

NEWS LEARNING: A STUDY ON RETENTION LEVELS IN PRINT AND TELEVISION

AUDIENCES

by

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Under the Direction of William Griswold

ABSTRACT

Using symbol systems theory and McQuail's concept of news learning, this thesis looks at the media of print newspaper and television and examines which form of media leads to higher levels of retention within various audiences. Symbol systems theory states that media contain systems of symbolic representation that, when working with a field of reference, allow those exposed to the system to retain or learn the information present. Rather than the messages contained in the media, it is the symbol system that is characteristic of each medium that incites learning. It is hypothesized that, when content is identical, the symbol systems involved with newspapers lead to higher levels of retention in an audience than do those symbol systems involved with a television news program. It is also hypothesized that individuals who are consistent and frequent readers of newspapers illustrate better overall knowledge of current events than those who prefer to get their news from television.

INDEX WORDS: News learning, Symbol systems theory, Retention, Newspaper, Television

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DEDICATION

I would like to recognize the support of my family. Without them I would not be where I am today. Thanks Mom and Dad. Most of all, I want to thank Joy. I love you and your support and confidence gets me through the day. Thank you for walking this path with me. Here is to many more journeys together.

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CHAPTER 1

INTRODUCTION OF NEWS LEARNING

Justification

Mass media have a firm grasp in our society. Everywhere you turn, various forms of media can be found constantly in everyday life situations. Many people begin the day by reading an edition of their local newspaper, while others center their dinner and family time on catching the evening television news. Now, more than ever, news media have become a requirement in the lives of millions. With all of the media around us and the multitude of medium options available, studies in retention or as McQuail defines it, “news learning,” can be vital (McQuail, 2000, 425). McQuail defines news learning as the “short term cognitive effect of exposure to mass media news, as measured by tests of audience recall, recognition or comprehension” (McQuail, 2000, 425). Indeed, it has been stated that media cultivate mental skills and can create a “crystallizing” effect that helps individuals move through life while always gaining knowledge (Salomon, 1976). Individuals may choose their form of media, consciously or subconsciously, based upon their ability to understand and retain the information provided. As a former print journalist, I have always wondered about the individual choices people made when it came to what articles to read and why there were particular aspects to each article that people burned into their memories. My interest into this quandary also stretches out into the increase in the use of other forms of media, such as television, as a primary source of news. On the surface, it appears that people simply do not wish to take the time to read a newspaper, even though newspapers contain more relevant content and go to much greater lengths to report the entire issue at hand. In looking at

the differences between the individual audiences, I hope to understand the amount of information, or news learning, that goes on within the separate audiences.

Even in the case of convenience, such as television news, the mental capacities of individual audiences might lead them to exercise less effort and, in turn, interpret the information on a more simple, less taxing, mental level. While this trend in media and news is in a continuous upswing, newspaper readership has declined. According to the Newspaper Association of America website, daily newspaper readership has dropped from 55% of the total population in 1998 to 50% of the total population in 2001. Sunday newspaper readership, traditionally the strongest day for newspaper sales, has dropped from 68% of the total population in 1998 to 64% in 2001. These numbers are a far cry from the 80% readership of the total population in 1964; in fact, readership has dropped gradually every year since.

Purpose of study

This study will attempt to discover what form of media leads to higher levels of retention, or news learning. Through this research thesis, I will look at the two media, investigate past research done on the topic and discuss the concepts of symbol systems theory. I will also discuss, in detail, experiments conducted in an effort to determine which medium leads to higher levels of retention. It is my belief that retention levels are higher among individuals or audiences that obtain their news or current events from print forms of media, specifically newspapers, than individuals or audiences that obtain their news from televised news programs. It is also my belief that newspaper-reading audiences or individuals will have a better overall knowledge of current events than those audiences or individuals who obtain their news from television news programs. These aspects will be discussed further and in more detail later in this research thesis.

Is the Medium the Message?

More and more people are turning away from the printed news because television is more convenient and faster. Rather than taking 10 minutes to read the front page, people can now find out what is happening in all relevant news sections in the same amount of time. Television is seen as a less taxing activity, mentally, while a degree of mental effort has to be made to read a newspaper article (Gunter, 1987). Some may also argue that the newspaper industry is not writing for the average person, rather it is writing for a more educated audience. In looking at the discrepancies between retention when it comes to newspapers and television, the two industries might be able to find a common ground by altering their readability. Studies in audience retention levels in various media might lead to some answers on how to improve the depth of television news coverage or indicate that a change should be made in regard to the reading levels of newspaper. However, the difference in learning facilitated from the different media may be hidden within the nature of the medium itself. Rather than the content contained in a newspaper article, it may be the fact that the information conveyed to a selected audience, itself, is in the form of a newspaper. In mass communications, studies have shown that the medium can have just as great an impact on information processing as the content of the message itself (Furnham, Benson, and Gunter, 1987, 105). Because news, for the most part, is understood to be more elaborate and in-depth in a newspaper article by nature, that nature may be what facilitates learning on behalf of the audience. Because of the different complexities of each form of media, it is logical to conclude that each type of media also calls on a different amount of mental effort for an individual to invest when exposed to such content and, therefore, one form of media may call for a person to invest more mental effort when examining one over the other (Beentjes and van der Voort, 1993). It is a common observation that different media have different types of

coding systems or formats in which the individual examines and processes within the brain (Salomon, 1976).

Individuals may learn from a television news program, but rather than learning from the actual content of the news portrayed, they may learn more or less from the fact that the vessel in which it is delivered to the audience is television. As Salomon stated in 1997, “Different media, because of their differential capitalization on different symbolic forms of representation, exert differential influence on learning not only because of what they are, but also because of what they are perceived to be” (Salomon, 1997, 381). As Marshal McLuhan stated in 1964, “the medium is the message” (MuLuhan, 1964). By the pure characteristics of each form of medium, different symbol systems arise and cue different responses in the brain, ultimately leading one to ask; What is more effective in the process of learning: the printed word or the combination of visual images and the spoken word?

Newspaper versus Television News

Past research in the area has made a case for newspapers being superior to television news. “Findings underscore the superiority of newspapers as agents of information to help people identify assets and liabilities of important political contenders” (Clarke and Fredin, 1978,156). Patterson concluded, “in conveying issue-related information to the public, then the daily newspaper is far superior to daily television” (Patterson, 1980, 157). Other researchers go further, stating that “television news appears to fall considerably short of a typical metropolitan daily newspaper” and “a transcript of a typical news broadcast could easily fit on the front page of a newspaper like *The New York Times*” (Eveland, Seo, and Marton, 2002, 357) since newspaper, by nature, is much more in-depth and contains more information in a typical story than that of a television news broadcast. The narrative standard 25- to 30-minute news broadcast

carries less content than the front page of a serious broadsheet newspaper (Furnham, Gunter, and Green, 1990, 203). In fact, until the beginning of the 1990s, the weight of research evidence on the relative effectiveness of print and television modes of presentation indicated that print was more effective than television (Gunter, B., Furnham, A., and Griffiths, 2000, 94). Gunter, Furnham, and Griffiths state, “The superiority of print is assumed to be a result of the opportunities it affords for a greater depth of cognitive processing than television because readers are self-paced they are able to exercise more cognitive control over their information processing than viewers” (Gunter, Furnham, and Griffiths, 2000, 94). Gunter acknowledged that learning was facilitated in both print and television forms of news, however, he acknowledged past research that stated that “information loss over time seems to be greater from television than from newspapers” (Gunter, 1987, 20) and that while there may be a loss in newspapers as well, the greater loss seems to come from television news. Justification for this comes from the fact that the two media are different by their nature and that the average news broadcast would “fill two columns of most broadsheet newspapers” (Gunter, 1987, 84). Furnham, Gunter, and Green add in their 1990 study that, “material presented in the print medium is remembered better, using cued and free recall, than identical material presented in audio visual or audio only modalities” (Gunter, 1987, 84). Gunter added in 1987 that “it has widely been argued that the best-educated members of society keep most informed about contemporary news issues and gain the most from exposure to media and it is exposure to print media rather than exposure to broadcast media that is most closely related to being highly knowledgeable about world affairs (Gunter, 1987, 84).

