 (20.00)	2.69 (2.60)
Total	45	20.47 (20.00)	2.66 (2.58)	63	21.14 (21.00)	2.80 (2.75)	108	20.83 (20.00)	2.76 (2.70)

* Mean (Median)

Panel B: Subject Classification

	EDS			Macromedia			Total		
	Soph	Jr.	Sr.	Soph	Jr.	Sr.	Soph	Jr.	Sr.
CD-ROM	12	10	1	8	3	30	20	13	31
Paper	11	9	2	9	9	4	20	18	6
Total	23	19	3	17	12	34	40	31	37

Panel C: Work Experience

	EDS				Macromedia				Total			
	None	0 to 1 Yr	1 to 2 Yr	2+ Yr	None	0 to 1 Yr	1 to 2 Yr	2+ Yr	None	0 to 1 Yr	1 to 2 Yr	2+ Yr
CD-ROM	3	4	4	12	5	9	6	21	8	13	10	31
Paper	2	2	4	14	2	6	4	10	4	8	8	24
Total	5	6	8	26	7	16	10	31	12	21	18	57

Proctors read the instructions prior to the treatment administration. Subjects were instructed that they recently received the annual report and are interested in the company. Subjects were then told that they have fifteen minutes to analyze the annual report.⁶ Note taking during the treatment was not permitted. A clock was provided and experimental starting times noted so that subjects could monitor the time elapsed. While viewing the annual report subjects were required to indicate the sections of the report they actually viewed on a checklist. The checklist contained the sections of the annual report and had two identical parts.

At the completion of the treatment, subjects were required to transfer their checks from checklist number one to checklist number two and then turn in checklist number one. Checklist number one is used to document the number of sections and which sections that the subject actually viewed/read. Checklist number two is retained by the subject as a record of the sections viewed/read. Subjects refer to checklist number two when completing the cued recall instrument since they only answer questions from sections actually viewed/read.

Following the treatment, subjects were required to complete four documents: a free recall instrument, a media satisfaction survey, a post-test attitude assessment survey, and a cued recall instrument. To control the order in which subjects completed the instruments, subjects were instructed to complete all instruments in a package before

⁶ Fifteen minutes was determined to be an ample amount of time for analysis since Clagett and Hirasuna (1988) and Squires (1989) find that the average stockholder only spends between five and six minutes with an annual report.

opening the next package of instruments. Package 1 contained the annual report (i.e., the experimental task) and the two checklists. At the completion of the allotted time (15 minutes), subjects opened package 2 which contained the free recall instrument. The free recall instrument allows subjects to list all information recalled. Package 3 contained the post-test attitude assessment survey and the media satisfaction survey. The post-test attitude assessment survey is identical to the pre-test attitude assessment survey. The media survey measures subjects' satisfaction with the particular media to which they were exposed. Finally, package 4 contained the cued recall survey. The cued recall instrument required subjects to answer specific questions from the annual report sections actually viewed or read.

Subjects in the paper-based treatment group were spaced apart to prevent them from determining what information another subject covered or remembered. Subjects in the multimedia treatment group were seated at computers and wore stereo headphones during the multimedia presentation so as not to disturb other subjects. To control for treatment diffusion and compensatory rivalry, subjects were asked to refrain from discussing the experiment until several days following administration.⁷

Dependent Variables

A short survey instrument was used to determine subjects' attitudes toward the company of interest in their treatment (i.e., EDS or Macromedia). Attitudes play an important part in the creation of schema that individuals use to make decisions (Eagly

⁷ An analysis of the results indicates no differences between treatment sessions suggesting that inter-session communication between subjects was not a confounding problem.

and Chaiken 1993). If presentation media changes attitudes, the particular media may also alter decision schema. To measure persuasion (i.e., change in attitude), a pre-test/post-test experimental design is employed. Following previous research (Clements and Wolfe 1997, Ottinger 1993), pre-test and post-test metrics are constructed by summing the responses to the respective survey questions.⁸

Media satisfaction is measured through a media satisfaction survey instrument that is similar to the ones used in Clements and Wolfe (1997), Butler and Mautz (1996) and Ottinger (1993). The instrument consists of items measuring a subject's impressions of the presentation format. To determine the underlying structure of the instrument, factor analysis was used on the survey responses. Based on the factor loading scores, dependent variables were created. Table 5 contains the questions, associated factors (i.e., dependent variables) and factor loadings for this experiment.

As Metcalfe et al. (1981) indicates, the primary purpose of any presentation is to inform the audience. In this study recall is used as a proxy for informedness. Two separate recall instruments are used to measure subjects' recall of information. The first measure of recall is a free recall score. The free recall score is the number of items that a subject recalled from the report viewed (i.e., free recall is a count of recalled items). The second measure of recall is a cued recall score. As in Clements and Wolfe (1997),

⁸ Questions 3 and 6 are negative in nature and therefore are reverse scored.

Table 5
Experiment 1
Rotated Factor Loadings for Satisfaction*

Media Survey Question	Entertainment	Clarity	Design Quality	Information Content
Overall Quality	0.361	0.461	0.361	0.121
Understandability	0.494	<u>0.525</u>	0.190	-0.012
Creativity	<u>0.601</u>	0.259	0.301	-0.027
Captures Attention	<u>0.737</u>	0.332	0.268	-0.007
Holds Attention	<u>0.795</u>	0.278	0.238	0.043
Page/Screen Layout Quality	0.348	0.214	<u>0.767</u>	0.172
Photo/Video Quality	0.234	0.123	<u>0.828</u>	0.041
Graphics/Artwork/Animation Quality	0.231	0.053	<u>0.861</u>	0.107
Writing Style	0.111	0.412	<u>0.627</u>	-0.020
Clarity	<u>0.542</u>	<u>0.611</u>	0.222	0.106
Believability	0.095	<u>0.771</u>	0.180	0.102
Interesting	<u>0.840</u>	0.276	0.113	0.043
Convincing	0.184	<u>0.759</u>	0.146	0.164
Informative	0.378	<u>0.567</u>	0.112	0.286
Argument Strength	0.358	<u>0.630</u>	0.232	0.339
Enjoyment	<u>0.817</u>	0.196	0.286	0.110
Conciseness	0.326	0.464	0.265	0.290
Entertainment	<u>0.834</u>	0.175	0.224	0.164
Stimulating	<u>0.832</u>	0.126	0.203	0.170
Design	0.326	0.322	<u>0.723</u>	0.192
Enjoyment	<u>0.788</u>	0.056	0.166	0.330
Evaluation/Information	0.072	<u>0.567</u>	0.094	<u>0.628</u>
Knowledge	0.682	0.146	0.061	<u>0.809</u>
Overall Quality	0.412	0.404	0.373	<u>0.601</u>
Eigenvalues	11.787	2.093	1.787	1.031
Cumulative Proportion of Variation	49.12%	57.84%	65.28%	69.58%

*Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Underlined factor loadings indicate the characteristic considered significant for each factor.

subjects were asked to use their checklist of annual report sections read/viewed and only attempt to answer questions on sections that they actually read or viewed. The cued recall score is the percentage of correct answers given on sections a subject actually read/viewed.

Other Variables

Demographic information (e.g., age, GPA, work experience, etc.) was analyzed to determine whether any additional demographic variables should be included in any of the models. Subjects' IDQ scores were also collected and used to determine if presentation preference has any effect on the results of the traditional models.

Any study involving presentation media must control for the media preference of the subject involved in the study. Dual Coding Theory explains differences in the way individuals represent and process information. It consists of a theoretical framework that involves two subsystems for information representation: the verbal and the imagery subsystems (Paivio 1991; Paivio 1986; Clark and Paivio 1991; Marschark and Paivio 1977; Paivio and Clark 1988). Verbal subsystems are used to represent and process language-based information (i.e., information communicated with text or speech). Imagery subsystems are used to represent non-verbal objects (i.e., information communicated through the use of sounds (other than speech), pictures, videos, and other non-verbal cues).

The comparative strength of verbal and imagery subsystems within individuals varies across the population (Paivio 1986). Some individuals have a more developed verbal subsystem and therefore prefer information to be communicated through the use

of text and/or speech while others have a more highly developed imagery subsystem and prefer information to be communicated in an imaginal format. This difference in preferred communication style can be measured using the Individual Differences Questionnaire (IDQ) (Paivio and Harshman 1983; Harshman and Paivio 1987; Tapley and Bryden 1977; Paivio 1971). The IDQ yields an imagery score as well as a verbal score, and it has been validated in a number of studies (Cohen and Saslona 1990; Harshman and Paivio 1987; and Overby 1990). (A copy of the IDQ is contained in the Appendix). To test for the effect of presentation preference in the annual report environment the dependent variables of attitude change/persuasion, satisfaction and recall will be analyzed in light of a subject's presentation preference as indicated by the IDQ.

Statistical Analyses

Statistical analyses will consist primarily of traditional analysis of variance (ANOVA) and analysis of covariance (ANCOVA) models. The experimental factors (independent variables) included in all models will be media (multimedia vs. paper), company (EDS vs. Macromedia) and expert (expert vs. non-expert). Pre-test attitude score will be included as a covariate in the statistical model for persuasion.

Demographic information (e.g., age, gender, GPA, work experience, etc.) will be included in the models as covariates or additional factors when deemed significant.

Additionally, presentation preference (verbal vs. imaging) will be included in all models as an interaction with media to determine the effect, if any, of presentation preference on the results. As presentation preference only influences results at the

extremes, the upper and lower quartiles of the IDQ distribution are used for analysis. Selecting the upper and lower quartiles of the distribution violates the normality assumption integral to parametric statistical analyses (ANOVA). Therefore, nonparametric statistical analysis is performed (i.e., Kruskal-Wallis). The relative efficiency of the Kruskal-Wallis test relative to the F test is never less than 86.4%, but may be as high as infinity for some violations of the normality assumption (Conover 1980, 237).

Experiment 2

Task and Experimental Design

Experiment 2 uses a fictitious company's management discussion and analysis (MD&A) section of the annual report as an experimental task. While the financial statements are the most influential disclosures for investment decision making, they are not the most widely read section of an annual report. The president's letter to shareholders and management's discussion and analysis are more widely read than the financial statements (Courtis 1982; Lee and Tweedie 1975). The president's letter and the MD&A contain additional information about the financial results of the current year that are not evident in the financial statements or the accompanying notes. In addition, the president's letter and the MD&A contain plans and expectations for future years of operations. Therefore, financial analysts often use these sections as qualitative validation for information contained in the financial statements (Chugh and Meador 1984).

The second experiment tests the user effects of media, source gender, and type of news across the constructs of persuasion, satisfaction, and recall. This second experiment will consist of a 2^3 full factorial design that will yield eight experimental treatment groups. Graphically, Figure 4 presents the experimental design of experiment 2. The media factor has two levels: video MD&A on the computer and textual MD&A on paper. The source gender factor has two levels: male and female. The news factor also has two levels: “good news” and bad news. The MD&A was manipulated for the three factors involved in the experiment. All treatments will be limited to 5½ minutes (i.e., the length of the video) of analysis.⁹

Figure 4
Experiment 2 Treatment Cells

	Male Source	Female Source
Paper	Good News	Good News
	Bad News	Bad News
Video	Good News	Good News
	Bad News	Bad News

⁹ Again, five and a half minutes was determined to be an ample amount of time for analysis since Clagett and Hirasuna (1988) and Squires (1989) find that the average stockholder only spends between five and six minutes with an annual report.

There are two levels of the media factor. In the video MD&A treatment, a spokesperson appears on video and delivers the MD&A (no text). The video was produced at the studio of a local television (PBS) station with professional actors. The video is a typical “talking head” video similar to what newscasts offer. At the completion of the video, subjects begin completing the experimental surveys. The surveys for the video treatment are computer-based. Subjects may not view the video again.

Subjects in the other media treatment analyze a paper-based MD&A. A color picture of the spokesperson is presented at the top of the first page of the MD&A text. Again, subjects are limited in their analysis of the MD&A to a time period equal to the length of the MD&A video (5½ minutes).

The source gender factor is manipulated by changing the gender of the spokesperson presenting the MD&A. The spokesperson on the video or in the paper-based pictures is either a male or a female. The male and the female are approximately 40 years old. Both presenters are professional actors and were paid for their time. The pictures on the paper-based MD&A are screen captures from the video and are printed in color.

The news factor is manipulated in two ways. First, a press clipping is presented to the subjects before actually viewing the annual report. This press clipping indicates that the anticipated results are either “good news” or “bad news.” The second manipulation occurs in the MD&A. The spokesperson indicates whether the company’s performance was lower than expected or greater than expected. In this study “good

news” and “bad news” is defined as it is in capital market studies. “Good news” is defined as exceeding earnings expectations and “bad news” is defined as not meeting earnings expectations. A manipulation check is performed to determine if the subjects actually perceived the news as “good news” or “bad news.”

Experimental Procedures

The experiment was conducted over several days in several sessions each day. Before arriving at the appointed time, each subject completed an Individual Differences Questionnaire (IDQ) to measure subject presentation preference. Upon arrival, the IDQs were collected, subjects completed an informed consent document and a demographic survey (Appendix B contains copies of all instruments for experiment 2). Next, subjects were randomly assigned to a treatment group, and those in a multimedia treatment group were taken to a computer lab while those in a paper-based treatment remained in the current classroom.¹⁰

Proctors read the instructions prior to the treatment administration. Subjects were instructed that they recently received the annual report and are interested in the company. Subjects in a paper-based treatment were told that they have 5½ minutes to analyze the annual report. Note taking during the treatment was not permitted. A clock was provided and experimental starting times noted so that subjects could monitor the time elapsed. For subjects in the video treatment, the computer displayed the video, which was 5½ minutes in length. Subjects were unable to replay the video. Subjects in

¹⁰ Subjects were not informed of treatment differences to protect against biases resulting from their selection into either the paper-based or video-based groups.

the video treatment completed all documents (except the informed consent) on the computer. The computer controlled the order of the documents.

Following the treatment, subjects were required to complete four documents: a free recall instrument, a media satisfaction survey, an attitude assessment survey, and a cued recall instrument. To control the order in which subjects in the paper-based treatments completed the instruments, subjects were required to complete all materials in a given package before proceeding to the next package of instruments. For the video treatment, the computer controlled the order that the instruments were completed and ensured that all materials were complete before proceeding.

After viewing the appropriate MD&A, subjects completed an attitude assessment survey. The attitude assessment survey was combined with the media satisfaction survey into one document. Since a fictional company is used, a pre-test attitude assessment survey is irrelevant. The media survey measures subjects' satisfaction with the particular media to which they were exposed. To measure subject's recall of information, two instruments were used. A free recall instrument was used to allow subjects to list all information they could recall. A cued recall instrument was used to ask subjects specific questions regarding the information that they viewed.

Subjects in the paper-based treatment group were spaced apart to prevent them from determining what information another subject covered or remembered. Subjects in the multimedia treatment group were seated at computers and wore stereo headphones during the multimedia presentation so as not to disturb other subjects. To control for

treatment diffusion and compensatory rivalry, subjects were asked to refrain from discussing the experiment until several days following administration.¹¹

Subjects

Subjects in experiment 2 were undergraduate students enrolled in accounting courses at a large state university in the Southwest. Participation in the experiment was voluntary, although academic incentives (i.e., extra credit points) were provided to encourage participation.

As previously mentioned, students are deemed acceptable subjects for this experiment because they have a working knowledge of the financial statements but do not have a highly complex system for analyzing annual reports. Since the majority of users of annual reports are non-experts, it is acceptable to use students as subjects without impairing the generalizability of the study. Also, unlike experiment 1, analysis of the effects of expertise was not an objective of experiment 2. Table 6 contains subject demographic information for experiment 2.

Dependent Variables

Attitude regarding the fictitious company (Branco) was collected using a short survey instrument similar to the one used in experiment 1. Unlike experiment 1, attitude assessment in experiment 2 is a post-test only measure and is combined with the media satisfaction survey instrument. The media satisfaction survey instrument is similar to the one used in experiment 1 with the addition of information concerning the company

¹¹ An analysis of the results indicates no differences between treatment sessions suggesting that inter-session communication between subjects was not a confounding problem.