There has also been research that states that television news facilitates learning more so than newspaper news under certain conditions, which seem to be based on individual level factors such as amount of interest in the topic and the media-related factors such as the use of redundant

as opposed to non-redundant visuals in news broadcasts (Eveland, Seo, and Marton, 2002, 356). Gunter agrees with this assessment, stating “sections of the public who are uninterested in a topic within the news, such as politics, will learn more about politics over time if they are exposed to television programming about political matters than if they are uninterested users of other forms of media (Gunter, 1987, 21). Television has been considered as the most important information source by mass publics and has been acknowledged as surpassing other media in its ability to attract the attention of viewers, especially children. In fact, Gunter, Furnham, and Griffiths cite research that states, “the interaction of symbol systems and the medium will determine the level of learning that takes place” (Gunter, Furnham, and Griffiths, 2000, 95). In turn, since television is a pictorially based medium that can “short-circuit” the process of image generation, then recall is greater influenced by television. (Gunter, Furnham, and Griffiths, 2000). Weaver and Drew concur with this idea, stating that television news has been the greatest influencing factor in all of the Presidential election from 1984 except in 1988 and 1992, where newspapers were found to be the strongest influencing factor for predicting voter behavior (Weaver, and Drew, 2001). Williams, Paul, and Ogilvie, in their 1957 article, “The mass media, learning and retention,” found that abstract content on television was better retained by audiences than that present in print and in radio. Leshner and Coyle acknowledged that past research indicates that print does yield better levels of retention than television (Leshner and Coyle, 2000, 602), however, television is in a data-driven format and retention levels would be higher in studies if test were administered in such a way. Other research has taken a different view altogether. Clark’s “mere vehicles” hypothesis, states that, “media are simply vehicles that deliver instruction but do not influence student achievement” (Clark, 1983, 445) or that various forms of media do not facilitate learning. Clark further states that, “media doesn’t influence student achievement

anymore than the truck that delivers our groceries causes changes in our nutrition” (Clark, 1983, 445).

Regardless of the viewpoint many in the academic community may take on the topic, research in this area of study has dropped off in recent years, with a large majority of studies going unpublished or remaining strictly in other fields of study, such as education and psychology. In looking at studies involving media effects, most research is limited to that of television (Lang, Boles, and Potter) and advertising (Lang). Research that has been done on the differences in print and television news retention in regard to learning usually deals with children and how each medium may better educate and improve cognitive skills (Salomon, 1976; Beentjes and van der Voort, 1993). Relatively speaking, little has been done in the area of retention and news learning in regard to print media, whether it is newspapers or magazines, to the general masses. Because of this gap in available research on the topic, it is important to take another look at the area of retention in regards to media research and determine if many of the past experiments pertaining to retention studies in media, especially in print and television media hold true today. Another factor for further research in this area would also be important in regard to the advent of new media, such as the Internet. There is no argument that media saturate the lifestyles of the public as a whole, and the more we can understand about what media have a greater impact in regards to news learning, the better we, as patrons of the media, can utilize these media with the ultimate goal being to educate the masses. It has been stated that not only should people be concerned with the content of newspaper versus television news but also the amount of actual learning that is facilitated by each medium and that there is a common misconception that occurs in media research in regards to the amount of learning a medium facilitates (Eveland, Seo, and Marton, 2002). Research in this area often examines which medium exhibits better forms of retention in

relationship to the pure content of the medium, when, for the most part, the mode of transportation of a medium is often overlooked and rarely examined (Salomon, 1979). Looking into the actual structure and aspects of the individual form of media may give researchers in the mass communication field a different, if not unexplored, view into why individuals retain knowledge. The pure characteristics of a medium may be the igniter of a person's mental facilities.

Using Gavriel Salomon's concept of symbol systems theory (Salomon, 1984), many scholars in the area of retention studies have been able to attribute better retention to print media. Salomon defines print media as a "hard medium" because more mental effort is involved in obtaining information, thus leading to higher levels of retention, and television is an "easy medium" because it requires less mental effort to retain information thus leading to lower levels of retention. The symbol systems theory will be discussed at length in Chapter 3. Salomon stated that his ultimate goal in regards to the theory was to increase a relationship with media and learning and shift the focus to a "more systematic and theoretically oriented approach" (Salomon, 1979, 8). These studies, along with other key pieces of literature will be examined and summarized for the purpose of establishing a theoretical guideline for which future studies in retention may be based. This research may be important in illustrating which medium allows an audience to have a better overall grasp of current events and which media provides its audience with information that will remain embedded into the minds of the individual audience members.

Conclusion and Discussion

In looking at media as a whole, it is clear that media facilitate some form of news learning, despite the efforts by some researchers to illustrate otherwise. Many researchers have different opinions over what media yield higher levels of learning more so than others; however, it is possible that while media does lead to some form of retention, the retention an individual

exhibits is fueled from the actual media rather than the message conveyed to the audience. All aspects of each medium, such as layout, design and text for print and images and the spoken word for television, play a role in the degrees to which an individual audience takes in and retains information and thus, learn.

In the upcoming chapters, I will examine past research on the topic of news learning in both television and print formats. Some of the studies lend themselves to be geared towards different audiences, such as children, the utilization of retention studies in regards to advertising, or they examine other forms of media, along with television and print. However, the theories and techniques employed by each research article are nonetheless vital towards developing an understanding of the topic altogether. Further discussion of Salomon's symbol systems theory will also occupy more text, as the theory has many concepts that may be novel to the reader. Corresponding hypotheses and experimentations will also be discussed, as I attempt to find out which form of media, television or print, incites mental cognition and retention more effectively and the ways in which one may do so over the other

CHAPTER 2

THE THEORITICAL GROUNDWORK FOR RETENTION BASED STUDIES

Early History

Since learning and cognition are key components and results of media effects, I think it is important to begin this section of research with a brief overview of the origins of media effects research with respect to aspects pertaining to news learning or cognition. According to McQuail's book "Mass Communication Theory", the history of media effects is broken up into two halves, from the turn of the century to the early 1930s and from the 1930s to today. Early studies on the subject looked more at the persuasive effects of media rather than the actual comprehension of said media. Most early research was not conducted with the use of scientific investigation but rather through observations of society and their reactions to the propaganda from World War I. Further studies on the presence of media effects were done during the 1920s and 1930s, particularly in Europe, where surveys and experiments in the area of social psychology were conducted in regards to the rampant propaganda from the first World War (Lazwell, 1927). The results usually indicated that the governments and people of power had a tremendous influence of the media, whether it was aimed to increase social reaction, education, or increasing public information.

During the 1930s, a breakthrough was made in the area of media effects studies when the Payne Institute funded studies on the effects of media in the United States (Blumer in 1933 and Peterson and Thurstone in 1936). The studies were geared to discover the influence of film on children. Hovland made a landmark study in 1949 when he reported that a large-scale film campaign, using the concepts of media effects, could influence American military recruits into

awareness and support for World War II. Lazarsfeld (1944) and Berelson (1954) furthered the research of media effects by looking at how effective democratic campaigns were and how they could be improved to get the desired effect from the audience. The advent of television also brought on more media effects research in the 1950s, especially its effect on children.

Another important name in the area of media effects was Klapper, who conducted studies during the 1940s on the subject. In 1960, he wrote “mass communication does not ordinarily serve as a necessary or sufficient cause of audience effects, but rather functions through a nexus of mediating factors” (McQuail, 2000,419). Klapper also determined that there are many different types of media effects, breaking away from the primary thought of influence by those in power. Klapper classified effects as conversion (change of opinion or belief according to the intention of the communicator), minor change (change in the form or intensity of cognition, belief or behavior), and reinforcement (confirmation by the receiver of an existing belief, opinion, or behavior pattern). He also classified media effects as either intended or unintended and short-term or long-term. Golding (1981) furthered this ideology by coming up with possible effects found through the media, one of which being news learning, which is defined as the short term cognitive effect of exposure to mass media news, as measured by tests of audience recall, recognition, or comprehension (McQuail, 2000, 425).

At this point, I think it is important to acknowledge a major theory in retention as it relates to the media. The knowledge gap hypothesis has long been a subject of research in this area in an attempt to explain why various media audiences receive information while others do not. Tichenor best defined the knowledge gap hypothesis in the following statement: “ As the infusion of mass media information into a social system increases, segments of the population with higher socioeconomic status tend to acquire this information at a faster rate than lower

segment status, so the gap in knowledge between them tends to increase rather than decrease” (Tichenor, Donohue, and Olson, 1970, 159). While this theory has its share of theoretical support, articles and techniques mapped out in various knowledge-gap hypotheses based research was not examined or considered for this research thesis.

Salomon, Sesame Street, and the Symbol Systems Theory

While my research has found different theories on retention studies, the one author who seems to have had the most influence on the subject would be Salomon. Although Salomon’s research lends itself to the world of psychology, he has done extensive studies over the years on the process of interpreting various forms of media. Salomon looked at television’s ability to cultivate mental skills in his 1976 article “Cognitive Effects of Visual Media”. Salomon stated that it has been well documented that media, film and television in particular, externalizes our modes of recall, association, and thinking (Salomon, 1976, 487). He also clearly points out that, in relationship with the research investigated within this thesis, that the way one extracts information from various coding systems differs from media to media. It was Salomon’s view that exposure to film and/or television which explicitly model a particular operation, that is, part of the filmic coding system, leads to improved mastery of that operation and, thus, media such as film and television can cultivate mental skills (Salomon, 1976, 490). To test his theory, Salomon exposed 317 children in Israel who previously been exposed to little or no television to Sesame Street. A number of television literacy tests were conducted on the participants before hand and it was found that the show was very fragmented. Salomon developed a test to gauge the participants’ ability to piece together the aspects of the television show together since the show was not in a continuous state. Salomon found that the show had a profound effect on the television-based literary skills of the audience. This was significantly higher on the aspects of

changing point of view, which is illustrated in the show's constant changes from character to character (Salomon, 1976, 492). Salomon also found a relationship within the confines of continual learning and mental cultivation. Post exposure observations and testing showed that the children were better able to learn from another form of film and they were better able to extract and process scientific information presented to them through film as a result of the exposure to Sesame Street (Salomon, 1976, 494). Prevalent to this study, Salomon concluded that media has effects on audiences due to the cognitive effects of the language or method which are characterized from one form of media to another (Salomon, 1976, 494). While this article deals strictly with television and how a television show, Sesame Street, can insight cognitive learning within children, the experimentation and theoretical guidelines set forth by Salomon are useful points for one to consider when looking at research regarding learning from the media. Salomon is quick to point out throughout the article that media, whatever type it may be, incites learning. Learning is facilitated depending on the type of vessel the message is related to the audience in. The language or symbols conveyed referred to the mental messages received from each type of media.

In 1979, Salomon came up with the symbol systems theory, which is intended to explain the effects of mass media on learning. In his 1979 book, "Interaction of Media, Cognition, and Learning" Salomon defined his theory in the following passage:

"The symbol systems of media affect the acquisition of knowledge in a number of ways. First, they highlight different aspects of content. Second, they vary with respect to ease of recoding. Third, specific coding elements can save the learner from difficult mental elaborations by overtly supplanting or short-circuiting specific elaboration. Fourth, symbol systems differ with respect to how much processing they demand or allow. Fifth,

symbol systems differ with respect to the kinds of mental processes they call on for recoding and elaboration. Thus, symbol systems partly determine who will acquire how much knowledge from what kinds of messages" (Salomon, 1979, 226-227).

According to Salomon, each medium is capable of conveying content via certain inherent symbol systems. Salomon suggests that television requires less mental processing than reading and that the meanings secured from viewing television tend to be less elaborating than those secured from reading. Salomon focuses the theory on symbol systems because, "media without symbol systems are as inconceivable as mathematics without numbers" (Salomon, 1979, 3). He stresses that media is about representation, and without images or text, the messages are lost. In turn, a person may acquire information about a subject they are familiar with equally well from a different medium but their ability to gain or understand and retain novel information may be significantly influenced by the symbol systems used in different media. In essence, the symbols discussed by Salomon are the very items that make up the media: text for print media and images and audio for television. Later, Salomon termed this concept as AIME or the amount of invested mental effort (Salomon, 1984). However, the meaning extracted from a given medium depends upon the learner. Thus, a person may acquire information about a subject they are familiar with equally well from different media but comprehension may be significantly influenced by different media for novel information. He explains this concept further in a passage from his book, "Interaction of Media, Cognition, and Learning".

"Learning can be facilitated to the extent that the activated skills are relevant to the demands of the learning task. Thus, when the task calls for some act of analytic comparison and the coded message activates imagery instead, the learning may be debilitated. For effective instructional communication, a match needs to be established

between the cognitive demands of a learning task, the skills that are required by the codes of the message, and the learner's level of mastery of these skills" (Salomon, 1979, 112).

This theory coincides with McQuail's definition of news learning, which is the short-term, cognitive effect of exposure to mass media news. Applied with AIME, news learning would simply be the effect of media exposure, depending on the amount of AIME an audience or individual exercises.

Furthermore, Salomon states in his 1979 book that the effectiveness of a medium when it comes to retention depends on its match with the learner, the context and the task involved. Salomon explains by saying, "for effective instructional communication, a match needs to be established between the cognitive demands of a learning task, the skills that are required by the codes of the message, and the learner's level of mastery of these skills" (Salomon, 1979, 112). This principle might prove to be an effective way to interpret the results of any experiment done on the topic of retention as well as give some insight into the theory used to explain any type of retention studies. With this concept in mind, I take particular interest in ideology laid out in Salomon's symbols system theory. As I have illustrated to this point, it seem theoretically possible that the medium from which a messages is conveyed, rather than the message itself, is the primary facilitator of retention within an exposed audience. Furthermore, the medium from which a message is carried has it's own distinct language and cognitive characteristics that allows the receiver to process information in a manner that is more or less mentally convenient. For these reason, the ideals and principles involved in Salomon's symbols systems theory may be referenced through the remainder of the chapter. Further discussion and explanation of Salomon and the symbol systems theory will continue in Chapter 3.