Table 6
Experiment 2
Demographic Information

Panel A: Age and GPA*

		Video			Paper			Total		
		N	Age	GPA	N	Age	GPA	N	Age	GPA
Male	Good News	15	21.13 (20.00)	2.60 (2.45)	21	20.86 (21.00)	2.99 (3.00)	36	20.97 (20.00)	2.82 (2.80)
	Bad News	13	21.08 (20.00)	2.81 (2.88)	16	21.31 (21.00)	2.61 (2.75)	29	21.21 (21.00)	2.70 (2.80)
Female	Good News	19	20.72 (20.50)	2.72 (2.69)	24	20.83 (20.50)	2.99 (2.98)	43	20.79 (20.50)	2.87 (2.85)
	Bad News	54	20.43 (20.00)	2.70 (2.64)	19	20.68 (20.00)	2.74 (2.80)	73	20.50 (20.00)	2.71 (2.70)
Total		101	20.67 (20.00)	2.70 (2.60)	80	20.90 (21.00)	2.85 (2.90)	181	20.77 (20.00)	2.77 (2.79)

* Mean (Median)

Panel B: Subject Classification

		Video					Paper				Total				
		Fresh	Soph	Jr.	Sr.	Other	Fresh	Soph	Jr.	Sr.	Fresh	Soph	Jr.	Sr.	Other
Male	Good News	1	8	5	1	0	1	7	4	9	2	15	9	10	0
	Bad News	0	4	7	2	0	2	3	9	4	2	7	16	6	0
Female	Good News	1	8	6	3	1	1	10	10	3	2	18	16	6	1
	Bad News	0	7	40	7	0	4	7	5	3	4	14	45	10	0
Total		2	27	58	13	1	8	27	28	19	10	54	86	32	1

Panel C: Work Experience

		Video				Paper				Total			
		None	0 to 1 Yr	1 to 2 Yr	2+ Yr	None	0 to 1 Yr	1 to 2 Yr	2+ Yr	None	0 to 1 Yr	1 to 2 Yr	2+ Yr
Male	Good News	0	2	1	12	0	1	5	15	0	3	6	27
	Bad News	1	0	4	8	4	3	3	8	5	3	7	16
Female	Good News	1	3	1	14	1	2	7	14	2	5	8	28
	Bad News	12	5	12	25	1	2	3	13	13	7	15	38
Total		14	10	18	59	6	8	18	50	20	18	36	109

Table 7
Experiment 2
Rotated Factor Loadings

Survey Question	Information		Overall	Source	Design	Financial	Believability	Clarity
	Content	Entertainment	Attitude	Attractiveness	Quality	Wellbeing		
Results of Operations	0.601	-0.014	0.146	0.013	-0.030	0.345	-2.620	0.028
Overall Report Quality	0.214	0.073	0.606	0.024	0.269	0.212	-0.117	0.378
Understandability	0.130	0.278	0.164	0.015	-0.192	0.078	0.081	0.651
Branco's Creativity	0.128	0.367	0.266	-0.041	-0.050	-0.195	0.045	0.481
Branco's Future	0.561	-0.035	0.364	-0.134	0.043	0.447	0.055	0.071
Career Opportunities with Branco	-0.245	0.285	0.648	0.030	0.049	-0.130	-0.060	0.019
Financial Problems	0.014	0.016	-0.114	0.070	-0.100	0.844	0.116	0.020
Overall Impression of Branco	0.627	0.006	0.067	-0.029	-0.086	0.518	0.027	-0.120
Investment Opportunity	0.087	0.248	0.786	0.118	-0.070	0.091	0.208	0.031
Branco's Future	0.152	0.104	0.719	0.195	-0.008	-0.264	0.101	0.037
Finacial Management	0.600	-0.122	0.286	0.151	-0.075	0.316	-0.104	0.154
Overall Quality	0.182	0.319	0.520	0.001	0.101	0.292	0.010	0.265
Report Creativity	0.083	0.643	-0.055	0.039	0.124	-0.023	0.111	0.168
Captures Attention	0.321	0.790	0.111	0.020	-0.050	0.049	-0.046	-0.013
Holds Attention	0.370	0.741	0.120	-0.028	-0.115	-0.040	0.026	0.017
Page/Screen Layout Quality	0.794	-0.061	-0.001	-0.037	0.397	-0.006	-0.078	0.009
Photo/Video Quality	-0.002	0.176	0.023	0.166	0.787	-0.111	0.147	-0.149
Spokesperson Professionalism	0.207	0.174	0.093	0.012	0.770	-0.034	0.089	0.006
Believability	0.169	0.092	0.021	0.077	0.108	0.032	0.741	0.014
Interesting	-0.268	0.788	0.221	0.056	0.081	0.041	0.045	0.064
Convincing	0.722	0.148	0.040	0.042	-0.037	0.097	0.276	0.151
Informative	0.360	0.155	0.056	-0.020	0.085	0.027	0.517	0.439
Argument Strength	-0.051	0.303	0.357	0.163	0.167	0.186	0.528	0.030
Enjoyment	0.001	0.782	0.195	0.083	0.169	0.063	0.197	0.141
Conciseness	0.757	0.066	0.018	0.086	0.033	-0.189	0.258	0.145
Entertainment	-0.368	0.722	0.238	0.178	0.130	-0.090	-0.010	-0.015
Stimulating	0.374	0.671	0.219	0.180	0.067	-0.025	-0.046	0.022

Table 7
Continued

Survey Question	Information		Overall Attitude	Source Attractiveness	Design Quality	Financial Wellbeing	Believability	Clarity
	Content	Entertainment						
Design	<u>0.829</u>	0.056	-0.063	-0.051	0.319	-0.009	-0.030	0.064
Enjoyment	-0.334	<u>0.696</u>	0.100	0.161	0.255	0.056	0.167	0.164
Evaluation/Information Knowledge	<u>0.790</u>	0.006	-0.022	-0.020	0.000	-0.096	0.293	0.154
Spokesperson Attractiveness	-0.370	<u>0.563</u>	0.047	0.143	0.056	-0.044	0.241	0.250
Spokesperson Class	0.306	0.001	-0.010	<u>0.705</u>	0.098	0.082	0.091	0.087
Spokesperson Beauty	0.443	0.031	-0.011	0.310	0.413	-0.004	0.098	0.381
Spokesperson Elegance	-0.300	0.195	0.223	<u>0.783</u>	0.121	0.059	0.136	0.022
Spokesperson Sexiness	0.332	0.071	0.048	<u>0.536</u>	0.341	0.073	0.005	0.375
	-0.155	0.270	0.146	<u>0.711</u>	-0.073	-0.112	-0.029	-0.193
Eigenvalues	8.343	6.167	2.351	2.083	1.593	1.443	1.326	1.003
Cumulative Proportion of Variation	17.30%	32.34%	40.67%	47.05%	53.02%	58.09%	62.86%	67.52%

*Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.
 Underlined factor loadings indicate the characteristic considered significant for each factor.

spokesperson. Factor analysis was used to identify attitude and satisfaction dependent variables.

As shown in Table 7, the factor analysis identified eight factors resulting from the attitude/media survey instrument. Each of the eight factors will be a dependent variable in the analysis. Two of the variables, overall attitude and financial wellbeing, are dependent variables for attitude regarding the company. Overall attitude measures a subject's evaluation of the company as a whole while financial wellbeing captures the subject's impression of the company's financial performance. The other variables are used as report satisfaction dependent variables. While source attractiveness is a dependent satisfaction measure, it is also included as a covariate in other analyses to determine if the attractiveness of the spokesperson had an impact on the tests of the other dependent measures.

As in experiment 1, two measures of recall are used to assess subject's informedness. The first measure of recall is a free recall score. This score is the number of items that a subject recalled from the MD&A. The second measure of recall is a cued recall score, which is the number of correct answers given on the cued recall survey.

Other Variables

As in experiment 1, IDQ scores are analyzed to determine whether subject presentation preference affects the results. To control for attractiveness differences and differences in voice quality, additional questions were asked of subjects regarding these constructs. The attractiveness instrument is adapted from validated instruments developed by Ohanian (1990). The validated scale consists of five questions regarding

the source's attractiveness. While many argue that beauty is in the eye of the beholder, people typically show a good deal of agreement in their evaluation of attractiveness (Berscheid and Walster 1974). Voice differences are evaluated through questions adapted from Zuckerman and Miyake (1993) and Zuckerman et al. (1991). Both of these control variables will be included in the analysis as covariates, if appropriate.

Statistical Analyses

As in experiment 1, statistical analyses consists of traditional analysis of variance (ANOVA) and analysis of covariance (ANCOVA) models. Experiment 2 includes media (video MD&A and textual MD&A on paper), spokesperson gender (male or female), and type of news (good news or bad news) as independent variables. In addition, presentation preference (verbal or imaging) is analyzed to determine whether presentation preference is a significant factor in the change of the dependent variables. Since presentation preference should only influence results at the extremes, the upper and lower quartiles of the IDQ distribution are chosen for analysis. As in experiment 1, nonparametric statistical analysis is performed (Kruskal-Wallis) on interactions only involving the media factor. Additionally, source attractiveness scores are included as covariates to control for spokesperson differences. Significant demographic variables (e.g., age, GPA, gender, work experience, etc.) are also included as covariates or additional factors, if necessary.

CHAPTER V

EXPERIMENTAL RESULTS

Experiment 1

Experiment 1 is intended to provide support for the findings of Clements and Wolfe (1997). Additionally, experiment 1 extends their study in two ways. Two companies are included in this research to allow between company comparisons of media effects, and experts are used in this research to allow comparisons between non-expert and expert subjects. The results from experiment 1, categorized by dependent variable, follow.

Persuasion

Hypothesis H_1 postulates that multimedia and paper annual reports are equally persuasive. Hypothesis H_2 postulates that expert and non-expert annual report users are equally persuaded by an annual report. Research question RQ_2 seeks to determine whether all companies receive the same persuasive effect from the additional (multimedia) form of annual report. In experimental terms, the answer to RQ_2 is determined by examining the statistical significance of the company and media interaction term.

The persuasiveness of a report was measured through a ten-question survey instrument. The experimental design is a pre-test/post-test design where the pre-test score (prescore) acts as a covariate and the post-test score is the dependent variable in the model. Table 8 presents the results of the ANCOVA for persuasion. Overall, the

corrected model is statistically significant ($F=7.809$, $p<.001$).¹² As expected, the covariate (prescore) is a statistically significant source of variation in the dependent variable (post-test score). Additionally, all of the main effects of the experimental factors and the three-way interaction term of expert, company and media are statistically significant.

The main effect of expert is a statistically significant source of variation in the post-test attitude score ($F=18.747$, $p<.001$). An analysis of the estimated marginal means indicates that, overall, non-expert subjects (mean = 66.85) were more persuaded than the expert subjects were (mean = 59.64). The experimental factor of company is also a statistically significant source of variation in post-test attitude score ($F=9.834$, $p=.002$). The estimated marginal means indicate that, overall, the Macromedia report (mean = 65.82) was more persuasive than the EDS annual report (mean = 60.68). Overall, there is also a statistically significant difference in the post-test attitude scores between the two different media ($F=3.667$, $p=.058$).¹³ The estimated marginal means indicate that paper annual reports (mean = 64.83) are significantly more persuasive than the multimedia annual reports (mean = 61.66).

Additional explanatory power is provided by the three-way interaction of expert, company and media ($F=3.446$, $p=.066$). Figure 5 depicts the three-way interaction. As

¹² Due to the exploratory nature of this research, p-values less than or equal to .10 will be interpreted as statistically significant.

¹³ When the analysis is limited to expert users currently investing, the main effect of media is insignificant ($F=2.174$, $p=.143$).

Table 8
Experiment 1
ANCOVA of Attitude Scores

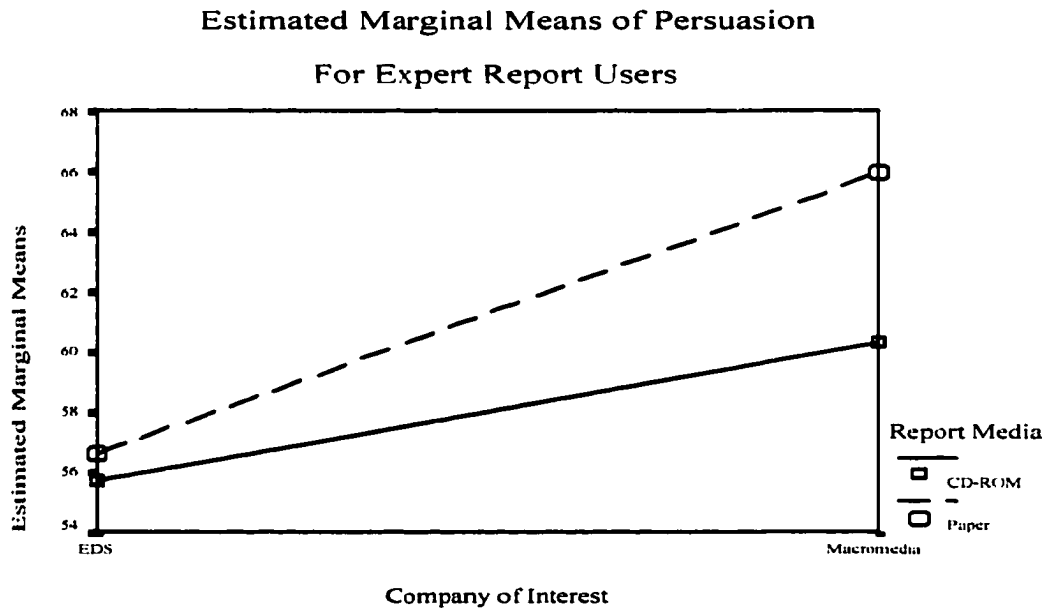
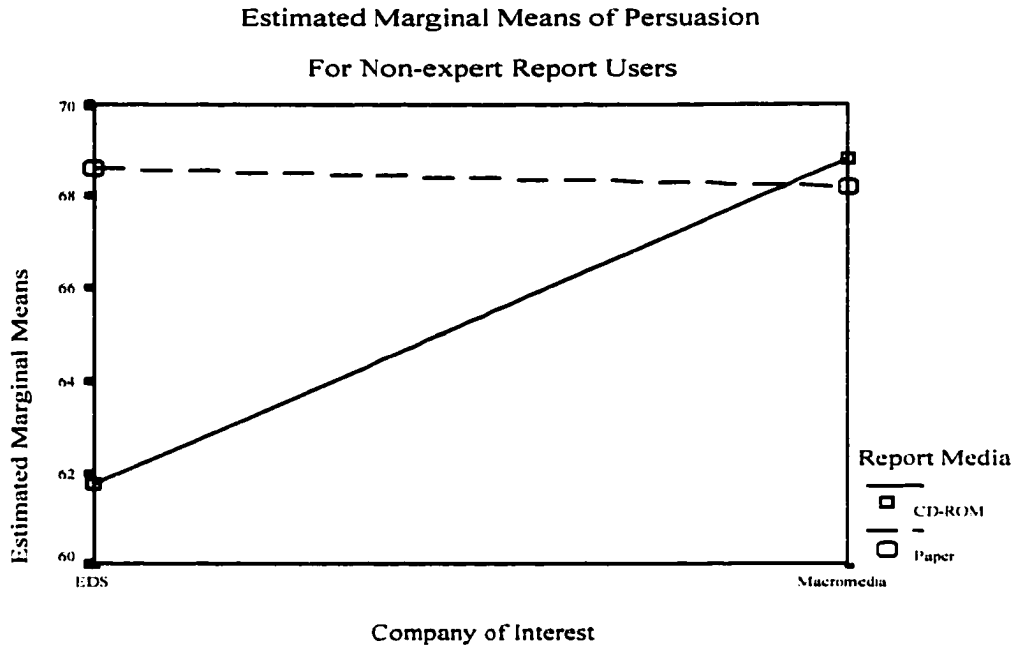
	SS	df	F	p-Value
Corrected Model	3867.379	8	7.809	0.000
Intercept	2625.005	1	42.404	0.000
Prescore (Covariate)	760.658	1	12.288	0.001
Company	608.767	1	9.834	0.002
Media	226.985	1	3.667	0.058
Expert	1160.513	1	18.747	0.000
Company x Media	10.698	1	0.173	0.678
Company x Expert	74.99	1	1.211	0.273
Media x Expert	0.128	1	0.002	0.964
Company x Media x Expert	213.345	1	3.446	0.066
Residual	8109.557	131		
Total	612219.000	140		

shown, the persuasive ability of the EDS paper annual report (mean = 68.60) is significantly higher than the EDS multimedia annual report (mean = 61.77) for non-expert subjects. The persuasiveness of the Macromedia reports (paper and multimedia) were very similar for non-experts (means = 68.20 and 68.84, respectively). For expert subjects, there was very little persuasive difference between the paper and multimedia EDS annual reports (means = 56.61 and 55.73, respectively). However, for the expert subjects, the paper Macromedia annual report (mean = 65.92) was more persuasive than the multimedia report (mean = 60.31).

The results of experiment 1 indicate that hypothesis H_1 is rejected. Overall, the results of the experiment indicate that there was a statistically significant difference in the media's ability to persuade. As previously mentioned, the paper annual report (mean = 64.83) was significantly more persuasive than the multimedia annual report (mean = 61.66). The results of experiment 1 also indicate that hypothesis H_2 is rejected. Non-expert report users were persuaded significantly more than expert report users.

Overall, there is no difference in the media's ability to persuade between companies (i.e., the interaction of company and media is not statistically significant. $F=.173$, $p=.678$). This finding is without regard to the type of user being considered. However, when considering whether the subject was an expert or non-expert report user, the media's persuasive ability does differ across companies. For non-expert subjects, the persuasiveness of the media does differ for EDS, but not for Macromedia. For expert subjects, the persuasiveness of the media differs for Macromedia, but not for EDS. Therefore, the answer to research question RQ_2 is that differences exist in the media's

Figure 5
Experiment 1
Three-way Interaction for Persuasion



ability to persuade between companies conditioned on whether the subject is a non-expert (undergraduate) or an expert (EMBA) user.

Satisfaction

Hypothesis H₃ postulates that there is no difference in user satisfaction due to annual report media. Research question RQ₁ is designed to question whether expert and non-expert report users are equally satisfied with an annual report. Research question RQ₂ seeks to determine whether all companies receive the same satisfaction effect from the additional (multimedia) form of annual report. In an experimental sense, the answer to RQ₂ is determined by examining the statistical significance of the company and media interaction term. Satisfaction was measured with a multi-question survey instrument. As previously discussed, the subject responses were factor analyzed to determine appropriate dependent measures. The results of the factor analysis are shown in Table 5. The four dependent measures identified through the analysis are entertainment, design quality, clarity, and information content.

The results of the ANOVAs for the four dependent measures are presented in Table 9. As shown, the models for entertainment ($F=.960, p=.463$), clarity ($F=1.613, p=.137$), and information content ($F=1.750, p=.103$)¹⁴ are not statistically significant. While insignificant, it is interesting to note that the experimental factor of company

¹⁴ When the analysis is limited to experts currently investing, the model for information content is statistically significant ($F=2.096, p=.048$). Furthermore, the interaction effects of expert and media ($F=2.788, p=.097$) and the three-way interaction ($F=4.074, p=.046$) are statistically significant.

Table 9
Experiment 1
ANOVA of Satisfaction Factors

Panel A: Entertainment	SS	df	F	p-Value
Corrected Model	6.732	7	0.960	0.463
Intercept	0.039	1	0.039	0.844
Company	0.311	1	0.311	0.578
Media	0.038	1	0.038	0.846
Expert	0.291	1	0.290	0.591
Company x Media	0.303	1	0.302	0.583
Company x Expert	2.280	1	2.276	0.134
Media x Expert	1.232	1	1.230	0.269
Company x Media x Expert	0.117	1	0.117	0.733
Residual	133.268	133		
Total	140.000	141		

Panel B: Clarity	SS	df	F	p-Value
Corrected Model	10.954	7	1.613	0.137
Intercept	0.976	1	1.005	0.318
Company	4.864	1	5.013	0.027
Media	0.080	1	0.083	0.774
Expert	2.294	1	2.364	0.127
Company x Media	0.280	1	0.289	0.592
Company x Expert	1.352	1	1.393	0.240
Media x Expert	0.459	1	0.473	0.493
Company x Media x Expert	0.355	1	0.366	0.546
Residual	129.046	133		
Total	140.000	141		

Panel C: Design Quality	SS	df	F	p-Value
Corrected Model	34.183	7	6.138	0.000
Intercept	3.922	1	4.929	0.028
Company	3.296	1	4.143	0.044
Media	6.685	1	8.403	0.004
Expert	16.587	1	20.848	0.000
Company x Media	0.585	1	0.736	0.393
Company x Expert	0.183	1	0.230	0.632
Media x Expert	1.351	1	1.699	0.195
Company x Media x Expert	0.427	1	0.536	0.465
Residual	105.817	133		
Total	140.000	141		

Panel D: Information Content	SS	df	F	p-Value
Corrected Model	11.808	7	1.750	0.103
Intercept	0.203	1	0.211	0.647
Company	3.852	1	3.997	0.048
Media	0.256	1	0.266	0.607
Expert	0.091	1	0.095	0.759
Company x Media	0.033	1	0.035	0.853
Company x Expert	0.160	1	0.166	0.684
Media x Expert	0.453	1	0.470	0.494
Company x Media x Expert	1.450	1	1.504	0.222
Residual	128.192	133		
Total	140.000	141		

appears to be the only source of variation in any of these three models that approach statistical significance (this occurs in the clarity and information content models).

As shown in Table 9, the only dependent measure of satisfaction with a statistically significant ANOVA model is design quality ($F=6.138$, $p<.001$). The main effects of all three experimental factors are significant sources of variation in design quality. An analysis of the means for whether a subject was a non-expert or an expert ($F=20.848$, $p<.001$) indicates that non-expert subjects (mean = .2177) had a higher satisfaction rating for the annual reports than did the expert subjects (mean = -.6297). The experimental factor of company was also a statistically significant source of variation in the rating of design quality ($F=4.143$, $p=.044$). Overall, subjects rated the design quality of the EDS annual report (mean = -.0171) higher than they did the Macromedia report (mean = -.3949). Finally, the main effect of media ($F=8.403$, $p=.004$) was also a statistically significant source of variation in design quality rating. The estimated marginal means indicate that the multimedia annual report (mean = .0630) was rated significantly higher than the paper report (mean = -.4750) regardless of company or whether the subject was an expert or not.

The results of experiment 1 indicate that media is a significant source of variation in the annual report design quality rating. Therefore, hypothesis H_3 is rejected with respect to the single satisfaction measure of design quality. However, for the other three satisfaction measures (entertainment, clarity, and information content), hypothesis H_3 cannot be rejected at any reasonable significance level. The answer to research question RQ_1 with regard to the user satisfaction measure of design quality is "Yes." The results

indicate that non-expert users have a higher opinion of the design quality of the annual reports viewed. However, the answer to research question RQ₁ is unknown for the three insignificant satisfaction measures. The answer to research question RQ₂ with regard to user satisfaction is an unequivocal “No.” There is no evidence that media has a differential effect on user satisfaction between different companies (i.e., none of the interaction terms are statistically significant).

Recall

Hypothesis H₄ asserts that there is no difference in recall of information due to presentation media. Hypothesis H₅ posits that there is no difference in recall of information between expert and non-expert report users. Similar to persuasion and satisfaction, research question RQ₂ inquires as to whether there is any difference in recall due to media across two companies. To test hypotheses H₄, H₅ and to provide an answer to research question RQ₂, two measures of subject recall were used. The first measure, free recall, required a subject to list all items remembered from the annual report. The second measure of recall, cued recall, asked specific questions from the appropriate annual report.

The results for free recall are presented in Panel A of Table 10. As indicated, the corrected model for free recall is statistically significant ($F=6.948$, $p<.001$). Further analysis indicates that the main effect of expert ($F=22.382$, $p<.001$), the main effect of company ($F=6.468$, $p=.012$), and the interaction of expert and company ($F=5.416$, $p=.021$) are statistically significant sources of variation in free recall. Analysis of the estimated marginal means indicates that, overall, expert (EMBA) subjects (mean =

Table 10
Experiment 1
ANOVA of Recall Scores

Panal A: Free Recall	SS	df	F	p-value
Corrected Model	1565.047	7	6.948	0.000
Intercept	6338.107	1	196.960	0.000
Company	208.126	1	6.468	0.012
Media	3.583	1	0.111	0.739
Expert	720.231	1	22.382	0.000
Company x Media	2.004	1	0.062	0.803
Company x Expert	174.299	1	5.416	0.021
Media x Expert	16.199	1	0.503	0.479
Company x Media x Expert	2.848	1	0.089	0.767
Residual	4183.359	130		
Total	13082.000	138		

Panal B: Cued Recall	SS	df	F	p-value
Corrected Model	0.538	7	2.282	0.032
Intercept	4.933	1	146.450	0.000
Company	0.370	1	10.996	0.001
Media	0.096	1	2.838	0.094
Expert	0.050	1	1.484	0.225
Company x Media	0.082	1	2.446	0.120
Company x Expert	0.034	1	1.008	0.318
Media x Expert	0.032	1	0.952	0.331
Company x Media x Expert	0.024	1	0.719	0.398
Residual	4.379	130		
Total	11.000	138		

11.18) recalled more information than did non-expert (undergraduate) subjects (mean = 5.54). Analysis of the marginal means for the experimental factor of company reveals that subjects receiving the Macromedia annual report (mean = 9.88) recalled significantly more than did those subjects receiving the EDS report (mean = 6.85) regardless of the type of media or whether the subject was an expert or non-expert.

As previously mentioned, the interaction of expert and company is a statistically significant source of variation in free recall ($F=5.416$, $p=.021$). Figure 6 graphically depicts the interaction of expert and company for free recall. As shown, there is very little difference in recall scores between the EDS (mean = 11.05) and Macromedia (mean = 11.31) reports for expert subjects. However, there is a significant difference between the EDS (mean = 2.64) report and the Macromedia (mean = 8.44) annual report for non-expert subjects.

The second measure of recall of information is captured in the cued recall score. The results of the ANOVA for cued recall are presented in Panel B of Table 10. As shown, the corrected model for cued recall is statistically significant ($F=2.282$, $p=.032$). Further analysis reveals that the main effects of company ($F=10.996$, $p=.001$) and media ($F=2.838$, $p=.094$) are statistically significant sources of variation in cued recall. Subjects receiving the EDS annual report (mean = .2971) were able to recall significantly more information than those receiving the Macromedia report (mean = .1693). This difference was present regardless of media or subject type. With respect to presentation media, the estimated marginal means indicate that subjects receiving a multimedia report

Figure 6
Experiment 1
Interaction of Expert and Company for Free Recall

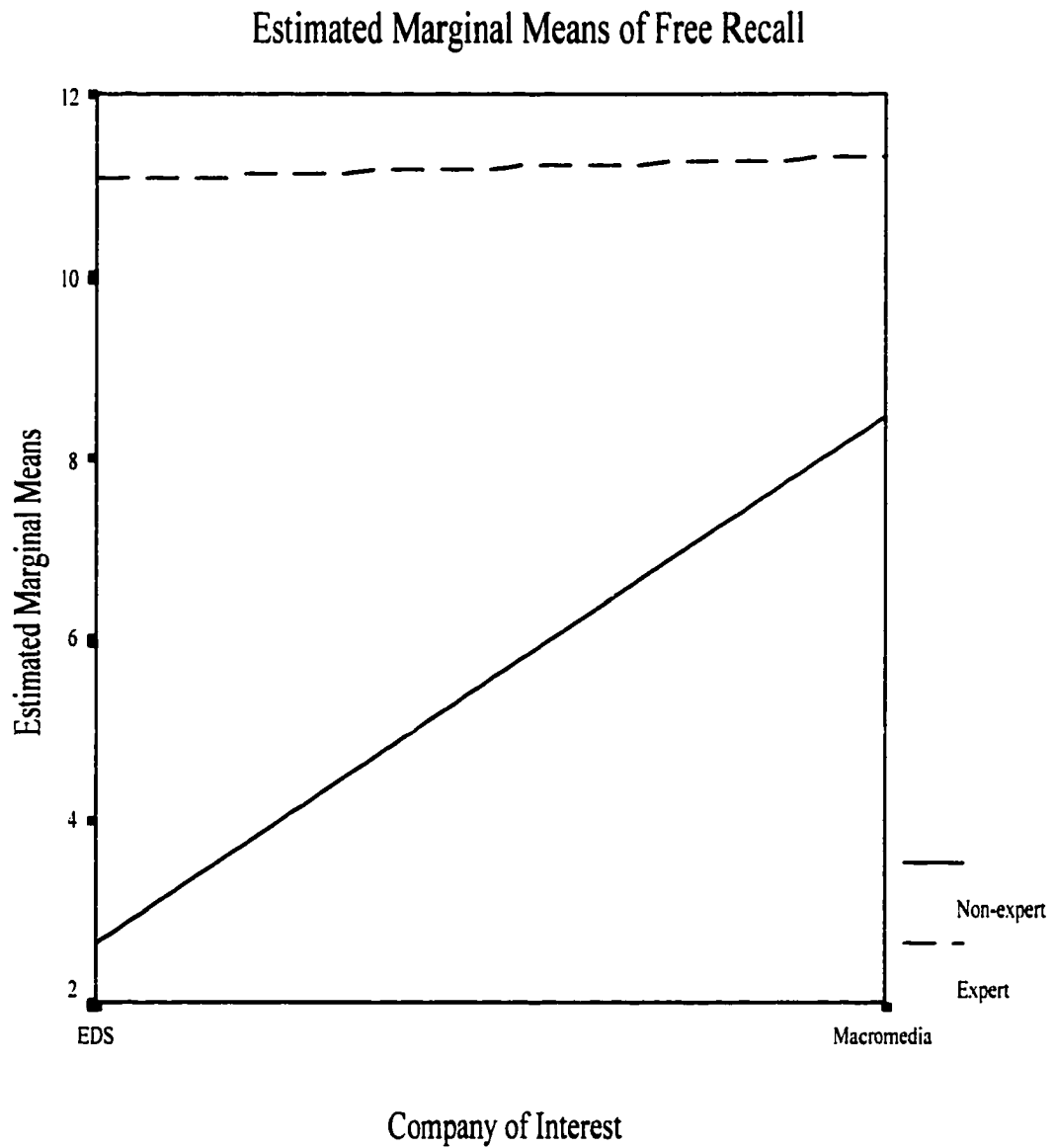


Table 11
Experiment 1
Summary of Results

Dependent Variable	Hypotheses & Research Questions						
	H ₁	H ₂	H ₃	RQ ₁	H ₄	H ₅	RQ ₂
Persuasion:	✓	✓					✗
Satisfaction:							
Entertainment							
Clarity							
Design Quality			✓	✗			
Information							
Recall:							
Free Recall						✓	
Cued Recall					✓		

✓ indicates that the hypothesis is rejected.

✗ indicates that the answer to the research

* indicates that the overall model is not

(mean = .2657) were able to recall more information than those receiving a paper annual report (mean = .2008).

Based on the statistical results of experiment 1, hypothesis H₄ is rejected for cued recall but not for free recall. The results of experiment 1 indicate that subjects were able to recall significantly more information from a multimedia annual report than from a paper annual report when given cues. The results indicate that hypothesis H₅ should also be rejected, but only for free recall. On a free recall basis, the results indicate that expert report users were able to recall significantly more information than non-expert report users. With respect to research question RQ₂, there is no evidence suggesting that media

has a differential recall effect between the two companies in experiment 1. Table 11 presents the overall results of experiment 1.

Media Preference

As previously mentioned, any study involving presentation media must also consider the media preference of the subject involved in the study. Each subject completed an Individual Differences Questionnaire (IDQ) prior to participating in the experiment. The IDQ measures an individual's preferred method of receiving communication (Paivio and Harshman 1983; Harshman and Paivio 1987; Tapley and Bryden 1977; Paivio 1971). The IDQ yields two measures of presentation preference. The first measure indicates an individual's preference for imagery communication (e.g., pictures, video, music, animation, etc.). The second measure indicates an individual's preference for verbal communication (e.g., written or spoken text). As in previous studies (Butler and Mautz 1996; Clements and Wolfe 1997), a single IDQ preference score is constructed for each subject. The IDQ preference score is computed by subtracting the imagery score from the verbal score for each subject.¹⁵ Table 12 contains descriptive statistics for IDQ preference scores.

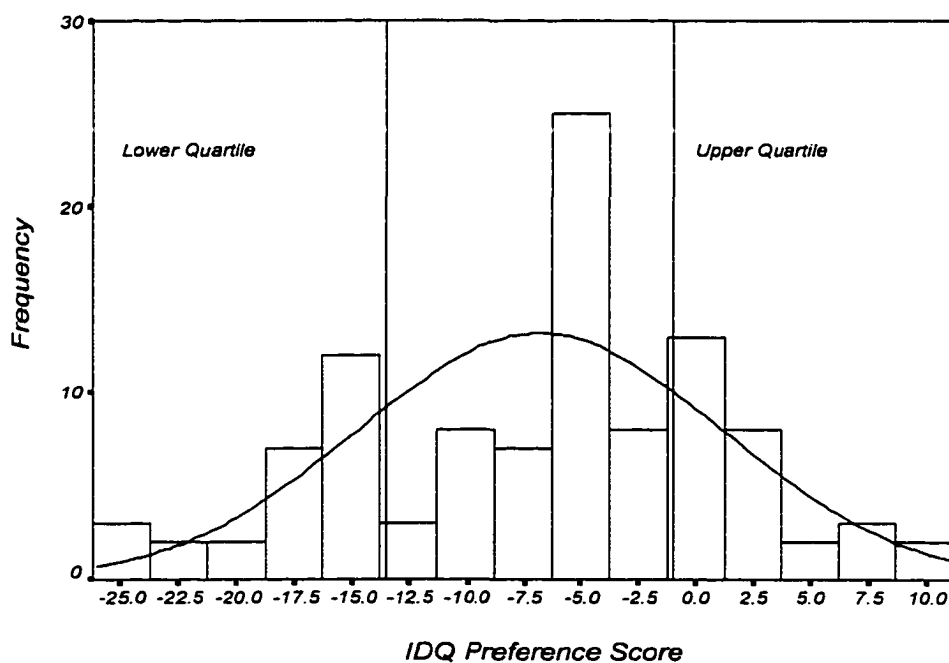
Theoretically, the effect of media preference should only be evident when a subject has a strong media preference (Butler and Mautz 1996; Clements and Wolfe

¹⁵ The verbal section of the IDQ is a 47-item scale and the imagery section is a 39-item scale. Therefore, zero does not mark an indifference point, nor does the sign of the difference necessarily indicate a preference. The difference is used to rank presentation preference.

Table 12
Experiment 1
IDQ Preference Scores

Panel A: Descriptive Statistics						
Treatment Group	N	Mean	Standard Deviation	Median	Minimum	Maximum
Overall						
IDQ Preference Score	105	-6.781	7.903	-6.0	-25	10
Upper Quartile	28	2.357	3.302	2.0	-1	10
Lower Quartile	26	-17.731	3.401	-17.0	-25	-14
EDS CD-ROM						
IDQ Preference Score	23	-4.044	7.637	-4.0	-22	10
Upper Quartile	9	3.222	3.866	2.0	-1	10
Lower Quartile	3	-17.333	4.042	-15.0	-22	-15
EDS Paper						
IDQ Preference Score	22	-7.409	7.563	-5.5	-23	7
Upper Quartile	4	2.250	3.594	1.5	-1	7
Lower Quartile	6	-17.500	3.146	-17.5	-23	-14
Macromedia CD-ROM						
IDQ Preference Score	37	-7.108	8.386	-6.0	-24	8
Upper Quartile	12	1.833	2.553	2.0	-1	8
Lower Quartile	10	-18.100	3.695	-17.0	-24	-14
Macromedia Paper						
IDQ Preference Score	22	-8.500	7.652	-6.0	-25	8
Upper Quartile	3	2.000	5.196	-1.0	-1	8
Lower Quartile	7	-17.571	3.690	-16.0	-25	-14

Panel B: IDQ Preference Score Distribution



1997). Therefore, analysis of presentation preference will only consider subjects in the upper and lower quartiles of the IDQ distribution. The results are presented in Table 13.

To assess the effect of individual treatment combinations, a multiple comparison was performed for each of the four significant models. Table 14 contains the results of the multiple comparisons. Figure 7 graphically presents the results of the multiple comparisons for the four significant models. As shown, subjects' presentation preference has no effect for persuasion. The significant difference in the model for persuasion is between the EDS paper report and the EDS multimedia report.

The comparisons for design quality are somewhat interesting. Overall, the EDS reports are rated higher than the Macromedia reports. However, the only significant difference is between the Macromedia paper report presented to imagery-preferring subjects (MPI). The design quality rating for the MPI group is significantly lower than the other seven groups. It is interesting to note that the Macromedia paper report has the fewest number of photographs, graphs and color which suggests that presentation preference is only significant when the presentation media is in stark contrast to the preferred style.