News Learning and Advertisements

Research in the area of mental retention and its place in the media have often dealt with that of advertisements. The purpose in this type of research has been, in large part, for companies and retailers to discover what kind of advertisements will remain in the mind of a possible consumer and, therefore, lead that individual to buying a product (Furnham, Benson and Gunter, 1987, 106). This type of research uses the proper theoretical approach in examining what types of media are more effective in regards to retention of a particular medium. Developing an understanding of what type of medium incites higher levels of retention, as far as commercials go, allows companies to focus on a particular medium with their messages. With respect to other research in this area, I find particular significance in the work of Furnham and Gunter. Both of the aforementioned scholars have not only looked at the effects of advertising in various forms of media, but have also done extensive research, in regards to retention, using television and print media. Many of the studies I have contained within this section of research, not only provide a solid theoretical framework for research on the topic, but also open the preverbal window of opportunity for future research in the area of news learning.

Furnham, Benson and Gunter used advertisements as their main focal point in determining which form of media yielded better levels of retention. In their 1987 study, the authors used an advertisement prepared for one type of medium, television, and presented the same material in other forums of media, audio-only and print. This allowed the authors to “test the superiority of one medium over the other in both free and cued recall” (Furnham, Benson, and Gunter, 1987, 108). As stated previously, the author noted the inconsistent nature past research has yielded in regards to which form of media incites learning more so than the others and cited print as the more consistent of all media in yielding high retention levels (Furnham, Benson, and Gunter,

1987, 108). The authors also noted past experiments using similar designs in regards to advertising. Because the study used real advertisements from the various forms of media, they contained different formats in terms of content and length and made it impossible for the researcher to separate the channel, or the medium, in which the advertisement was contained and the content (Furnham, Benson, and Gunter, 1987, 107). Therefore, an individual could not be sure if one advertisement was more memorable over another in a different medium. By making the content identical, the researcher may be able to avoid this issue.

The experiment used 69 students and each subject either saw, listens to, or read each of the three advertisements for microwave ovens. The advertisements were approximately the same in length in terms of timing and words. The subjects were given the same amount of time to read the materials as subjects who heard or saw the advertisement. After being exposed to all three, the subjects were then tested on the material contained in each medium. The experiment found that recall was greatest for the print advertisement, followed by television and the audio track. The authors concluded that cued recall of verbal material is better from print and all three advertisements were most remembered in their print format. According to the authors, “the superiority of the print medium found once again, though with regard to memory for advertising rather than news content, leads support to the hypothesis that reading engenders a deeper and more effective level of cognitive information process than does viewing or listening” (Furnham, Benson, and Gunter, 1987, 107).

Furnham and Williams, in their 1987 article, “Remembering Commercials in Different Media”, coincides with Salomon’s symbol systems theory while citing past research. Rather than simply looking at the recall abilities of an audience when presented with an advertisement, they conducted research looking at the cognitive effects of ads in three different forms: print

(newspapers), audiovisual (television), and audio-only (radio). The authors point out that “comparisons of learning from print and audiovisual presentations of the same material have indicated that learning is better from print” (Beighley, 1952 and Browne, 1978) and that retention was better following print presentations than television presentations because reading requires more cognitive effort and facilitates greater depth of information processing than television viewing. In their study, the authors selected three different advertisements in the various forms and randomly assigned individuals to each advertisement. The amount of words presented and the time taken to view each advertisement were taken into consideration and each group was exposed to each advertisement. Afterwards, subjects completed a cue recall questionnaire on the advertisements, with scores ranging from 0 to 3 per question with totals ranging from 0 to 15. A two- way ANOVA was performed and there was a significant effect found on the form of media, with print yielding superior results over audio and audiovisual (Furnham and Williams, 1987, 120). Cued recall was the greatest in the print condition and worst in the audiovisual condition, which is consistent with past findings (Browne, 1978; Gunter, 1984; and Furnham and Gunter, 1985, 1987) regarding the superiority of print for recall of news items. While this article deals with advertising and not news content, it still engages in a comparison of various media and the overall differences each media has over an individuals’ ability to recall information. Furnham, Benson and Gunter found similar results in another study where three advertisements were present in audio, video and print form with the print form being a transcription of each advertisement. The results yielded higher levels of retention in the audience that took in the transcribed advertisement than those who watch the commercial or listened to the transcript.

Retention: Television Versus Newspaper

Research in the area of retention and media generally look at the theoretical ideology of which form of medium better incites learning. Indeed, it has been stated that television is seen as a less taxing activity, mentally, while a degree of mental effort has to be made to read a newspaper article (Gunter, 1987). Using the symbol systems theory, as stated by Salomon, print is seen as a hard medium, meaning more mental effort is needed to process the information and higher levels of retention are yielded and television is an easy medium; while less mental effort is needed, retention levels are lower. Others have found that television, not newspapers, fosters greater levels of retention in various audiences depending on the circumstances involved in the intake of media. For example, Weaver and Drew (2001) found that television news yielded greater levels of retention for political seeking audiences who were otherwise disinterested in politics. Salomon also acknowledges the possibility that television news may foster higher levels of retention due to the fact that less cognitive processing is necessary for the individual to conceptualize the information presented (Gunter, 1987, 46). The following articles look at the different levels of retention each medium fosters. These studies provide, again, a theoretical framework from which future studies can be conducted. For the most part, each article looks at the differences in television and print audiences.

Drew and Weaver look at the various retention differences in retention levels within various medium in their 1990 article "Media Attention, Media Exposure and Media Effects." The article looks at the level of retention in newspapers, television news and radio news and looks at four possible effects; knowledge gain, opinion direction, opinion strength and behavior, as a result of using those three media. The authors hypothesized that media attention and media exposure is significantly associated with different media effects, suggesting that attention and exposure are

not the same. Using a skip interval method, a phone survey of Bloomfield, Indiana was conducted. The surveys asked questions about two national and world issues and two local issues, while also measuring their use of the media and where they got their information on the subjects. The findings were tested using multiple regression analysis. While their hypothesis was supported by the results, the questionnaire showed that the majority of people were not well informed about world issues, but were up to speed on local stories and those who were more educated about an issue had stronger opinions on said issue.

This study looks at the different levels of retention in three media: newspaper, television and radio. The article provides a valuable framework when it comes to possible explanations into the results of any experiment involving retention in different forms of media. The idea that stands out in my mind is the authors' hypothesis about a solid difference in attention and exposure. If an experiment is conducted, then these ideas of a difference in attention and exposure might explain why retention levels would be low in television viewing. This article also supports the notion that people are less informed because of the medium they chose to get their news through.

In the Beentjes and van der Voort article, "Television viewing versus reading: Mental effort, retention, and inferential learning", the authors tested Salomon's model on learning from television and print medium, which states that the differences in the learning effects of watching television and reading print articles are attributed to differences in the amount of mental effort viewers and readers invest in processing information. The authors were testing three primary hypotheses: children invest more mental effort in processing print stories compared to television, story recall is not effected by the medium from which the story is conveyed and print stories lead to more inferential learning than television stories. Eighty-eight children, fourth and sixth grade students, watched the television version of one story and read the text version of a

different story. Tests were administered after the children completed each and scores were based on the number of correct answers. Measuring the level of retention immediately after viewing the movie and reading the book, the authors found similar results. The authors calculated the overall scores for mental-effort scale, base-reaction time, secondary reaction time immediate retention, delayed retention, immediate inference and delayed inference for each form of media. However, contrary to both their hypothesis and Salomon model, the authors found the children better retained the television movie than the print story when tested weeks later. This study provides a solid framework for studying retention, especially in light of its use of the print medium. It could easily be replicated to fit print newspapers.