The two measures of recall also produced statistically significant models. For free recall, subjects viewing/reading the Macromedia report remembered more than those reading/viewing the EDS report regardless of presentation media or presentation preference. For cued recall, subjects viewing/reading the EDS reports produced greater recall than those viewing/reading the Macromedia reports. Within the EDS report results, subjects receiving a presentation in a media contrary to their preferred media

Table 13
Experiment 1
Kruskal-Wallis ANOVAs

Dependent Variable	N	df	Chi-Square	p-value
Persuasion	54	7	14.640	0.041
Entertainment	54	7	9.486	0.220
Design Quality	54	7	12.698	0.080
Clarity	54	7	7.902	0.341
Information Content	54	7	8.034	0.330
Free Recall	53	7	29.066	0.000
Cued Recall	53	7	13.114	0.069

Table 14
Experiment 1
Multiple Comparisons Based on IDQ Preference Scores

Groups: MCV – Macromedia CD with a Verbal Preference ECV – EDS CD with a Verbal Preference
MCI – Macromedia CD with a Imagery Preference ECI – EDS CD with a Imagery Preference
MPV – Macromedia Paper with a Verbal Preference EPV – EDS Paper with a Verbal Preference
MPI – Macromedia Paper with a Imagery Preference EPI – EDS Paper with a Imagery Preference

	Persuasion			Design Quality			Free Recall			Cued Recall		
	Group 1 ^a Mean Rank	Group 2 ^a Mean Rank	Mean Rank Difference	Group 1 ^a Mean Rank	Group 2 ^a Mean Rank	Mean Rank Difference	Group 1 ^a Mean Rank	Group 2 ^a Mean Rank	Mean Rank Difference	Group 1 ^a Mean Rank	Group 2 ^a Mean Rank	Mean Rank Difference
MCV vs MCI	34.08	28.45	5.63	24.00	28.30	4.30	39.17	32.85	6.32	18.79	22.95	4.16
MCV vs MPV	34.08	23.17	10.91	24.00	35.00	11.00	39.17	23.67	15.50 *	18.79	27.67	8.88
MCV vs MPI	34.08	27.36	6.72	24.00	11.29	12.71	39.17	36.93	2.24	18.79	19.00	0.21
MCV vs ECV	34.08	15.44	18.64 **	24.00	29.56	5.56	39.17	14.78	24.39 ***	18.79	38.11	19.32 ***
MCV vs ECI	34.08	10.00	24.08 **	24.00	36.67	12.67	39.17	26.50	12.67	18.79	34.33	15.54
MCV vs EPV	34.08	39.00	4.92	24.00	32.25	8.25	39.17	14.25	24.92 ***	18.79	29.50	10.71
MCV vs EPI	34.08	34.25	0.17	24.00	37.50	13.50	39.17	10.00	29.17 ***	18.79	35.83	17.04 **
MCI vs MPV	28.45	23.17	5.28	28.30	35.00	6.70	32.85	23.67	9.18	22.95	27.67	4.72
MCI vs MPI	28.45	27.36	1.09	28.30	11.29	17.01 **	32.85	36.93	4.08	22.95	19.00	3.95
MCI vs ECV	28.45	15.44	13.01	28.30	29.56	1.26	32.85	14.78	18.07 ***	22.95	38.11	15.16 *
MCI vs ECI	28.45	10.00	18.45	28.30	36.67	8.37	32.85	26.50	6.35	22.95	34.33	11.38
MCI vs EPV	28.45	39.00	10.55	28.30	32.25	3.95	32.85	14.25	18.60 **	22.95	29.50	6.55
MCI vs EPI	28.45	34.25	5.80	28.30	37.50	9.20	32.85	10.00	22.85 ***	22.95	35.83	12.88
MPV vs MPI	23.17	27.36	4.19	35.00	11.29	23.71 *	23.67	36.93	13.26	27.67	19.00	8.67
MPV vs ECV	23.17	15.44	7.73	35.00	29.56	5.44	23.67	14.78	8.89	27.67	38.11	10.44
MPV vs ECI	23.17	10.00	13.17	35.00	36.67	1.67	23.67	26.50	2.83	27.67	34.33	6.66
MPV vs EPV	23.17	39.00	15.83	35.00	32.25	2.75	23.67	14.25	9.42	27.67	29.50	1.83
MPV vs EPI	23.17	34.25	11.08	35.00	37.50	2.50	23.67	10.00	13.67	27.67	35.83	8.16
MPI vs ECV	27.36	15.44	11.92	11.29	29.56	18.27 **	36.93	14.78	22.15 ***	19.00	38.11	19.11 **
MPI vs ECI	27.36	10.00	17.36	11.29	36.67	25.38 **	36.93	26.50	10.43	19.00	34.33	15.33
MPI vs EPV	27.36	39.00	11.64	11.29	32.25	20.96 *	36.93	14.25	22.68 ***	19.00	29.50	10.50
MPI vs EPI	27.36	34.25	6.89	11.29	37.50	26.21 ***	36.93	10.00	26.93 ***	19.00	35.83	16.83 *
ECV vs ECI	15.44	10.00	5.44	29.56	36.67	7.11	14.78	26.50	11.72	38.11	34.33	3.78
ECV vs EPV	15.44	39.00	23.56 **	29.56	32.25	2.69	14.78	14.25	0.53	38.11	29.50	8.61
ECV vs EPI	15.44	34.25	18.81 **	29.56	37.50	7.94	14.78	10.00	4.78	38.11	35.83	2.28
ECI vs EPV	10.00	39.00	29.00 **	36.67	32.25	4.42	26.50	14.25	12.25	34.33	29.50	4.83
ECI vs EPI	10.00	34.25	24.25 **	36.67	37.50	0.83	26.50	10.00	16.50	34.33	35.83	1.50
EPV vs EPI	39.00	34.25	4.75	32.25	37.50	5.25	14.25	10.00	4.25	29.50	35.83	6.33

^a Group 1 refers to the first group in the pairing while Group 2 refers to the second group in the pairing.

* Mean Rank Differences are statistically significant at the .10 level.

** Mean Rank Differences are statistically significant at the .05 level.

*** Mean Rank Differences are statistically significant at the .01 level.

Figure 7
Experiment 1
Analysis of Multiple Comparisons

Persuasion

EPV (39.00)	EPI (34.25)	MCV (34.08)	MCI (28.45)	MPI (27.36)	MPV (23.17)	ECV (15.44)	ECI (10.00)
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Design Quality

EPI (37.50)	ECI (36.67)	MPV (35.00)	EPV (32.25)	ECV (29.56)	MCI (28.30)	MCV (24.00)	MPI (11.29)
----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------

Free Recall

MCV (39.17)	MPI (36.93)	MCI (32.85)	ECI (26.50)	MPV (23.67)	ECV (14.78)	EPV (14.25)	EPI (10.00)
----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------

Cued Recall

ECV (38.11)	EPI (35.83)	ECI (34.33)	EPV (29.50)	MPV (27.67)	MCI (22.95)	MPI (19.00)	MCV (18.79)
----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------

actually remembered more than those receiving the presentation in their preferred media (although the differences were insignificant). However, for Macromedia, subjects receiving a media in agreement with their preferred style remembered more than those receiving a media in contrast to their preferred media.

Overall, media preference does not significantly affect the persuasion, satisfaction, or recall of non-expert report users.

Experiment 2

Experiment 2 is designed to evaluate the effect of video in an annual report. Additionally, experiment 2 also analyzes the behavioral implications of source gender used (male or female) and type of news communicated (“good news” or “bad news”) in an annual report. These factors are analyzed over the dependent constructs of persuasion, satisfaction, and recall. For each of these dependent constructs, there are multiple measures. Unlike experiment 1, experiment 2 does not use expert subjects and considers only video and text presentations.

Persuasion

As previously mentioned, attitude measures were gathered via a survey instrument that also contained questions regarding user satisfaction and source attractiveness. A factor analysis performed on user responses to the survey yielded eight factors (Table 7). Of the eight factors identified, two – overall attitude and financial wellbeing – measure user attitudes toward the company of interest. The variable overall attitude tends to measure subjects’ evaluation of the company as a whole while the variable financial wellbeing measures subjects’ evaluation of the company’s ability to maintain a strong financial position. These two measures are used to test hypotheses H₆ and H₇ and research questions RQ₃, RQ₆, RQ₇, RQ₈ and RQ₉ for the construct of attitude.

Hypothesis H₆ states that there is no difference in attitude between subjects receiving a video MD&A and those receiving a paper MD&A. Hypotheses H₇ postulates that there is no difference in subjects’ attitude due to the type of news conveyed in the

MD&A (i.e., “good news” or “bad news”). Research question RQ₃ inquires whether or not source gender has a persuasive effect in an annual report MD&A. The remaining research questions (RQ₆, RQ₇, RQ₈ and RQ₉) examine whether or not there are any two or three-way interaction effects of the experimental factors (media, source gender, news type).

Overall Attitude. An analysis of variance (ANOVA) using a full factorial model was used to examine the mean differences in attitude responses. Panel A of Table 15 contains the results of the ANOVA for the dependent variable overall attitude. The model is significant ($F=3.387$, $p=.002$). The results also indicate that presentation media ($F=5.120$, $p=.025$) and news type ($F=19.663$, $p<.001$) are significant sources of variation for the variable overall attitude. The results indicate that subjects receiving a video MD&A (mean = .169) had a more positive attitude toward Branco than subjects receiving a paper MD&A (mean = -.183). As anticipated, the group receiving “good news” (mean = .338) had a significantly higher attitude toward Branco than those receiving the “bad news” (mean = -.352).

Financial Wellbeing. Panel B of Table 15 provides results of the ANOVA for the dependent variable financial wellbeing. The model is significant ($F=4.737$, $p<.001$). As in overall attitude, the results indicate that presentation media ($F=5.022$, $p=.026$) and news type ($F=22.822$, $p<.001$) are significant sources of variation for financial wellbeing.

Table 15
Experiment 2
ANOVA of Attitude Scores

Panel A: Overall Attitude	SS	df	F	p-value
Corrected Model	21.663	7	3.387	0.002
Intercept	0.007	1	0.008	0.930
Presentation Media	4.679	1	5.120	0.025
Source Gender	0.114	1	0.125	0.724
News Type	17.967	1	19.663	0.000
Presentation Media x Source Gender	0.000	1	0.000	0.992
Presentation Media x News Type	0.372	1	0.407	0.524
Source Gender x News Type	0.345	1	0.378	0.539
Presentation Media x Source Gender x News Type	0.122	1	0.134	0.715
Residual	155.337	170		
Total	177.000	178		

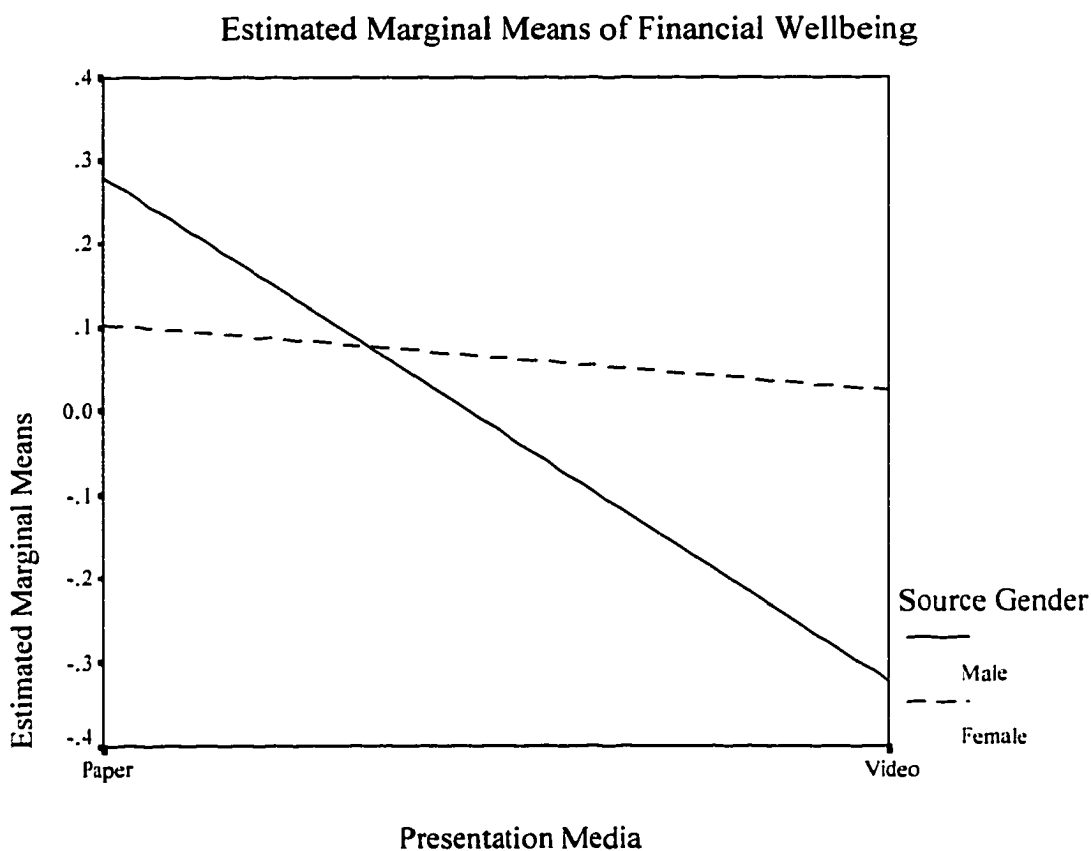
Panel B: Financial Wellbeing	SS	df	F	p-value
Corrected Model	28.887	7	4.737	0.000
Intercept	0.068	1	0.078	0.781
Presentation Media	4.376	1	5.022	0.026
Source Gender	0.276	1	0.317	0.574
News Type	19.884	1	22.822	0.000
Presentation Media x Source Gender	2.570	1	2.950	0.088
Presentation Media x News Type	0.008	1	0.009	0.924
Source Gender x News Type	0.063	1	0.072	0.789
Presentation Media x Source Gender x News Type	0.561	1	0.644	0.423
Residual	148.133	170		
Total	177.000	178		

An analysis of the means indicates that, overall, subjects receiving a paper MD&A (mean = .1915) evaluated the financial wellbeing of Branco higher than those receiving a video MD&A (mean = -.1492). Furthermore, subjects receiving an MD&A with “good news” (mean = .3843) rated Branco’s financial wellbeing significantly higher than those receiving an MD&A with “bad news” (mean = -.3419). The interaction of presentation media and source gender is also a statistically significant source of variation ($F=2.950$, $p=.088$) for financial wellbeing.

Figure 8 is a plot of the estimated marginal means of financial wellbeing for the two-way interaction of presentation media and source gender. It is evident from the figure that for the female level of source gender the effect of presentation media is slightly lower for video (mean = .02413) than for paper (mean = .1037). What is more evident in the figure is the significant effect that presentation media has on subjects’ evaluation of Branco’s financial wellbeing when the source gender is male. The mean response for subjects receiving a male source on video (mean = -.3225) was significantly less than those receiving a male source on paper (mean = .2793).

,

Figure 8
Experiment 2
Analysis of Interaction of Presentation Media and Source Gender
for Financial Wellbeing



The two attitude constructs provide mixed evidence in evaluating hypothesis H_6 . While both constructs favor the rejection of H_6 , the results are not consistent for the two attitude constructs. For the variable overall attitude, subjects evaluated the company higher when receiving a video MD&A. However, for the financial wellbeing variable,

subjects tended to rate the company lower when receiving a video MD&A. This is especially true for those subjects that received a male source. Based on the results, hypothesis H₆ is rejected in favor of video presentation in situations where attitude regarding the company in general is concerned. In situations relating to the company's financial wellbeing, the evidence indicates that hypothesis H₆ is rejected in favor of a paper MD&A presentation.

The results for both attitude constructs strongly indicate that news type ("good news" or "bad news") significantly affects subjects' attitude toward Branco. As expected, subjects receiving "good news" had a significantly higher perception of Branco than those receiving "bad news." Therefore, hypothesis H₇ is rejected for both measures of attitude/persuasion.

In answer to research question RQ₃, the results indicate that there is no persuasive effect of gender in an annual report MD&A. The two attitude constructs also provide mixed evidence when answering research question RQ₆. The overall attitude construct indicates that there is not a significant interaction between the presentation media and the source gender ($F < .001$, $p = .992$). Whereas the financial wellbeing construct indicates that there is a significant interaction between presentation media and source gender ($F = 2.950$, $p = .088$). Therefore, the answer to research question RQ₆ is that there exists an interaction between the presentation media and the source gender when subjects are evaluating the company's financial wellbeing but not when they are expressing their attitude about the company as a whole.

Both attitude constructs provide consistent and unequivocal evidence to evaluate research questions RQ₇, RQ₈, and RQ₉. The interaction of presentation media and news type is not significant for overall attitude ($F=.407$, $p=.524$) or financial wellbeing ($F=.009$, $p=.924$). Likewise, the interaction of source gender and news type is not significant for either of the constructs ($F=.378$ and $.072$, $p=.539$ and $.789$, respectively, for overall attitude and financial wellbeing). Finally, the three-way interaction of presentation media, source gender and news type is not statistically significant for overall attitude ($F=.134$, $p=.715$) or financial wellbeing ($F=.644$, $p=.423$). Therefore, the unequivocal answer to research questions RQ₇, RQ₈ and RQ₉ is “No.” Table 16 provides a summary of results for experiment 2.

Satisfaction

As shown in Table 7, there are six measures that comprise the satisfaction construct. The six factors are: information content, entertainment, source attractiveness¹⁶, report quality, believability, and clarity. These measures are used to test hypothesis H₈ and research questions RQ₄, RQ₅, RQ₆, RQ₇, RQ₈ and RQ₉. Hypothesis H₈ postulates that presentation media has no effect on user satisfaction. Research question RQ₄ inquires as to whether or not source gender affects user satisfaction. Likewise, research question RQ₅ seeks to determine whether or not “good news” affects report users’ satisfaction differently than “bad news.” The remaining research questions (RQ₆, RQ₇, RQ₈ and RQ₉) ask whether the two-way and three-way interactions

¹⁶ Source attractiveness may or may not be a true satisfaction measure. However, it is included here for ease of discussion.

Table 16
Experiment 2
Summary of Results

Dependent Variable	Hypotheses				Research Questions						
	H ₆	H ₇	H ₈	H ₉	RQ ₃	RQ ₄	RQ ₅	RQ ₆	RQ ₇	RQ ₈	RQ ₉
Persuasion:											
Overall Attitude	✓	✓									
Financial Wellbeing	✓	✓						✗			
Satisfaction:											
Information Content						✗	✗	✗	✗	✗	✗
Entertainment			✓					✗	✗	✗	
Source Attractiveness						✗*					
Report Quality			✓					✗			✗
Believability			✓					✗			
Clarity			✓*					✗*			
Recall:											
Free Recall				✓							✗
Cued Recall				✓							✗

✓ indicates that the hypothesis is rejected.

✗ indicates that the answer to the research question is "Yes"

* indicates that the overall model is not statistically significant.

significantly affect user satisfaction. Hypothesis H₈ and all research questions are evaluated for each of the six user satisfaction measures. All six measures are analyzed using a full factorial ANOVA model. The experimental factors used in the ANOVA model are presentation media, source gender, and news type.

Information Content. Information content represents subjects' evaluation of how informative the MD&A was. Since subjects had no prior information, it is anticipated that the MD&A is very informative. However, it is important to determine whether differences in information content exist due to the experimental treatment factors.

Table 17 contains the results for an ANOVA of the six satisfaction measures. For information content, the results indicate that the overall model is statistically significant ($F=23.310$, $p<.001$). The main effects of presentation gender ($F=13.465$, $p<.001$) and presentation news ($F=21.583$, $p<.001$) are statistically significant sources of variation in information content. Further analysis indicates that subjects rated a male presenter (mean = .4836) as giving more information than a female source (mean = .0481). With respect to presentation news, subjects viewed “good news” (mean = .5416) as having more information content than “bad news” (mean = -.0099).

The results also indicate that beyond the main effects of the experimental factors, the three two-way interactions are statistically significant. The interaction of presentation media and source gender ($F=5.842$, $p=.017$) is a statistically significant source of variation in information content. An analysis of the estimated marginal means reveals that subjects rated a male presenter on video (mean = .5312) the highest for delivering information. Next, a male paper presentation was rated second highest (mean = .4361) followed by a female paper presentation (mean = .2874) and finally a female video presentation (mean = -.2721). The preferences for the combination of source gender and media occur without regard to the type of news being presented.

The interaction of presentation media and news type is also a statistically significant source of variation in information content ($F=7.852$, $p=.006$). The estimated marginal means indicate that “good news” on video provides the greatest information content (mean = .6120) followed by “good news” presented on paper (mean = .4711) and

Table 17
Experiment 2
ANOVA of Satisfaction Scores

	df	Information Content			Entertainment		
		SS	F	p-value	SS	F	p-value
Corrected Model	7	86.686	23.310	0.000	24.078	3.824	0.001
Intercept	1	10.660	20.066	0.000	2.306	2.564	0.111
Presentation Media	1	1.386	2.609	0.108	5.402	6.005	0.015
Source Gender	1	7.153	13.465	0.000	0.125	0.139	0.709
News Type	1	11.466	21.583	0.000	0.022	0.024	0.877
Presentation Media x Source Gender	1	3.104	5.842	0.017	5.400	6.003	0.015
Presentation Media x News Type	1	4.172	7.852	0.006	2.665	2.962	0.087
Source Gender x News Type	1	4.278	8.053	0.005	4.588	5.101	0.025
Presentation Media x Source Gender x News Type	1	8.378	15.770	0.000	2.281	2.535	0.113
Residual	170	90.314			152.922		
Total	178	177.000			177.000		

	df	Source Attractiveness			Report Quality		
		SS	F	p-value	SS	F	p-value
Corrected Model	7	7.227	1.034	0.409	14.488	2.165	0.040
Intercept	1	0.232	0.232	0.630	0.024	0.025	0.874
Presentation Media	1	0.068	0.068	0.797	6.059	6.338	0.013
Source Gender	1	2.968	2.972	0.087	0.630	0.659	0.418
News Type	1	2.109	2.112	0.148	0.129	0.135	0.714
Presentation Media x Source Gender	1	0.864	0.865	0.354	3.632	3.799	0.053
Presentation Media x News Type	1	1.691	1.694	0.195	0.229	0.240	0.625
Source Gender x News Type	1	0.389	0.389	0.533	0.067	0.070	0.792
Presentation Media x Source Gender x News Type	1	0.555	0.555	0.457	2.930	3.065	0.082
Residual	170	169.773			162.512		
Total	178	177.000			177.000		

	df	Believability			Clarity		
		SS	F	p-value	SS	F	p-value
Corrected Model	7	14.860	2.226	0.034	9.874	1.435	0.194
Intercept	1	0.292	0.306	0.581	0.025	0.025	0.874
Presentation Media	1	3.827	4.012	0.047	3.185	3.240	0.074
Source Gender	1	0.837	0.878	0.350	0.108	0.110	0.740
News Type	1	5.376	5.636	0.019	2.827	2.875	0.092
Presentation Media x Source Gender	1	0.163	0.171	0.680	3.434	3.493	0.063
Presentation Media x News Type	1	1.771	1.857	0.175	0.972	0.988	3.220
Source Gender x News Type	1	0.001	0.001	0.979	0.024	0.024	0.876
Presentation Media x Source Gender x News Type	1	1.309	1.372	0.243	1.649	1.677	0.197
Residual	170	162.140			167.126		
Total	178	177.000			177.000		

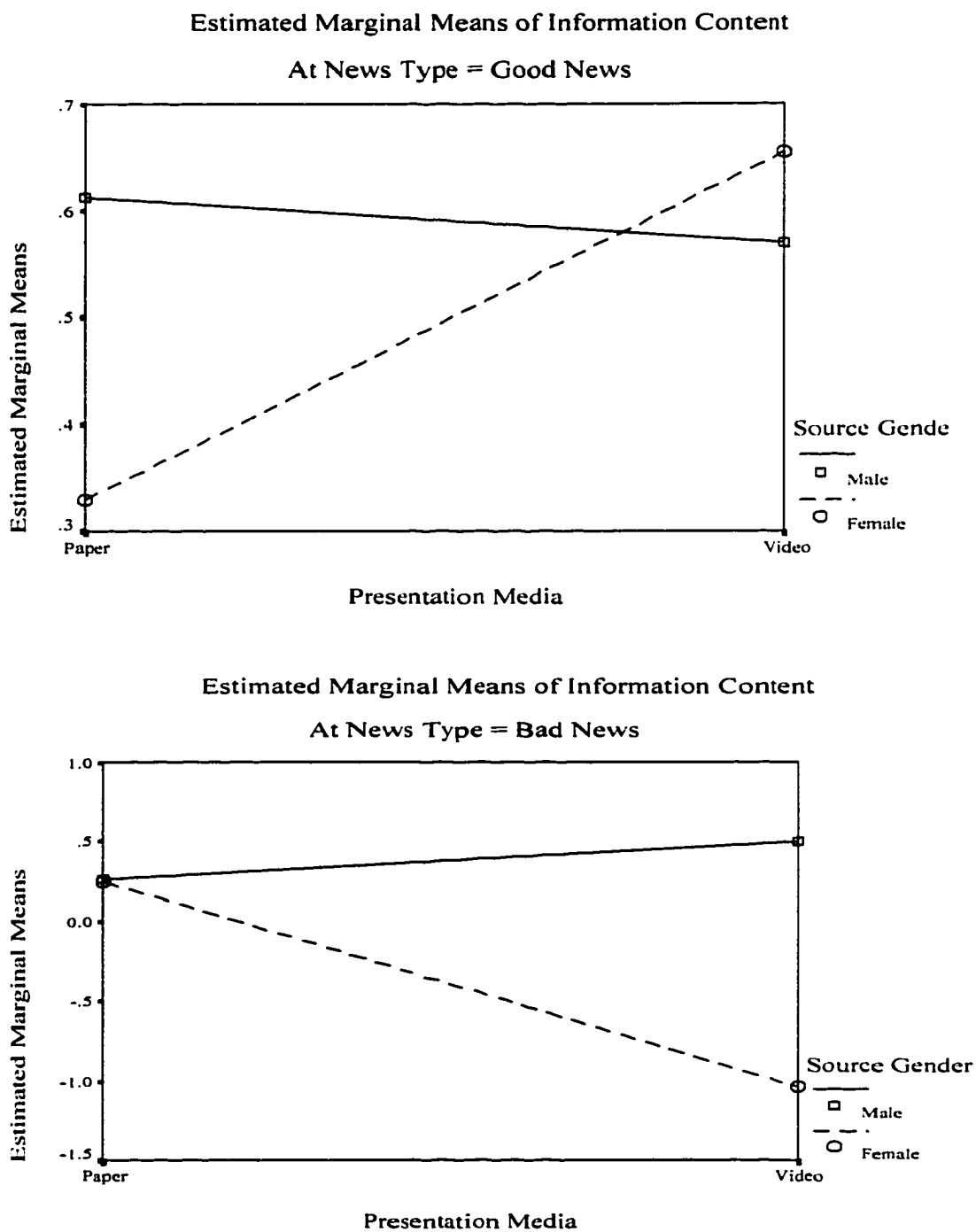
then “bad news” presented on paper (mean = .2523) and finally, “bad news” presented on video (mean = -.2721). These results are without regard to source gender presenting the news.

The third and final two-way interaction of source gender and news type is also statistically significant ($F=8.053$, $p=.005$). Further analysis indicates that highest rated presentation is for a male presenting “good news” (mean = .5910). The other three combinations in order of preference are: a female presenting “good news” (mean = .4922); a male presenting “bad news” (mean = .3763); and finally a female presenting “bad news” (mean = -.3961). The results of the interaction of source gender and news type are without regard to the type of media used to present the results.

Above and beyond the main effects of the experimental factors and the two-way interactions.

The highest order interaction (a three-way interaction of presentation media, source gender, and news type) is statistically significant ($F=15.770$, $p<.001$). Figure 9 depicts the relationship of the three experimental factors for information content. For the “good news” treatment there is very little difference in the mean information content scores when there is a male source regardless of presentation media. For a male source presenting “good news”, the scores are slightly higher for a paper presentation (mean = .6127) than for a video presentation (mean = .5692). However, for a female source presenting “good news” there is a significant difference between paper (mean = .3295) and video (mean = .6549) presentations.

Figure 9
Experiment 2
Analysis of Three-way Interaction for Information Content



There is only a slight difference in the mean score of a male source in the “bad news” treatment regardless of presentation media. However, unlike the “good news” treatment where the paper presentation was slightly higher, in the “bad news” treatment the video presentation (mean = .4933) is higher than the paper presentation (mean = .2594). For bad news, female presenters are scored significantly lower for information content when presenting on video (mean = -1.0374) than when presenting on paper (mean = .2453).

The results of the analysis for information content are very interesting. The results indicate that presentation media and source gender are important considerations when presenting a particular type of news. For “good news”, the preferred combination is a female source on video. The next best combination is a male source on paper, followed by a male on video and finally a female on paper. For “bad news” situations, the preferred combinations are (in preferred order): a male on video, a male on paper, a female on paper, and finally a female on video.

Entertainment. The results of the analysis of the satisfaction variable entertainment are presented in Table 17. The ANOVA model for entertainment is statistically significant ($F=3.824$, $p=.001$). The results also show that the main effect of presentation media ($F=6.005$, $p=.015$) and all two-way interactions are statistically significant sources of variation in the model. The means indicate that a paper MD&A (mean = .0656) is more entertaining than a video MD&A (mean = -.3129).

Figure 10 depicts the interaction of presentation media and source gender

($F=6.003$, $p=.015$). The results indicate that there is no statistically significant difference in mean entertainment scores for a female source regardless of media. The mean entertainment score for a female source presenting on paper is $-.0948$ while it is $-.0949$ on video. For a male source there is a significant difference in mean entertainment scores between paper (mean = $.2260$) and video (mean = $-.5310$). Without regard to news type, subjects viewed a male source on paper as the most entertaining, followed by a female source on either media and finally, they viewed a male source on video as the least entertaining.

The interaction of presentation media and news type was also a statistically significant source of variation ($F = 2.962$, $p=.087$). The interaction of presentation media and news type is depicted Figure 11. There is very little difference in mean entertainment scores for “bad news” regardless of media. The mean entertainment score for “bad news” presented on paper is $-.0554$ while it is slightly lower at $-.1680$ for video. For “good news,” however, there is a drastic difference between paper and video presentations. For “good news” presented via paper, the mean entertainment score is $.1866$ while it is significantly lower at $-.4578$ for a video presentation. These results indicate that for “good news” paper is more entertaining and both media are equally entertaining when presenting “bad news.”

Figure 10
Experiment 2
Analysis of Interaction of Presentation Media and Source Gender
for Entertainment

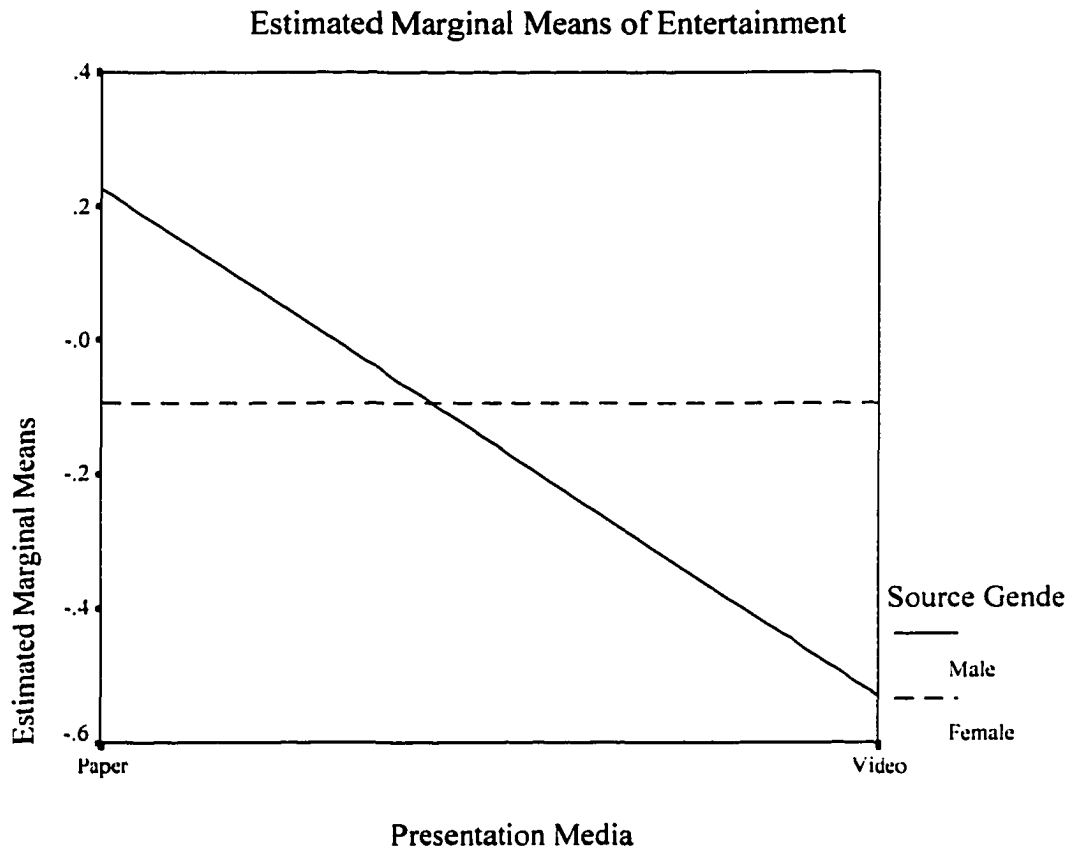


Figure 11
Experiment 2
Analysis of Interaction of Presentation Media and News Type
for Entertainment

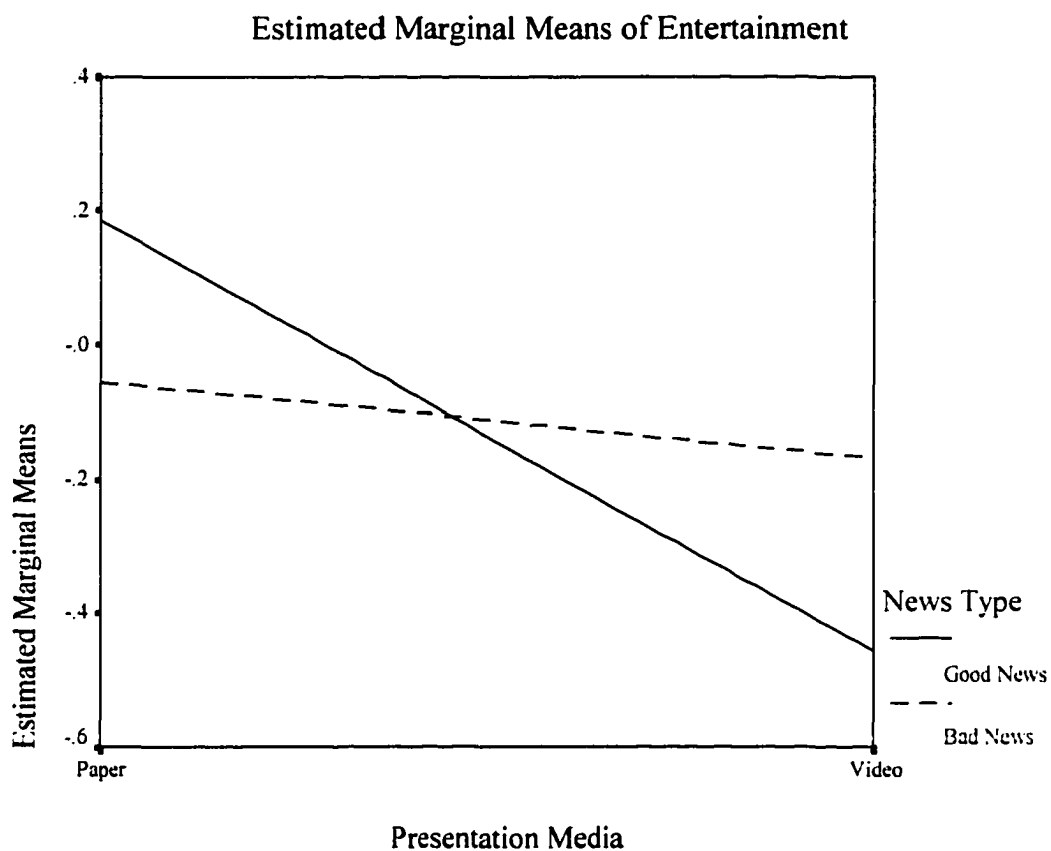
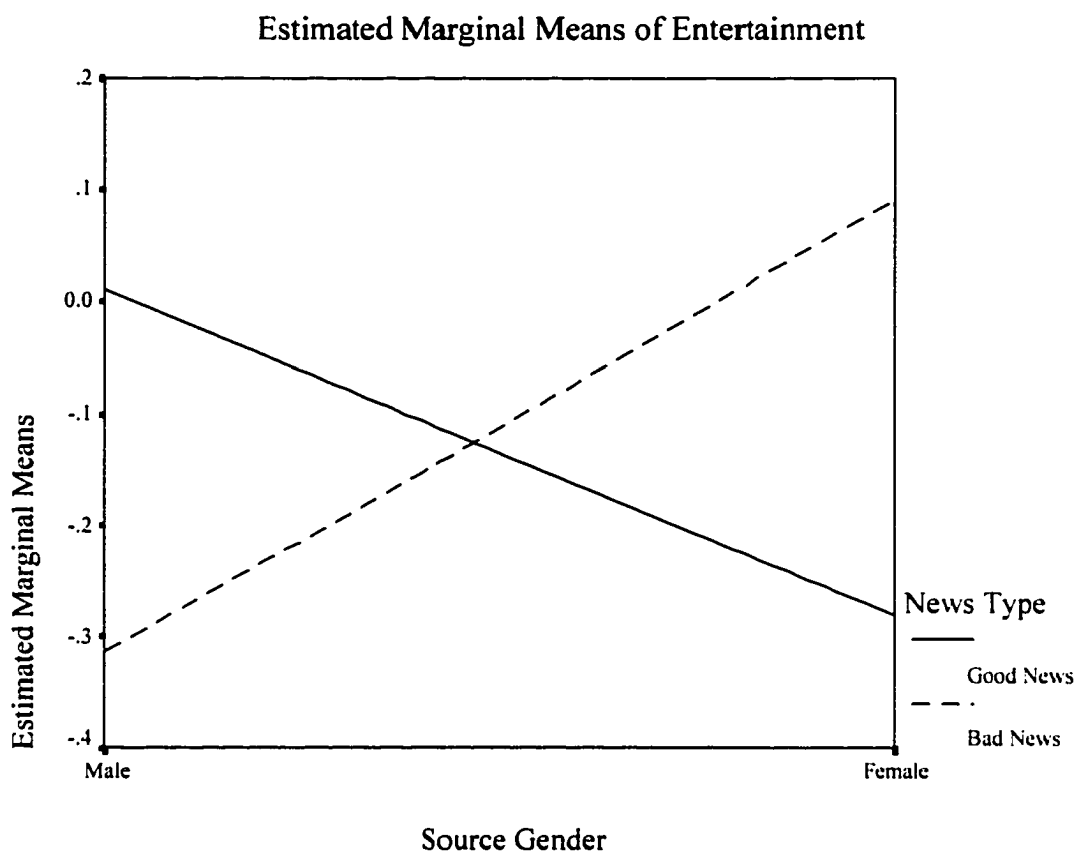


Figure 12
Experiment 2
Analysis of Interaction of Source Gender and News Type
for Entertainment



The third statistically significant interaction for entertainment is the interaction of source gender and news type ($F=5.101, p=.025$). The interaction is obvious in Figure 12. For “good news” the mean entertainment score is significantly higher for a male source (mean = .0100) than for a female source (mean = -.2812). In contrast, a female source is

more entertaining (mean = .0915) for “bad news” than a male source (mean = -.3150).