The article directly measures the level of retention in an audience, all be it a young one, after watching a film and reading a book. I think this can easily be replicated into a similar study using television news and newspapers. I am somewhat surprised by the finding of the study. One could argue that the test audience's age and education level might play a factor in the finding. Regardless, I think an audience with more age and a higher level of education is going to retain information for a newspaper more so than that from television news, an idea that is in line with Salmon's 1979 model.

In the unpublished research article, "Media and Learning", Tripp looks at Clark's "mere vehicles" hypothesis, which states "media are simply vehicles that deliver instruction but do not influence student achievement" (Clark, 1983, 445). The author challenges Clark's theory by looking at past studies conducted by various authors (Furnham and Gunter and Salomon). In his experiment, Tripp, using Salomon's AIME principal, tested 36 students on their level of learning based upon their media intake, either print or audio formats. Tripp preferred the audio format to television images because he made the claim that people learn from the audio in news

broadcasts, rather than from the images that are shown. The students were exposed to a passage in the same setting from a computer and were presented the material through words typed out on a computer screen or through headphones. His results indicated that the text group recalled much more information than that of the audio group, defying Clark's hypothesis that media does not influence learning (Clark, 1983, 445).

The article serves as a method of disproving the notion that media does not have an influence on learning, which would be a valuable asset in supporting any results found from a potential experiment. The article tends to support Salomon's original AIME concept, unlike Beentjes and van der Voort article. Both articles use a similar method with the exception of Tripp's use of audio media rather than television. However, Tripp explains that the sound, not the pictures, is what an audience is taking in. However, in regards to the symbol systems theory, Tripp negates the use of visual media, increasing the amount of mental effort his audience would have to endure. He also uses older students, which might explain why their scores, reading wise, were higher than other forms of media. Tripp's experiment is very basic in concept and, on the surface, it seems to be fairly effective.

Eveland and Dunwoody looked at the effectiveness of learning from the aspect of print versus forms of on-line news sources. The authors of this study point out that print newspapers have yielded superiority in regards to mental retention than their on-line counterparts. It is illustrated that the authors find print and on-line newspapers to be very similar in regards to their format of both text and images (Eveland and Dunwoody, 2002, 35). The Web, or as the authors describe as hypermedia, is different in that it facilitates an alternative organizational structure compared to traditional print. Individuals can more easily chose to move through an article in any number of ways instead of in a single order determined by the fixed structure of a traditional print text

(Eveland and Dunwoody, 2002, 35). The authors note past research which indicates that print and on-line versions of articles yielded little to no statistically significant difference; however found that print advertisements were better remembered than the on-line editions. The authors use two primary theories in this research article. The first is the theory of user control, which assumes that individuals learn in an idiosyncratic way (Eveland and Dunwoody, 2002, 35). The best form of media presentation for one individual is not necessary the best form for another and since an individual's knowledge structures is unique, based upon his or her own set of experiences and abilities, the way that individuals prefer to access information is also distinct (Jonassen, 1998, 14). It is from this theory that the authors hypothesize that content knowledge should be greater among web users than from traditional print users (Eveland and Dunwoody, 2002, 38). The second theory the authors use is that of structural isomorphism, which states that the structure and function of the Web as a medium, mimics in many ways an associative nature of human memory since the Web is "a node-link system based upon semantics structures, it can map fairly directly the structure of knowledge it is representing" (Eveland and Dunwoody, 2002, 40). The authors conclude in an additional hypothesis that elaboration will be greater among Web users than that of traditional print users.

The experimentation consisted of 62 students at a west coast university who were randomly assigned to one of two conditions: Web or print. The Web condition was an on-line magazine, "The Why Files" and used a combination of text, pictures, and graphics and provided freedom for the user with various Web options, such as advertisements (Eveland and Dunwoody, 2002, 42). The print condition was created by organizing Web content into a singular, linear document, 14 pages in length, with all of the Web graphics included in the print version. The participants were given 55 minutes in which to view each form of media. After being exposed to the formats,

the participants took a 26-item quiz on the content of the story, which featured true/false questions, short answer, multiple choice and definition terms. The authors found that the first hypothesis was not supported, as there was no statistically significant difference in the amount of learning facilitated from the print article and the on-line article. However, the experiment yielded a significant difference in the amount of elaboration in on-line users than those exposed to the print article. The results of the study strongly supported structural isomorphism theory; however, there was no justification for the user control theory, which indicated a higher level of retention for the Web over print. This article, while it uses the Internet as one of its experimental forms of media, supports print as the medium that yields a higher level of learning, a useful principle for future research conducted in this article. The experimental design used in this experiment could also be deemed as useful in that a similar study could be conducted using television rather than the Internet versus print. In regards to Salomon's symbol systems theory, the experimental design outlined above on the surface seems to allow the audience to use the same amount of mental effort in viewing each form of media since print was the primary information carrier and each format continued the same pictures and images. Although the symbol systems theory was coined well before the advent of the Internet, one could make these logical assumptions based on the relationship Salomon lays out with the media and advancements in technology (see Chapter 3).

Furnham, Gunter, and Green had similar findings in their article "Remembering Science: the Recall of Factual Information as a Function of the Presentation Mode." In this study, the authors looked at the level of retention from various audiences for a program on information technology. The program was presented in three different forms: audio, with only the sound, transcripts and the television broadcast. Each group was exposed to each separate medium for a 30 minute time period, which was the length of the television program. They were then instructed to write down

all they could remember from the material presented in six minutes, which fell into a free recall format. They were given a questionnaire, which constituted as cued recall. As the authors predicted, the subjects who read the print material were significantly better at remembering the information present than those who listened or watch. A second experiment was conducted from these studies in which the authors tested the language used in the content, in an attempt to “upgrade” written material to fit audiovisual stimuli rather than the other way around (Furnham, Gunter, and Green, 1990, 208). Two scripts of 500 words were written on insect biology, where one was written without complicated or scientific terminology and the other written with heavy technical diction. Two videotapes were made of a “talking head” or a person simply reading the scripts with the “easy” tape being three minutes and 26 seconds and the “hard” being three minutes and 36 seconds. Six groups of 10 were expose to a transcript, video, or audiotape of the easy material or a transcript, video or audiotape of the hard material. They were again exposed to free recall by writing down all they could remember in five minutes and cued recall, answering 15 questions on the material. The authors found that print, again, yielded higher recall than the other two formats. The less complex material yielded a higher overall level of recall than the more complex material, but the audio only media yield better recall with the difficult material and the easy material was recalled better in the audio visual format. This lead the author to believe that not only do the media used have an effect on the level of audience recall, but the material conveyed in those formats also has an effect on the levels of recall. The findings in this experiment coincide with that discussed previously on the symbol systems theory. The authors assign distinctions in regards to the types of media, i.e. being of a “hard” or “easy” nature and the nature of the medium used, not just the content, are discussed as being an emerging factor in the levels of retention the participants exhibit.