The interaction indicates that subjects found a male source most entertaining when “good news” was presented and found a female source more entertaining when “bad news” was presented.

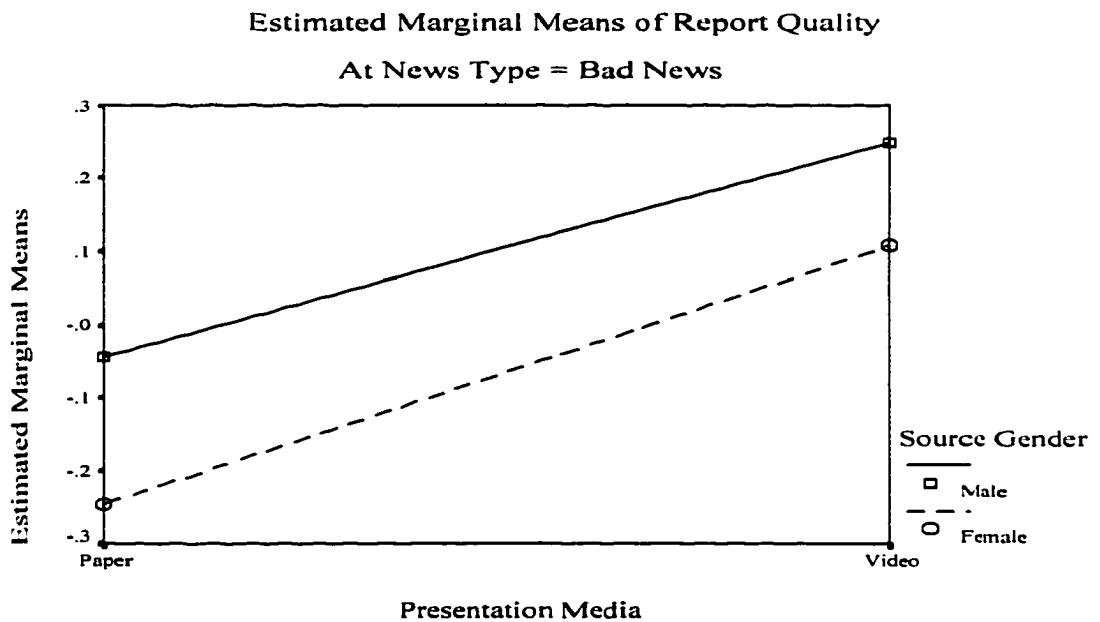
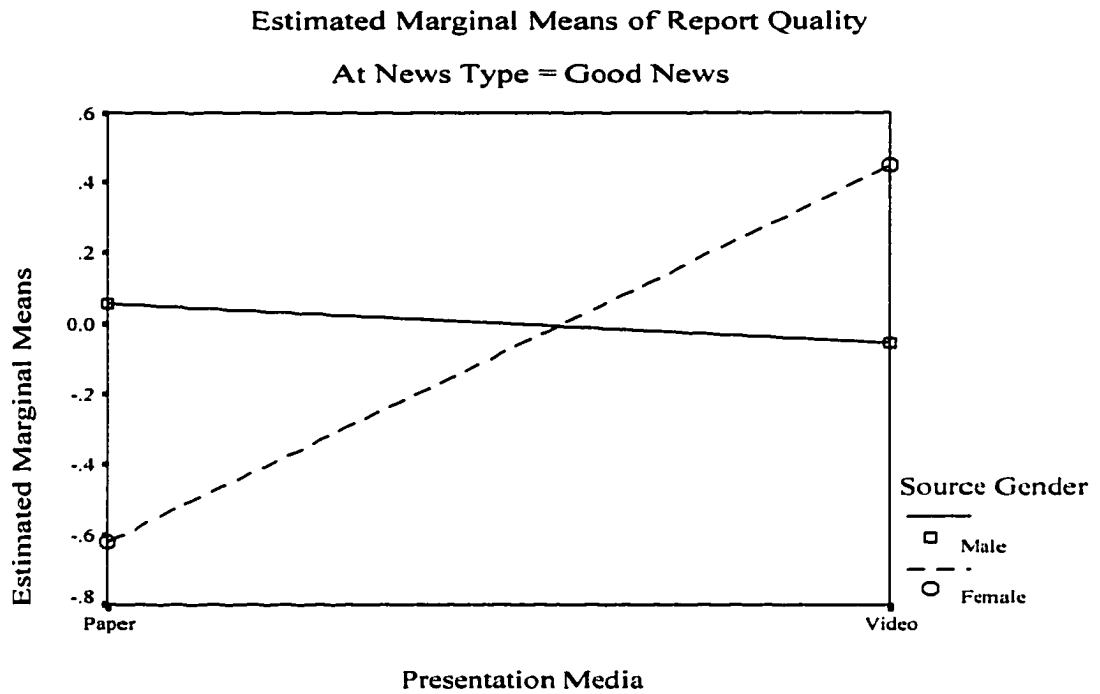
Source Attractiveness. Source Attractiveness measures subjects’ evaluation of how attractive the presenter is. The questions relating to source attractiveness are based on the questions developed by Ohanian (1990). Table 17 contains the statistical results of the analysis of Source Attractiveness. The ANOVA model for source attractiveness is not statistically significant ($F=1.034$, $p=.409$). Even though the overall model is not statistically significant, it is interesting to note that subjects’ did perceive that the female source was more attractive (mean = .1010) than the male source (mean = -.1795). To ensure that source attractiveness was not a significant source of variation in other models, source attractiveness was included in all other models as a covariate. The results indicate that source attractiveness had little effect on the variation in the models (p -values ranged from .343 for cued recall to .943 for report quality).

Report Quality. Consistent with Clements and Wolfe (1997), report quality is one of the satisfaction variables identified with the factor analysis (Table 7). The ANOVA model for report quality is statistically significant ($F=2.165$, $p=.040$). The results (Table 17) indicate the main effect of presentation media ($F=6.338$, $p=.013$) is a statistically significant source of variation in subjects’ evaluation of report quality. Further analysis indicates that, overall, subjects judged the video MD&A (mean = .1878) to be of higher quality than the paper MD&A (mean = -.2131).

Beyond the main effect of presentation media, the three-way interaction of presentation media, source gender, and news type is also a statistically significant source of variation for report quality ($F=3.065$, $p=.082$). The three-way interaction for report quality is depicted in Figure 13. For “good news”, there is a definite source gender preference between paper and video presentations. For a paper presentation, a male source (mean = .0568) is preferred over a female source (mean = -.6195). However, for a video presentation, a female source (mean = .4485) is preferred over a male source (mean = -.0534). For “good news” there is little difference in report quality scores between media for a male source (paper mean = .0568, video mean = -.0534). For a female source presenting “good news,” there is a significant preference for video (mean = .4485) over paper (mean = -.6195).

Figure 13 indicates that for “bad news” there is a definite preference for video regardless of source gender. The results also indicate that there is a preference for a male source regardless of media when presenting “bad news.” In “bad news” situations, the preferred combination of presentation media and source gender is a male source on video (mean = .2479) followed by a female source on video (mean = .1082), then a male source on paper (mean = -.0434), and finally a female source on paper (mean = -.2463).

Figure 13
Experiment 2
Analysis of the Three-way Interaction for Report Quality



Believability. The believability of the MD&A information is another variable comprising the satisfaction construct. Table 17 presents the results for the ANOVA of believability. The overall ANOVA model is statistically significant ($F=2.226$, $p=.034$). The main effects of presentation media ($F=4.012$, $p=.047$) and news type ($F=5.636$, $p=.019$) are statistically significant sources of variation for believability. An analysis of the marginal means reveals that subjects believed a video presentation (mean = .1153) over a paper presentation (mean = -.2033). Furthermore, subjects also tended to believe “bad news” (mean = .1448) to a greater extent than “good news” (mean = -.2328).

Clarity. The final variable comprising the satisfaction construct is clarity. While the main effects of presentation media ($F=3.240$, $p=.074$) and news type ($F=2.875$, $p=.092$) and the interaction of presentation media and source gender ($F=3.493$, $p=.063$) are statistically significant sources of variation, the overall model is not statistically significant ($F=1.435$, $p=.194$).

The six variables comprising the satisfaction construct provide equivocal evidence relating to hypothesis H_8 and research questions RQ_4 , RQ_5 , RQ_6 , RQ_7 , RQ_8 and RQ_9 . As previously mentioned, Table 16 summarizes the results of experiment 2. With regard to satisfaction, hypothesis H_8 (i.e., media affects satisfaction) is rejected for three of the measures – entertainment, report quality, and believability. The only satisfaction measure where the main effect of source gender (RQ_4) is statistically significant is information content. The main effect of news type (RQ_5) was statistically significant for two of the satisfaction measures – information content and believability (also clarity, but the model is statistically insignificant). The interaction of presentation media and source

gender (RQ₆) was a statistically significant source of variation for information content, entertainment, and report quality. The interaction of presentation media and news type (RQ₇) was a statistically significant source of variation for information content and entertainment. The interaction of source gender and news type (RQ₈) was a statistically significant source of variation for information content and entertainment. The three-way interaction of presentation media, source gender, and news type (RQ₉) is a statistically significant source of variation for information content and report quality.

Recall

Hypothesis H₉ states that there is no difference in recall due to a difference in presentation media. As previously mentioned, research questions RQ₆, RQ₇, RQ₈ and RQ₉ evaluate the two-way and three-way interaction effects of media, gender, and news type. There are two recall measures: free recall and cued recall. Free recall scores are the sum of discrete responses (i.e., duplicates were eliminated) by subjects when asked to list information recalled from the MD&A. The cued recall measure represents the number of correct responses to specific questions regarding the MD&A.

Free Recall. Panel A of Table 18 contains the results of the analysis of free recall. The ANOVA model for free recall is statistically significant ($F=13.221, p<.001$). Two main effects and the three-way interaction are identified as statistically significant sources of variation in free recall. The main effect of presentation media is a statistically significant source of variation ($F=83.492, p<.001$) in free recall. An analysis of means indicates that subjects in the paper MD&A treatment recalled substantially more items (mean = 10.37) than subjects in the video treatment (mean = 5.53). The results indicate

that the superiority of paper for recall is present regardless of source gender and news type.

The second main effect identified as statistically significant is source gender ($F=3.499$, $p=.063$). Free recall is greater for subjects receiving a female source (mean = 8.45) than for subjects receiving a male source (mean = 7.46). The statistically significant main effect indicates that the relationship of source gender and free recall is present regardless of presentation media and news type.

The analysis of the statistically significant three-way interaction ($F=4.546$, $p=.034$) provides additional insight into the relationship of the three experimental factors and free recall. The three-way interaction is shown in Figure 14. For “good news” situations, subjects receiving a female source were able to recall more information than subjects receiving a male source were, regardless of media. For paper presentations of “good news”, scores for subjects receiving a female source (mean = 11.21) were almost 2.5 items higher than scores for subjects receiving a male source (mean = 8.76). However, for video presentations of good news, the free recall scores of subjects receiving a female source (mean = 5.26) were only slightly higher than scores for subjects receiving a male source (mean = 5.07).

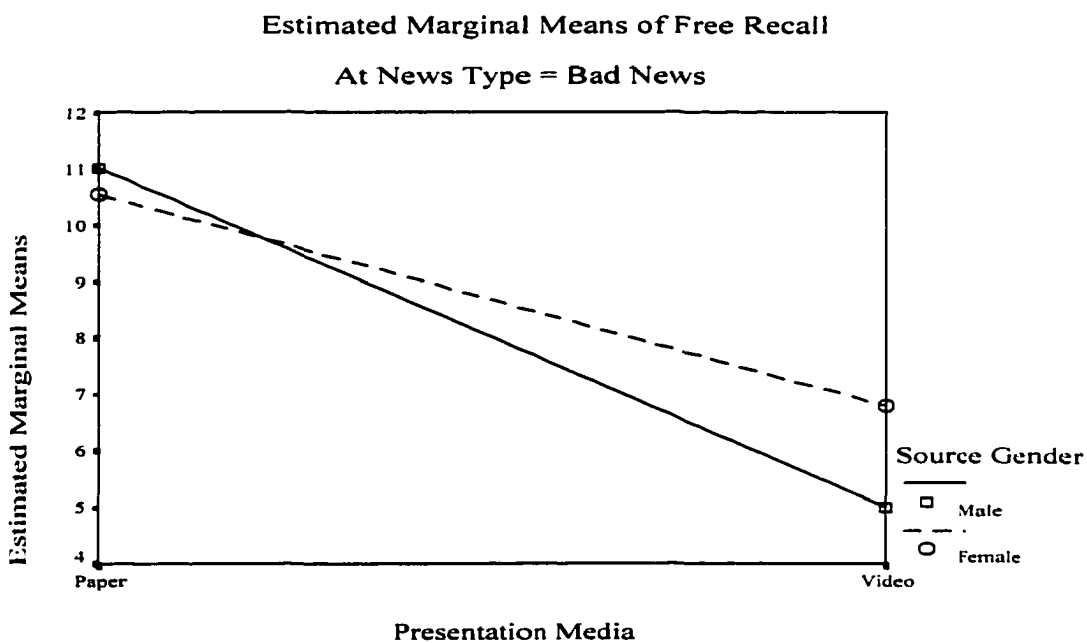
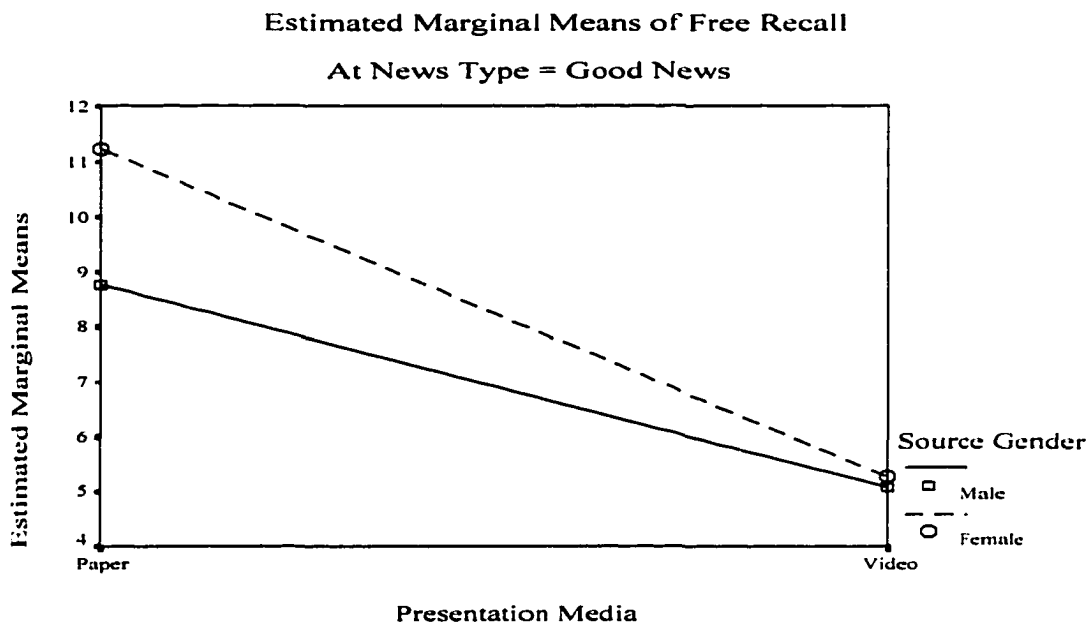
In the “bad news” treatment, male sources provide higher free recall scores when paper is used and female sources provide higher scores when video is used. While subjects receiving a male source on paper (mean = 11.0) scored higher than subjects receiving a female source (mean = 10.53), the difference was slight. When video was

Table 18
Experiment 2
ANOVA of Recall Scores

Panel A: Free Recall	SS	df	F	p-value
Corrected Model	1008.982	7	13.221	0.000
Intercept	9819.797	1	900.719	0.000
Presentation Media	910.243	1	83.492	0.000
Source Gender	38.149	1	3.499	0.063
News Type	22.163	1	2.033	0.156
Presentation Media x Source Gender	0.001	1	0.000	0.992
Presentation Media x News Type	0.019	1	0.002	0.966
Source Gender x News Type	4.229	1	0.388	0.534
Presentation Media x Source Gender x News Type	49.561	1	4.546	0.034
Residual	1907.882	175		
Total	14549.000	183		

Panel B: Cued Recall	SS	df	F	p-value
Corrected Model	337.465	7	4.830	0.000
Intercept	21360.426	1	2139.844	0.000
Presentation Media	243.395	1	24.383	0.000
Source Gender	9.429	1	0.945	0.332
News Type	9.160	1	0.918	0.339
Presentation Media x Source Gender	14.787	1	1.481	0.225
Presentation Media x News Type	20.967	1	2.100	0.149
Source Gender x News Type	4.826	1	0.484	0.488
Presentation Media x Source Gender x News Type	55.949	1	5.605	0.019
Residual	1736.909	174		
Total	27190.000	182		

Figure 14
Experiment 2
Analysis of Three-way Interaction for Free Recall



used to present “bad news”, subjects in the female source treatment (mean = 6.80) remembered more information than subjects in the male source treatment did (mean = 5.00).

Cued Recall. The second recall measure is cued recall. Panel B of Table 18 presents the analytical results of cued recall. The ANOVA model for cued recall is statistically significant ($F=4.830$, $p<.001$). The results indicate that presentation media is a statistically significant source of variation ($F=24.383$, $p<.001$) for cued recall. An analysis of the marginal means indicates that subjects receiving a paper MD&A (mean = 13.03) were able to correctly answer 2.5 more questions than those receiving a video MD&A (mean = 10.52). The presence of a significant main effect for presentation media indicates that paper media produces greater recall regardless of source gender and news type.

Panel B of Table 18 also indicates that there is a statistically significant three-way interaction. The presence of the statistically significant three-way interaction indicates that there are differential recall effects when considering all three factors simultaneously. Figure 15 depicts the statistically significant three-way interaction for cued recall. For good news, a female source engenders greater recall than a male source regardless of media and recall is greater for paper regardless of source gender. On paper, subjects receiving a male source (mean = 14.00) recalled more information than subjects receiving a female source (mean = 12.32). However, when receiving video subjects recalled more information with a female source (mean = 10.89) than subjects receiving a male source (mean = 8.92).

Figure 15
Experiment 2
Analysis of Three-way Interaction for Cued Recall

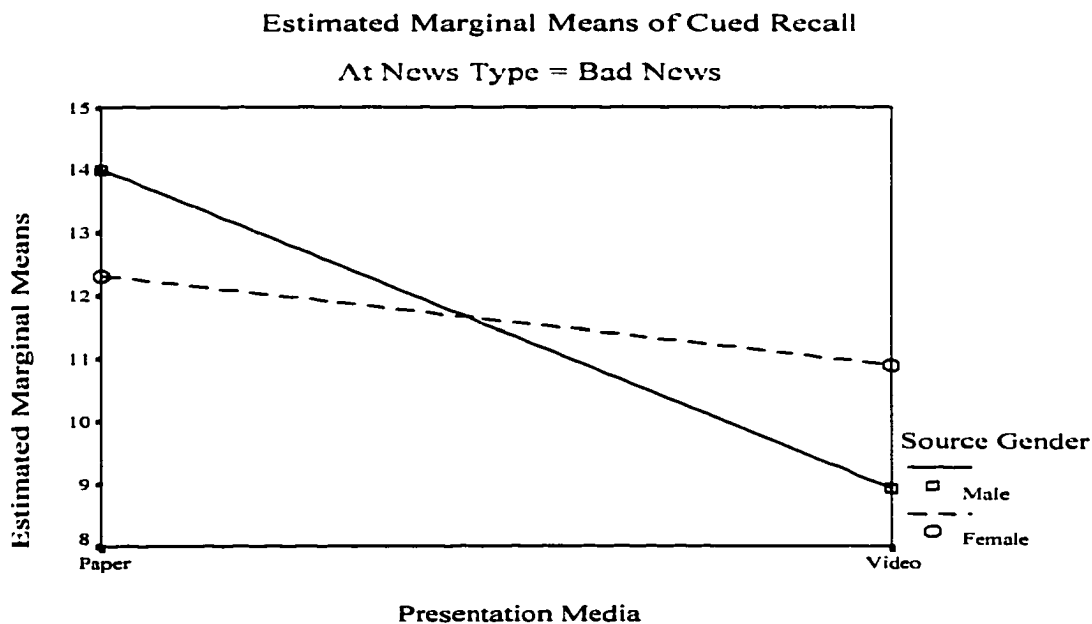
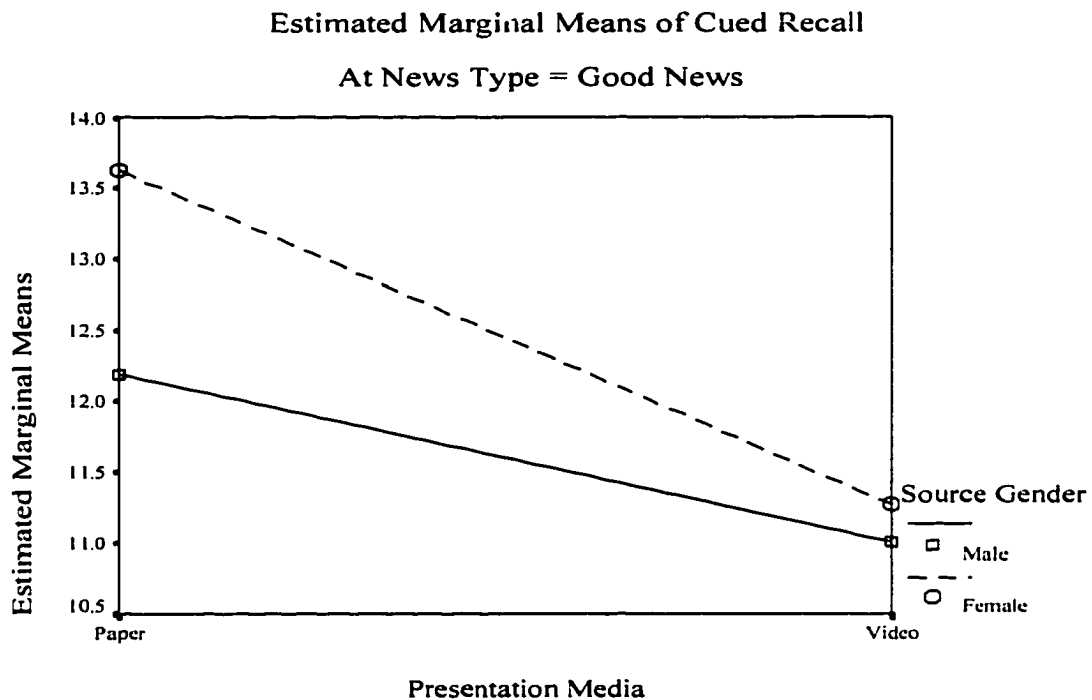
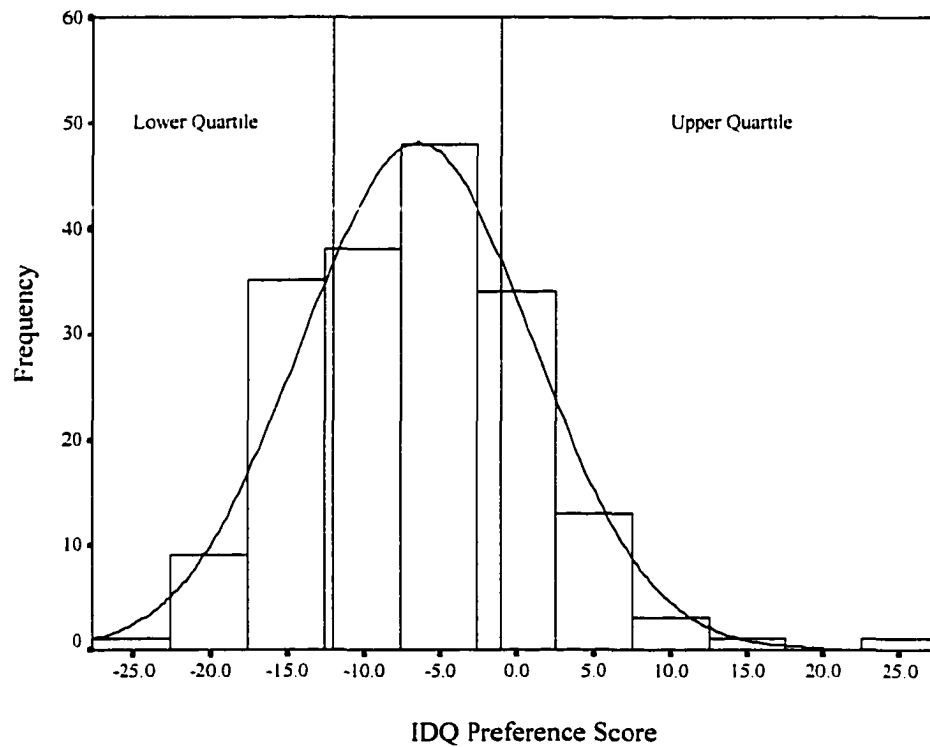


Table 19
Experiment 2
IDQ Preference Scores

Panel A: Descriptive Statistics

Treatment Group	N	Mean	Standard Deviation	Median	Minimum	Maximum
Overall						
IDQ Preference Score	183	-6.481	7.570	-7.0	-26	25
Upper Quartile	47	3.128	4.475	2.0	-1	25
Lower Quartile	52	-15.442	2.838	-15.0	-26	-12
Paper						
IDQ Preference Score	82	-6.890	7.997	-7.0	-20	25
Upper Quartile	18	4.111	5.880	2.0	0	25
Lower Quartile	27	-15.482	2.486	-15.0	-20	-12
Video						
IDQ Preference Score	101	-6.149	7.228	-7.0	-26	13
Upper Quartile	29	2.517	3.302	2.0	-1	13
Lower Quartile	25	-15.400	3.228	-14.0	-26	-12

Panel B: IDQ Preference Score Distribution



Overall, the two recall constructs provide significant evidence as to the primacy of print. For both measures the main effect of presentation media was statistically significant and indicates that subjects recall more information from a paper presentation than from a video presentation of the same information. Therefore, hypothesis H₉ is rejected. As anticipated, the recall results favor a paper presentation over a video presentation. For both recall measures, the results indicate that none of the two-way interactions are statistically significant (RQ₆, RQ₇, and RQ₈), and that there is a statistically significant three-way interaction for both measures of recall (RQ₉).

Presentation Preference

As previously mentioned, any study involving presentation media should also consider a subject's presentation preference. As in experiment 1, subjects completed an IDQ prior to participating in the experiment. Table 19 presents descriptive information regarding the IDQ preference scores for experiment 2. The upper and lower quartiles of the IDQ distribution were used since presentation preference should influence the results only at extreme levels. Only the interactions of the presentation media and subjects' media preference are analyzed. Theoretically, there is no evidence to suggest that media preference should interact with source gender and/or news type. Therefore, source gender and news type are excluded from the analysis.

Table 20
Experiment 2
Kruskal-Wallis ANOVA Based on IDQ Preference Scores

Groups:				
IV	= High Imagery x Video			
IP	= High Imagery x Paper			
VV	= High Verbal x Video			
VP	= High Verbal x Paper			
Panel A: Kruskal-Wallis ANOVA				
Dependent Variable	N	df	Chi-Square	p-value
Entertainment	96	3	1.049	0.789
Attitude	96	3	0.981	0.806
Information Content:	96	3	10.812	0.013
Source Attractiveness	96	3	1.783	0.619
Report Quality	96	3	3.960	0.266
Financial Wellbeing	96	3	6.924	0.074
Believability	96	3	6.070	0.108
Clarity	96	3	0.492	0.921
Free Recall	99	3	36.058	0.000
Cued Recall	98	3	12.467	0.006
Panel B: Multiple Comparisons				
	Group 1 ^a	Group 2 ^a	Mean Rank	
	Mean Rank	Mean Rank	Difference	
<i>Information Content:</i>				
IV vs IP	45.36	58.84	13.48	
IV vs VV	45.36	36.79	8.57	
IV vs VP	45.36	57.88	12.52	
IP vs VV	58.84	36.79	22.05	***
IP vs VP	58.84	57.88	0.96	
VV vs VP	36.79	57.88	21.09	**
<i>Financial Wellbeing:</i>				
IV vs IP	39.80	52.00	12.20	
IV vs VV	39.80	45.34	5.54	
IV vs VP	39.80	61.53	21.73	**
IP vs VV	52.00	45.34	6.66	
IP vs VP	52.00	61.53	9.53	
VV vs VP	45.34	61.53	16.19	
<i>Free Recall:</i>				
IV vs IP	27.88	64.09	36.21	***
IV vs VV	27.88	41.57	13.69	
IV vs VP	27.88	73.22	45.34	***
IP vs VV	64.09	41.57	22.52	***
IP vs VP	64.09	73.22	9.13	
VV vs VP	41.57	73.22	31.65	***
<i>Cued Recall:</i>				
IV vs IP	36.72	52.78	16.06	*
IV vs VV	36.72	47.03	10.31	
IV vs VP	36.72	67.29	30.57	***
IP vs VV	52.78	47.03	5.75	
IP vs VP	52.78	67.29	14.51	
VV vs VP	47.03	67.29	20.26	**

^aGroup 1 refers to the first group in the pairing while Group 2 refers to the second group.

* Mean Rank Differences are statistically significant at the .10 level.

** Mean Rank Differences are statistically significant at the .05 level.

*** Mean Rank Differences are statistically significant at the .01 level.

Panel A of Table 20 presents the results of the nonparametric Kruskal-Wallis ANOVAs. As the results indicate, four of the models – information content ($\chi^2=10.812$, $p=.013$), financial wellbeing ($\chi^2=6.924$, $p=.074$), free recall ($\chi^2=36.058$, $p<.001$), and cued recall ($\chi^2=12.467$, $p=.006$) were statistically significant.

To ascertain the significant differences for each model, a multiple comparison was performed for each of the four significant models. Panel B of Table 20 presents the results of the multiple comparisons. Graphically, Figure 16 also presents the results of the multiple comparisons.

As shown, in all models, a paper presentation outperforms a video presentation regardless of presentation preference. For the models related to financial wellbeing, free recall and cued recall, the pattern is the same – a paper presentation to a verbal-preferring subject is the highest ranked followed by a paper presentation to a imagery-preferring subject. The next highest rated combination is a video presentation to a verbal-preferring subject followed by a video presentation to a imagery-preferring subject. Theoretically, presentations corresponding to an individual's preference should produce higher measures of satisfaction, persuasion, and recall than presentations in conflict with an individual's preference. The results show that IP treatment (i.e., the presentation disagrees with the preference) always produces higher ratings than IV treatment (i.e., the presentation agrees with the preference). The results of the multiple comparisons indicate that there is no interaction of presentation media with a subject's media preference.

Figure 16
Experiment 2
Analysis of Multiple Comparisons

Information Content:			
IP (58.84)	VP (57.88)	IV (45.36)	VV (36.79)
<hr/>			
Financial Wellbeing:			
VP (61.53)	IP (52.00)	VV (45.34)	IV (39.80)
<hr/>			
Free Recall:			
VP (73.22)	IP (64.09)	VV (41.57)	IV (27.88)
<hr/>			
Cued Recall:			
VP (67.29)	IP (52.78)	VV (47.03)	IV (36.72)
<hr/>			

CHAPTER VI

DISCUSSION AND CONCLUSION

Annual reports have changed radically from a bland legalistic document to a vibrant high-tech multimedia presentation designed to influence investors and consumers. While annual reports have changed over the past 30 years, accounting research has largely ignored the effect of these changes on report users. Given the significant economic resources dedicated to the preparation of an annual report, it is essential that companies begin to understand the effects of annual report attributes. Heeding Hopwood's (1996) call for accounting research in this area, this research represents a significant addition to the extant accounting literature.

Experiment 1

Experiment 1 extends relevant accounting literature in two ways. First, subjects used in the experiment consisted of expert report users and non-expert report users. Second, two companies were used to see if differences due to experimental factors (media and expertise) were consistent across both companies. In addition, experiment 1 replicates many aspects of Clements and Wolfe (1997) and evaluates their findings.

Expert vs. Non-expert Report Users

The results for experiment 1 indicate experts and non-experts are affected by annual report attributes differently. Specifically, non-expert subjects are influenced significantly more by the annual reports than expert subjects and judged the design

quality of the annual reports more highly than did expert users. Finally, non-expert users recalled less than expert users did on a free recall basis. However, there was no difference in recall of information between expert and non-expert users on a cued recall basis.

One of the most interesting findings from experiment 1 is that non-expert report users were more persuaded by the annual report than expert report users. As the HSM and ELM theories of persuasion suggest, peripheral cues contained in annual reports should influence non-expert users more than they influence expert users. This influence occurs regardless of the company or the media type.¹⁷ These results indicate that non-expert users followed the peripheral (a.k.a. heuristic processing) route to persuasion while expert users followed the central (a.k.a. systematic processing) route to persuasion.

Satisfaction was analyzed using four dependent measures – entertainment, design quality, clarity, and information content. Of the four measures, only design quality produced a statistically significant model. Overall, the results indicate that non-experts judged the quality of the annual reports higher than experts did. This finding could be the result of the naiveté of non-expert users. Expert users have seen many annual reports and have a better background to judge annual reports. On the other hand, non-expert users have seen fewer annual reports and are more impressed with the “slick and glossy” nature of the annual reports.

¹⁷ Both multimedia and paper annual reports contain peripheral cues. While not containing the same type of cues, paper annual reports contain a significant number of peripheral cues.

Subject recall was analyzed with two constructs: free recall and cued recall. The models for both measures of recall produced statistically significant results. For free recall, expert subjects were able to recall more information than non-experts. Expert users have a well-developed schema for storing information in long-term memory. On the other hand, non-experts must process an annual report's financial information in a bounded working memory that can manage only a limited number of items simultaneously (Baddeley 1992; Simon and Gilmarin 1973; Sweller and Cooper 1985). The experimental results support the fact that expert report users are able to process, store, and retrieve significantly more information than non-expert report users on a free recall basis.

On a cued-recall basis, expert and non-expert report users did not differ in their observed ability to recall information. This finding, coupled with the results from free recall, suggests that expert users recall information with or without the aid of cues. However, non-expert subjects require cues to recall information to the same extent as experts. The cues that are given to non-expert users may act as a schema which allows them to recall information at a level equal to non-expert users.

EDS vs. Macromedia

The results indicate that the experimental factor of company is a significant source of variation for persuasion, design quality and recall. The company variable captures all differences in the information communicated by the respective annual reports (EDS or Macromedia). The significance of the company variable indicates that differences between companies, or the amount, type, or quality of the information

communicated in the annual report differed between EDS and Macromedia. The interactions of the two experimental factors with company provide the greatest insight. In essence, the company interactions indicate that the experimental factors have differing effects between the two companies.

While the main effects of company are significant for all of the dependent variables, the interaction effects are less common. Significant interactions were found for persuasion (three-way) and free recall (company x expert). For persuasion, the ELM and HSM theories suggest that expert users should be equally persuaded by the two report forms (paper and multimedia) regardless of company while non-expert users may be influenced to a greater extent by either media depending on the quantity and strength of additional peripheral cues.

The information communicated in an annual report is very complex and technical in nature and imposes a substantial cognitive load on the user (Cooper et al. 1994). Chaiken and Eagly (1976) found that highly technical information, such as that found in a typical annual report, produced greater persuasion when communicated with written text. Therefore, for non-expert users it is logical that the EDS paper annual report is more persuasive than the EDS multimedia annual report. However, there is no persuasive difference for the Macromedia reports for non-expert users. An analysis of the Macromedia multimedia report reveals that it is very similar in nature to the paper report with a substantial amount of text. Therefore, it is reasonable that there are no persuasive differences in the Macromedia reports for non-experts.