Gunter, Furnham, and Griffiths conducted a study to compare children's learning of news information from television versus audio-only or printed text presentations of narrative content. They investigated and compared children's recall of news information in three different formats and tested previous results by looking at the participants' expectations of a memory test and the children's different reading proficiency's. The author's felt that since television is a pictorially based medium that can bypass the process of image generation in the mind, then children would show greater levels of recall when exposed to television news stories than from print (Gunter, Furnham, & Griffiths, 2000, 96). This also led to their conclusion that recall from television would be significantly greater for verbal information that is accompanied by supportive visual material than for verbal-only information. The authors used a sample of 166 children, both male and female, from the ages of 10 and 11 and presented them with five different news stories in either their original soundtrack, televised or print forms. A portion of the children were made aware that they would be tested on the material before hand, serving the aspect of the experiment that performance is based on testing expectations. The memory of the five news stories all tested cued recall, using questions that corresponded directly with events depicted within each news story. The testing showed that children remembered television news stories significantly better than printed news stories. The advantage of television only applied to information that was conveyed both verbally and visually on the television. There was no significant advantage of television for verbal-only information. The results in this experiment were contrary to other experiments done by both Gunter and Furnham that state that print from of media insight greater levels of recall within various viewing audiences (Gunter, Furnham, & Griffiths, 2000). In this article, the author employ aspects of the symbol systems theory; however, the primary purpose of this study was the measure whether a test expectation within the participants effect the level of

retention exhibited. The use of children in this study, while explains differences in levels of retention in adults, does not alter the theoretical framework and therefore, could serve as a solid example for future research in this area.

As technology has advanced over time, other forms of media have joined into the debate of which form of media better facilitates recall of information. In the 2002 article, "Learning from the News in 2000: An Experimental Comparison of TV News, Newspapers, and Online News," Eveland, Seo, and Marton look at the news disseminated during the final days of the 2000 presidential election and conduct a research experiment looking at the amount of recall resulting from newspaper, television and on-line audiences. The authors acknowledge that past research seems to favor a level of superiority in regards to retention from newspapers (Eveland, Jr., Seo and Marton, 2002, 355). They are also quick to add that more recent evidence focuses on television and, under certain conditions, television fosters greater levels of learning than newspaper (Eveland, Jr., Seo and Marton, 2002, 356) and a slight advantage goes to newspapers in regards to learning over on-line sources. In their experiment, the authors use an experimental design that differs from previous research in the area. First, the experimenters used natural content appearing in each medium in order to increase external validity. Second, each exposure of each medium consisted of a complete form of content of each medium rather than a single story. Third, the amount of exposure was held constant across the three media so that reading the print or Web newspaper was not privileged by the longer time it takes to read a newspaper compared to watching a television broadcast.

The experimenters also provided two consecutive days of news, providing a larger base of content for participants to deal with and measurements of the information consumed were tested

after a one-day delay to allow for a natural decay of information. All of these attempts were an effort to increase the external validity of the experiment.

The authors have many hypotheses that come from their research, the first being that attention will be greater in the television-news condition than the print-and on-line news condition. Although attention in newspapers should be higher, the authors argue that attention varies due to particular forms of content and that election coverage would yield higher levels of attention (Eveland, Seo, and Marton, 2002, 354). The authors also hypothesize that elaboration will be greater in on-line and print news than television news due to the pure nature of their coverage and content. They also believe that the number of accurate story recall will be yielded from print and on-line sources than from television news. In their opinion, the inverted-pyramid format of newspapers may facilitate learning by putting the important points of the story first (Eveland, Seo, and Marton, 2002, 363). The researchers used 59 undergraduates from a Midwestern University and were randomly assigned to one of the three conditions: print, on-line news, or television. They were asked to complete a questionnaire gauging their knowledge of the news examples being used and each spent 20 minutes either watching the ABC World News Tonight, the on-line version of the New York Times or the print version of the New York Times. On the second day of testing the students were then exposed to updated versions of the news content from the previous day and were then asked to complete a post-test questionnaire. In regards to their hypothesis that attention will be greater in the television-news condition than the print-and on-line news condition, their research found that attention was higher for the broadcast version of the news rather than print or on-line news. They were unable to support their hypothesis on elaboration. They also found that the number of accurate recalls was marginally less in the on-line condition than in the television news and print newspaper condition, rejecting their

hypothesis that the number of accurate story recall will be yielded from print and on-line sources than from television news.

While it has been noted that the symbol systems theory was developed long before the advancement of media in the form of the internet, this article is being included within this literature review to lay the foundation for future research in the area of on-line media in regards to retention and news learning. Like the pervious articles, the symbol systems theory could logically be applied to such a topic, however, the primary goal of this article was to examine the recall ability and elaboration of recall fostered by print, television and on-line media in the confines of a political campaign. A practical application of symbol systems in this article would likely consider print and on-line media, an on-line newspaper perhaps, as exercising the same amount of cognitive effort in that their means of communication include print and still images. Television, on the other hand, is much more cognitively complex and does a large amount of work for the audience (Salomon, 1979). At any rate, a study such as this using symbol systems as the primary theoretical rational is foreseeable.

Conclusion and Discussion

The previous passage has been an attempt to establish that news learning, in regard to the levels of retention exhibited by an audience, has been a long-studied topic that, for the most part, has been ignored in recent years. While most research in the early development of mass communication focused on the effects of media such as the knowledge gap hypothesis, it seems that little discussion has been made on the complexities that make up the way in which media content is conveyed to an audience. Within the realm of Salomon's symbol systems theory, a theoretical explanation has been established. While much of the research deals with advertising in various formats or the use of television and print in fostering cognitive skills within

adolescents, the theory and information outlined in the symbol systems theory logically could apply to adult audiences and the form of news within the print and television media. The concept that the medium and each aspect of said medium incites retention rather than the news content by itself deserves further research and explanation. In the next chapter, I will take a more in-depth and detailed look at Salomon's symbol systems theory, explain in more detail the concept of symbol systems, discuss some the theory's strength and weaknesses and outline my hypothesis for the purpose of this research.

CHAPTER 3

SYMBOL SYSTEMS THEORY

Introduction

Before moving on, I think it is vital to discuss, in detail, the various aspect of Salomon's symbol system's theory. According to Salomon, media are made up of various symbol systems, which are made up of symbol schema. All entities consisting of technology, contents, instructional situations and symbol systems are different from the sum of their parts (Salomon, 1979,1). Media's symbol systems or "modes of appearance" are the most essential attributes to media. Media remain our primary means of selecting, gathering, storing and conveying knowledge in representative forms and if an aspect of media, such as the symbol system were removed, then that medium would be rendered useless (Salomon, 1979,3). In this passage, I will explain the theoretical basis of symbol systems theory, the relationship between the mind and the media and how symbol systems affect cognition and/or learning, and the ultimate purpose of this research.

Symbol Systems Theory: An Overview

In regard to psychological standards, all learning and cognition is based on the idea of symbolic representation. As Rosenthal and Zimmerman explain, cognition is the process by which an individual uses symbolic representation within the mind to deal with the outside world (Salomon, 1979, 7). If this is to be considered true, then the processing of information as represented through the media and cognition within the individual has a vital and essential relationship. Some would argue that the mode in which media is conveyed does not take priority in regards to cognition over the media being conveyed. Media research in instructional media

seems to lead to the conclusion that “learning seems to be affected more by what is being delivered than by the delivery system” (Schramm, 1977, 273). Other research disagrees. Some studies have found that “newspapers are seen as important links between self and society which cinema are more self-oriented, in respects to self-gratification” (Katz, 1977, 47). Media for the most part, contain the same messages. For example, the information in a newspaper would likely entail the same information found on the evening news. Since learning is facilitated differently for each format and content is similar, then there has to be another reason for the facilitation of learning. Early research pitted various forms of media against each other in an effort to discover which yielded the greater level of learning based on their various symbol systems, but the most typical finding was that “it did not matter what form of symbolic representation (media) one employed, since all resulted in the same learning outcomes” (Olson, 1974, 8).