As expected, for expert users there is no difference in persuasion for the EDS reports. However, for the Macromedia reports, experts are more influenced by the paper report than by the multimedia report. The Macromedia multimedia annual report has a negative effect on expert users. In other words, the Macromedia multimedia report did not allow the experts to follow the central route to persuasion. However, it is not obvious why this occurred.

There is also an interaction of expert with company for free recall. Experts were equally adept at recalling information from the EDS report as from the Macromedia annual report. As previously mentioned, experts have a well-developed schema that allows them to store information in long-term memory rather than working memory. Therefore, free recall of information by experts should be consistent across all companies. However, non-experts lack a well-developed schema and therefore must process and store all information in working memory. While not tested, the Macromedia report may present information in a manner that more closely matches the non-experts' rudimentary schema than the EDS report does. Therefore, the Macromedia report allows non-experts to store significantly more information in working memory than the EDS report does.

Other Findings

There are two other important findings from experiment 1. Unlike Clements and Wolfe (1997), the results show that paper annual reports are more persuasive than multimedia annual reports, regardless of the company (EDS or Macromedia) or type of subject (expert or non-expert). This finding is contrary to most theoretical expectations

laid out in the ELM (Petty and Caccioppo 1986a, 1986b) and HSM (Chaiken 1980; Eagly and Chaiken 1993) models of persuasion. Given the fact that individuals are cognitive misers and non-expert users lack a well-developed schema, non-expert users should follow the peripheral route to persuasion and be influenced more by the multimedia report. Experts, on the other hand, have a well-developed schema and should be equally persuaded by the paper and multimedia reports.

A probable explanation for these results is the type of information communicated in a typical annual report. The information communicated in an annual report is very complex and technical in nature and imposes a substantial cognitive load on the user (Cooper et al. 1994). As previously mentioned, Chaiken and Eagly (1976) found that highly technical information, such as that found in an annual report, produced greater persuasion when communicated with written text. Therefore, it is logical that paper annual reports are more persuasive than multimedia annual reports.

Another finding contrary to Clements and Wolfe (1997) is the primacy of multimedia for cued recall. Subjects were able to recall more information from a multimedia annual report than from a paper annual report. This finding is contrary to findings by Clements and Wolfe (1997) in their study of annual report media. In their study they did observe that video produced higher recall than text did, but not at a statistically significant level.

There is, however, theoretical support for primacy of multimedia. Evidence exists that working memory has separate processing streams for auditory and visual information (Penney 1989), and tapping the multiple processing streams can actually

increase working memory (Frick 1984; Martin 1980). The utilization of both processing channels allows individuals to store significantly more information in working memory. If only one processing stream is used, the working memory available for the other processing stream remains unused. Therefore, subjects in the multimedia treatment are able to store and recall more information than subjects in the paper treatment.

Finally, the fact that the results differed for free recall and cued recall also proves to be interesting. It is interesting to note that media was not a significant factor for free recall. The difference could result from the fact that subjects did recall more from the paper report, but the information they recalled was not questioned on the cued recall instrument. In other words, free recall allows an individual's schema to work while cued recall imposes a schema upon the user. If the schemas coincide, the results could be enhanced for cued recall. However, if the schemas (i.e., the user's schema and the schema imposed for cued recall) conflict, the results of cued recall will be worse than the results of free recall.

Interestingly, experts did not maintain their recall advantage for cued recall. For free recall experts enjoyed a significant recall advantage. Several factors could be at work to reduce the superiority of experts' cued recall. First, the cued recall imposed schema may not coincide with the experts' schema (or it may coincide with non-experts' schema; see discussion above). Second, there could be a distraction effect causing the results, since free recall was completed immediately after administration of the experiment and cued recall was the last completed document.

Overall the results of experiment 1 provide significant new evidence in understanding media's effect on expert and non-expert annual report users.

Experiment 2

Experiment 2 is designed to analyze the effects of media (video or paper) in a section of the annual report, source gender (male or female), and type of news (good news or bad news) on the dependent variables of attitude, satisfaction and recall. In addition, all interaction effects are investigated across the aforementioned constructs.

Presentation Media

Presentation media was significant for both persuasion measures (i.e., overall attitude and financial wellbeing). While a video MD&A produces higher ratings for overall attitude, a paper MD&A produces higher ratings for financial wellbeing. These results indicate that video may be more persuasive when a general attitude about the company is formed. However, a paper report may be more persuasive when developing attitudes about complex ideas such as the financial wellbeing of the company (Chaiken and Eagly 1976).

The results for satisfaction yielded four statistically significant models. Of the four significant models, presentation media was a significant factor in three of the models – entertainment, report quality, and believability.

Unlike previous findings (e.g., Clements and Wolfe 1997; Butler and Mautz 1996; Ottinger 1993) subjects found a paper MD&A presentation more entertaining than a video (i.e., multimedia) MD&A presentation. The nature of the video could explain

why it was not perceived as entertaining. Unlike the multimedia presentations used in previous studies, the video MD&A was not constructed to be entertaining. The video was a single person delivering a newscast style report. Therefore, it is understandable that the video report was less entertaining than the paper report.

As in previous studies (e.g., Clements and Wolfe 1997; Ottinger 1993; experiment 1), report quality is a significant measure of user satisfaction. Subjects judged the video MD&A presentation higher in quality than the paper MD&A presentation. This finding supports found in Clements and Wolfe (1997), Ottinger (1993), and experiment 1 (previously discussed). This finding is interesting because the MD&A presented to subjects in experiment 2 is lower in quality than the annual reports used in previous experiments (Clements and Wolfe 1997; experiment 1). Even so, the subjects still perceived the video (i.e., multimedia) report to be of higher quality than the paper report.

For believability, subjects tended to believe a video presentation to a greater extent than they believed the information presented on paper. Interestingly, while subjects believed the information more when communicated via video, their opinion of the overall company (i.e., overall attitude) was influenced more when the information was communicated on paper.

As in experiment 1, recall is analyzed with two measures – free recall and cued recall. The ANOVA models for both measures are statistically significant. For both measures, presentation media is a statistically significant source of variation. In both models, paper MD&A presentations produce greater recall than video MD&A

presentations. These results support the primacy of print and are confirmed by a substantial amount of prior research (e.g., Clements and Wolfe 1997; Wilson 1974; Furnham and Gunter 1985, 1987, 1989; Furnham et al. 1987, 1988, 1990; Gunter and Furnham 1986; Gunter et al. 1984a, 1984b, 1986). As mentioned in Chapter II, there are several reasons why paper may produce greater recall than video. First, subjects may process the information at their own pace with a paper presentation while a video presentation dictates the speed at which the information must be processed. Second, paper presentations allow users to re-read sections of the text several times before moving on to other parts of the texts. Video on the other hand does not allow the user to view the information a second time. Finally, written text is the most common way of learning in today's educational setting. Therefore, subjects may feel more comfortable learning from a text-based document rather than from a video-based document.

Source Gender

The results indicate that source gender was significant in determining user satisfaction (information content) and recall (free recall). For information content, subjects judged males as providing more information than females even though the content presented was identical. The fact that subjects imputed more information content to a male source may be due to the fact that males tend to be evaluated more favorably in a male dominated industry (Eagly et al. 1992; 1995). Also, the subjects' responses may be conditioned because the gender portrayals in many corporate communications tend to devalue the role of women (Kuiper 1986; Tinker and Neimark 1987; Anderson and Imperia 1992) which leads to a more favorable evaluation of males.

For free recall, subjects tended to recall more information from a female source than from a male source. No theory exists indicating why a female source engenders more recall than a male source. It is interesting to note, however, that subjects judged a male presentation to contain more information but actually remember more from a female source's presentation. Perhaps the conditioning mentioned above does affect subject's perceptions regardless of their actual performance.

News Type

For both persuasion measures (overall attitude and financial wellbeing), the type of news ("good news" or "bad news") significantly influenced a subject's attitude. For both persuasion measures, subjects receiving a "good news" MD&A had a significantly more positive attitude toward Branco than subjects receiving "bad news." The persuasive reaction was highly anticipated and, to a great extent, acts as a manipulation check to ensure that subjects did correctly perceive the "good news" and "bad news" treatments.

In conjunction with the results for persuasion, subjects also judged "good news" as containing more information than "bad news." When news is presented it can be classified as "good news" or "bad news"; however, some uncertainty will remain. In a market setting, this uncertainty produces a negative overreaction to "bad news" and a positive underreaction to "good news" (Brown et al. 1988). Therefore, subjects will have a significantly better attitude toward the company when presented with "good news" than when presented with "bad news." The cause of the under and overreaction could be because of the perceived information content of the news conveyed.

Several of the two-way and three-way interactions are significant for experiment 2. Very little theory exists to indicate why the interactions take place. However, the interactions are practically as well as theoretically interesting. The interaction effects provide some insight into the optimal combination of the three factors to produce the greatest desired benefit for the company. From a theoretical standpoint, the results also provide an initial glimpse into the behavioral and social implications of the combination of the three factors. For instance, it is important that a company presenting “good news” know that a male is equally informative on video or paper but a female is perceived as being more informative on video than on paper. From a theoretical perspective, however, it is important that an understanding is developed of why the female is perceived as more informative on video.

Limitations

This study contains several potential limitations. The usual caveats related to behavioral research apply (e.g., student subjects, artificial task, and time limitations). In particular, the use of undergraduate students as surrogates for average investors threatens the internal validity of both experiments if they are not appropriate surrogates. Based on the demographic data (Table 3), executive MBA students are very appropriate surrogates for expert investors. In addition, both experiments suffer from the use of artificial incentives (i.e., extra credit) to induce participation in the experiments.

In experiment one, the use of only two companies’ annual reports limits the generalizability of the study. It is also important to note that the independent variable

'company' is confounded with several annual report attributes. Not only does the company variable capture variation due to the information communicated in the annual report, it also captures variation due to different media (e.g., video, voice, sounds, music, animation, etc.) used in the multimedia reports and different media (e.g., pictures, text, graphs, etc.) used in the paper reports. Therefore, any significance of the company variable must be interpreted cautiously.

The results for experiment 2 have several limitations in their interpretation. First, the quality of the four video and four paper reports are assumed to be equal, although they may be perceived to be different. Internal validity is threatened if the reports are not of equal quality. Second, the experiment was designed to provide insight into the main effects and interaction effects of the three independent factors (presentation media, source gender, and news type). However, the experiment was not designed to answer why the interactions take place. Therefore, any interpretation of the interaction terms must be made cautiously. Finally, the generalizability of the study is limited due to the fact that only one female presenter and one male presenter are used in the experiment.

Insignificant findings for any of the models could be caused by scale limitations of the instruments or power of the statistical tests. Any significance in the statistical tests could be caused by omitted variables that are highly correlated with the independent variables included in the test. All results of this research must be evaluated in light of these potential threats and limitations.

Extensions

The results of the research indicate that media is a significant factor to consider when developing an annual report. The results also indicate that there is a significant difference in the way the experts and non-experts react to all aspects of an annual report. Additional studies should attempt to confirm the results from experiment 1 using different annual reports. Future research should also attempt to isolate and explain the cause of multimedia providing greater recall for the companies in experiment 1. Furthermore, the methods employed in experiment one should be extended to companies publishing their annual report on the Internet.

The results of experiment 2 indicate that media, source gender and news type are significant factors to consider when communicating financial information. Additionally, future research should test additional attributes of the video. These attributes could include changing from a “talking head newscast” video to a more relaxed or a more corporate environment. Other attributes (e.g., age, race, expertise, etc.) of the source could also be manipulated in future research. Additional information attributes could be manipulated as well (e.g., presenting confirmatory or disconfirmatory information). Future studies could also incorporate multiple male and female presenters in the experiment to improve the generalizability of the study. Finally, experiments should be designed to begin addressing the question of “why” with regard to the main and interaction effects noted in experiment 2.

Finally, the most important extension of both experiments would call for the user to make a decision with the information presented. In the current studies, user

characteristics (e.g., attitude, satisfaction, recall) are studied that should influence the user's ultimate decision. However, to adequately determine the ultimate effect of the manipulated variables, a decision must be studied as the dependent variable. An obvious extension would involve a market simulation where information is communicated to the participants via different media, source gender, or news. Through tracking the trading of the participants, the effect of the variables can be evaluated.

Concluding Remarks

Companies have invested substantial economic resources into the preparation of multimedia annual reports. However, the effect of these reports has been unknown. It is important for companies and users to understand the user effects of the newest form of annual report. Furthermore, it is important for regulators to understand the effects this newest form of annual report has on the non-experts they are charged with protecting.

This research provides empirical results on how report users are affected by media in annual reports. Experiment 1 provides evidence that non-expert report users and expert report users are affected differently for some dependent measures. Experiment 2 also provides evidence that source gender and news type also affect annual report users. This information is of practical use to companies contemplating or currently preparing a multimedia annual report. The results give some guidance as to the effect of media, source gender, and news type on expert and non-expert annual report users. The research has also provided significant insight into areas of research that may be studied in the future.

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APPENDIX A

Materials contained in Appendix A are located on the CD-ROM accompanying this dissertation. The experimental materials were prepared on a PC using Microsoft Word '97.

APPENDIX B

Materials contained in Appendix B are located on the CD-ROM accompanying this dissertation. The experimental materials were prepared on a PC using Microsoft Word '97. Authorware 3.5 was used to develop the computerized task for experiment 2. However, the application developed will run on any IBM PC compatible computer. The video files (*.avi) will also play on any IBM PC compatible computer.

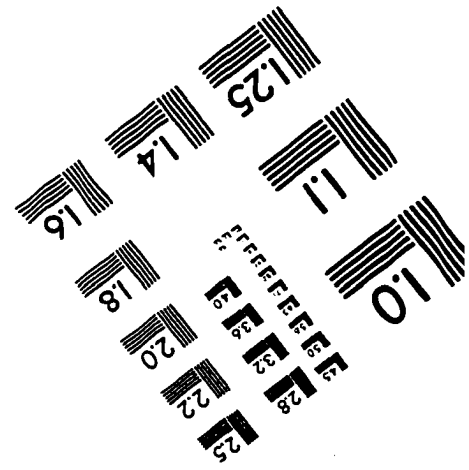
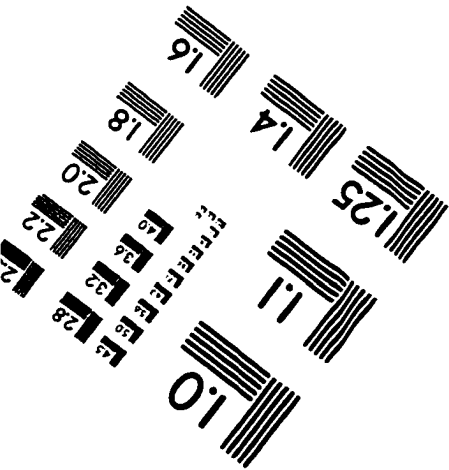
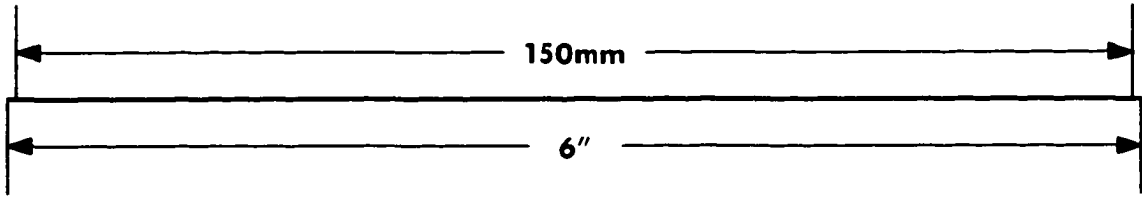
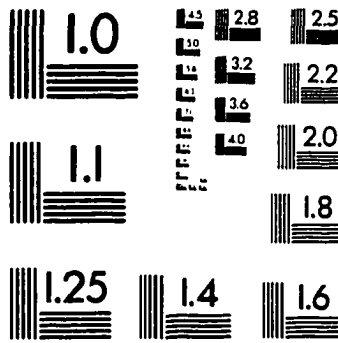
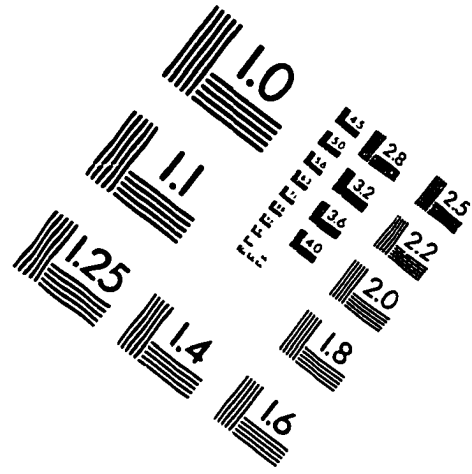
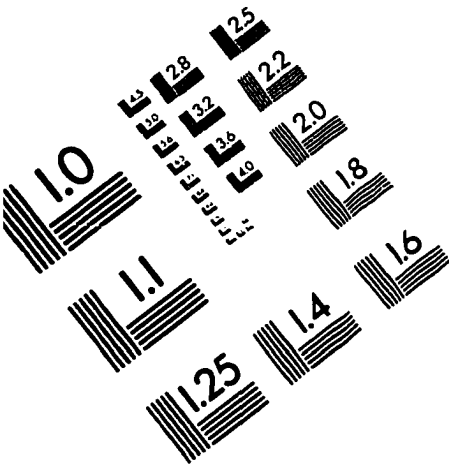
VITA

Curtis Eugene Clements received his Bachelor of Science in computer science from Harding University in Searcy, Arkansas in May of 1985. He received his Master of Science from Harding University in August of 1986. His professional experience includes three years of public accounting with Arthur Andersen & Co. reaching the senior accounting level. Curtis received his certification as a Certified Public Accountant in the state of Texas in October of 1988. Mr. Clements also has a total of seven years of teaching experience (five years at Harding University and two years at Baylor University).

Curtis' primary teaching interest is in the accounting information systems area. His primary research focus is on the effects of media in annual reports. Previous research efforts have led to one publication co-authored with Christopher J. Wolfe. The article, "An Experimental Analysis of Multimedia Annual Reports on Non-expert Report Users" was published in the 1997 issue of *Advances in Accounting Information Systems*.

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