A symbol system is “an element that refers in specifiable ways to domains of reference and are interrelated according to some syntactic rules” (Salomon, 1979, 20). Symbol systems can be considered systems since each class of symbols correlates with one of a limited number of fields of reference. Symbol systems differ in regards to the reality in which they deal with. With this concept in mind, language, pictures, graphs and numbers are all different symbol systems. Some symbol systems are more obvious and elementary than others. According to Gross, the main modes of symbolic behavior and elementary symbol systems are the linguistic, the socio-gestural, the iconic, the loco-mathematical and the musical (Gross, 1974). Examples of some of these categories are; for the iconic system there are photographs and drawings, while for the linguistic there are poetry and technical language. However, as technologies advance, these systems tend to blend with one another. Derivations that result in increasingly more complex subsystems, such as film and television, are often related to technological advances (Salomon,

1979, 21). When a new form of technology is presented over time, it has a tendency to combine elements from other technologies, creating a multi-symbolic forum.

The interaction between a technology and a symbol system provides us with new ways of reading and retaining information and evolves to make that symbol system unique to each medium. So rather than the medium being the messages, as Marshal McLuhan coined, the interaction between the medium's technology and preexisting symbol systems influence the message of that medium (Salomon, 1979, 23). The symbol system gives the content a distinct form and alters how an audience takes in a particular medium. Media vary with respects to the content they convey but such variations are due to the symbol systems involved. Each symbol system complies with a different field of reference, i.e. photographs with objects (Salomon, 1979, 25). Media differ in regards to the symbol systems they use and with the content they convey. For example, a television news broadcast can offer visible aspects of a news story while a newspaper article on the same topic offers describable content, with little to no visible aspects, which is a result of the different symbol systems used with the form of media. Content correlates with media but are not the defining attributes of the media.

The most effective way of understanding how symbol systems within the media generate learning may be to understand the nature of symbol systems themselves. Any object, movement, gesture, mark or event can serve in a symbolic capacity and most of these examples that generate a level of extractable knowledge are symbols (Salomon, 1979, 29). A symbol system consists of two classes: the syntactic component, which is the atomic and compound symbols, and the rules of convention of combining them, which together constitute a symbol scheme and the correlation with a field of reference (Salomon, 1979, 32). Symbols are characters or coding elements, such as the alphabet, with rules of arranging those elements into schemes. However, rules for various

schemes vary. The rules for putting words together to form a coherent sentence are different from those of arranging, say, visual elements for the formation of a clear and accurate depiction of events. Some are simpler than others to spell out, such as the alphabet and their formation into words and words formation into a sentence. Others, such as television and film, do not have easily governing rules. This would be, as Salomon points out, the differences between the formal rules of prescription and conventions of coherence. Rules of prescription are more or less fixed and inflexible, which develop out of social demands to assure coherent communication. Conventions of coherence are much more flexible and can facilitate communication but cannot prevent misunderstandings and can contain many open ended meanings (Salomon, 1979, 30). However, as social demand increases for a particular media, conventions of coherence can become more formalized. An obvious example of this is the format by which the nightly television news is broadcast. You start with a lead story, followed by local stories, then world news, weather and sports. Most networks follow this stagnant format; yet, the symbol schemes involved are more conventions of coherence because television, generally speaking, operates on flexible rules and formats.

In most symbol schemes, single elements can be combined to create compound formats, hence the example of letters to words, words to sentences, sentences to paragraphs and paragraphs to an article. In pictorial schemes, any symbol can be regarded as a single element and a compound element at the same time (Salomon, 1979, 31). In television or film, based on its temporal and multi dimensions, single shots are sometimes regarded as atomic elements and sequences of shots are seen as compounding elements. A symbol scheme becomes a symbol system when correlated with a field of reference and this field of reference can then said to comply with the symbol scheme and the scheme can be said to apply to its field of reference or

compliance class (Salomon, 1979, 31). For example, objects are the field of reference for photographs and written words are their field of reference for written text. However, the field of reference for one symbol system may itself be a symbol system. In film or television, we may encounter a depiction of a person that in itself, a symbol of an idea or image, such as the cowboy with the white hat representing good (Salomon, 1979,31). The field of reference for a script is words, which is a symbol system that has its own field of reference. There are also content specific items within the field of reference that have no symbol or representation that comply with them, such as the conceptions of we, nevertheless, or in spite of, which can be communicated with language but not with photography or film (Salomon, 1979,31).

The conjunction with the correlation of a symbol system and its field of reference, modes of symbol combination are also correlated within the relationship between the denoted or depicted events. For example, the left to right succession of letters within the English language correlates with the temporal succession of sounds. Film and television have their own symbol combination, as Munsterberg pointed out that, “the arrangement of events in the theater correlate with their order in life, but the arrangement of film correlates to the way we think” (Munsterberg, 1970). The understanding of the symbol systems and their field of reference is an essential concept in term of understanding the theoretical grounds of the symbol systems theory. Without the field of reference, the symbol system is rendered meaningless and could leave interpretation as a relative pointless exercise.

An important concept involved in symbol systems is the idea of notationality, which entails specific criteria for characterizing and classifying symbol systems (Salomon, 1979, 33). There are symbol systems that fulfill the conditions of being notational systems and those that fail to meet these conditions and are nonnotational systems. “A notional systems consists of a set of

discontinuous characters correlated with a field of reference which is similarly segregated so that any character in the system isolates the character that is correlated with it. This ideal contrasts with a continuous system for which no alphabet or set of disjoint characters exists” (Gardner, Howard, and Perkins, 1974, 31). For a system to be notational, both its elements and its referents need to be disjointed and segregated, such that there is a one on one relationship between them. For the most part, language and words are partially notational simply because different meanings can be derived from words with multiple meanings. Nonnotational systems do not permit unambiguous mapping to and from their fields of reference and can lead to multiple meanings (Salomon, 1976, 34). For example, pictures are nonnotational because different meanings can be interpreted from them. A car may represent the number of automobiles manufactured in a given year, but some may see it simply as a car. This is, at times, a questionable and confusing concept. The requirements of notationality, as formulated by Goodman and stated by Salomon, are stringent theoretical standards against which symbol systems can be judged and the only system that meets these standards completely, would be that of musical notation. Language deviates from these standards because they do not meet all of the outlined conditions, but they are notational schemes, rather than notational systems. Television and film deviate in varying degrees of notationality (Goodman, 1968, 153). Because of these differences, it is stated that pictures need to be recognized and words need to be understood because each requires a different amount of mental effort to be processed and understood. There is also a difference outlined in regards to the difference between description and depiction. The more a symbol resembles, copies, or imitates the referent, the more it is a depiction of that object and a symbol that does not resemble its referent, is conventionally designed, or stands for an abstract idea, is to be considered abstract from its referent and is considered to be descriptive (Salomon, 1979, 36).

Symbolic models are usually tangible and use abstract verbal, numerical, or symbolic representations of conceptual systems. Symbols are divided into four classes, with the first being conventional symbols, which are taken to stand for events or ideas in a particular culture (Salomon, 1979, 37). Letters standing for sounds or names standing for objects would fall into this category. Representational symbols are designed to represent the “empirical aspects of reality”. Connotative symbols are morphological distortions of representative symbols in the service of emphasizing or highlighting a particular quality, such as the exaggerated shapes of the subjects in Picasso’s paintings. Qualitative symbols are those in which an organization of qualities are designed to represent some idea or feeling that has neither objective referent nor arbitrary assigned meaning as does a conventional symbol (Salomon, 1979, 37). An example would be how a color is used to evoke thoughts of sadness. Along these guidelines is the concept of resemblance between symbol and a represented object. Representational symbols capture a crucial quality of their referents but conventional symbols have nothing in common with their referents and are considered arbitrary. Connotative symbols deviate somewhat from faithfulness in that they introduce distortions and qualitative symbols entail what they express. Goodman, however, argues that while sometimes present, resemblance is neither a “necessary nor sufficient condition for representation because a picture can depict an object without resembling it” (Goodman, 1968, 229). In Goodman’s opinion, the difference between depiction and description lies in the characteristics of notationality and its correlates. Regardless, the concept of depiction and description has many different interpretations and, for the purpose of this study, I will refer to this concept as Salmon outlined it.

Another important concept in relation to symbol systems is the psychological effects and considerations of their interaction. This is where the concept of resemblance comes back into

play. Resemblance between a symbolic depiction and a referent is often experienced and cannot be ignored. Some objects in the media, such as pictures and television broadcasts appear to resemble their referents more so than others, while other depictions within the media are clearly detached from their referents. For example, small children often misperceive television programs as exact copies of reality while law enforcement agencies use pictures on televised news to identify suspects (Salomon, 1979, 43). One usually knows that a pictorial description is to be treated different from a verbal one and thus uses different mental applications that are specific to pictorial interpretation. Similarity to depicted objects are usually assumed to exist when dense symbol systems are encountered while no such assumptions are made when notational systems are involved (Salomon, 1979, 43). An example would be that an individual could be described as a collection of atoms, as an avid reader, or a politician but the average person would likely reject the first two descriptions based on the fact that they fail to resemble the image or conception we have of that person. Although resemblance is not needed to underlie representation on a philosophical level, psychologically, individuals search for resemblance in nonnotational systems and treat depictions as if they entail real or imaginary attributes (Salomon, 1979, 44). Here in lies a problem. As Salomon argues, concrete objects and events are rarely the intended referents, as in the depicted unicorn, which has no real referent, but donates a mental image. The referents are internal images or conceptions, which a depiction can be perceived to resemble to varying degrees. Resemblance and realism are usually viewed as inherently present in a stimulus or absent from it but, psychologically, it is not the presence of similarity that figures but the perceived one (Salomon, 1979, 45). Realism in objects is often judged from, not the object in question, but against ones own knowledge of an object. For example, a person who is asked to draw a building is given a picture of a building; they are more likely to draw a building, not from

the photograph given, but from their own mental image of a building (Salomon, 1979, 46). This is also true in the absence of an object, where similarity is judged against an internal representation of one kind or another, such in reading text. All of this leads to the ideal of an internal representation in play, which must precede the correct identification of a depiction. Internal schemata of past experiences guide perception and knowledge that determines what stimuli will be picked up from a perpetual field (Salomon, 1979, 46). These schemata, rather than the information entailed, determine how a presentation is to be perceived. Perception is the precursor for understanding and processing new information. This also works in the opposite, as “without a preexisting structure, no information could be acquired at all” (Neisser, 1976, 43). Analog images and objects and transformations are in large part the same whether the transformation or the object is merely imagined or actually perceived and thus, evidence shows that the mental transformation of an object is executed in an “analogous” way to the corresponding external object (Shepard, 1978, 135). A previously encountered symbolic rendering of an object, regardless of symbol system, has given rise to an internal representation that is now perceived as the real object and, in turn, conceptions of realism vary across culture (Salomon, 1979, 48).

With the concepts of symbol schemes, symbol systems and their field of reference and the idea of notationality, I think it is important to discuss these characteristics in direct regards to television and print. While print has been mentioned throughout the examples listed above, I will again restate where language and print stand in these guidelines. First, because of the complexities involved, I will discuss the media of television and/or film in this context. While it appears to be clear where print lies in regards to symbol systems and their point of reference and their notationality, television and/or film remains, at times, a confusing dichotomy of various

symbol systems. Television and/or film is not a symbol system nor does it use one symbol system, but rather it uses many, all derived from different forms of media (Salomon, 1979, 51). Film/television are meeting places for various symbol systems and codes from which many different messages or meaning can be obtained. Compounding within one symbol system is that of dialog and the use of sentences and language, which compounding across symbol systems is evident in the establishment of single shots, each containing different symbolic modes such as pictures, music and dialog. As a symbol scheme, film uses the shot, the sequence, and the whole film and each has its own rules and conventions. However, the comprehension of these together is complex. A sequence of a person looking into the camera, followed by a shot of a house fire, followed by music, playing to scenes from multiple stories upcoming communicates different messages from the same shots in a different sequence. It is true that any arrangement of shots would communicate something, but continuity and coherency is lost (Salomon, 1979, 54). The overall nature of television and/or film leads towards the nonnotational, dense end of the continuum discussed earlier. The majority of television and/or film are pictorial, thus dense, and its modes of articulation do not comply in unambiguous ways with any well-differentiated referent. Thus, interpretation is highly content dependent as is typical of pictures in general but less true of printed text (Salomon, 1979, 57). Printed text, however, is not as complex in regards to symbol systems. Text is, itself, a symbol scheme, which is made up of letters to words, words to sentences, sentences to paragraphs and paragraphs to an article or story. All of this constitutes as symbol systems simply because of their reliance on each other in a field of references. However, text is classified as part notational because, while there is a governing rule to using language and diction, different meanings can be taken from individual words, depending on the

individuals' preconceived knowledge of the subject at hand. The media of television and print will be addressed further.

The Relationship Between the Mind and the Media

Before discussing the effects symbol systems, in conjunction with the media, has on learning, I think it is important to discuss the relationship between the mind and the media. Salomon was quick to point out that the mind and media are two different entities. According to Salomon, one is the "essence of humanity: intelligence, emotion, compassion, will, and creativity" while the other is "impersonal, dehumanizing, dull technology of the mass production of information for mass distribution" (Salomon, 1997, 376-377). However, the two work hand in hand in an exchange of information and gradually, education and retention. Technology and the mind are interrelated in many ways. First, when an individual is exposed to a form of information, or in the case of this research study, media, the use of metaphors comes into play. Technology has long been used as a metaphor to explain human nature. In turn, exposure to media and its content can be viewed in a metaphorical, or symbolic nature. The human mind tends to use metaphors already placed in their individual psyche to help explain and make sense of the information that is before them (Salomon, 1997, 378). This ideal was influenced by the symbolic/representational nature of the information to be learned and was influenced by the growing understanding of both human cognition and the psychology of symbol systems in communication (Salomon, 1997, 379). The media, constructed in the sense of different technologically based use of symbol systems, has had an influence on learning. On the same token, a medium is closely related to the technology that conveys it, but is not equal with that technology. Content and situational factors are key components with the medium; however, if you replace some content or situational factor with something else in a television program, the medium of television sit remains. On the other

hand, if you change the medium from which a message is being illustrated, then you have altered the form of media all together (Salomon, 1979, 19). The technology in which a medium is conveyed is not necessarily what facilitates learning on the part of the observer. The relationship between symbol systems and technology goes hand in hand. When a new form of technology or media develops, it often borrows the symbolic forms and typical contents from another form of technology. This concept is key in regards to the development of television and its symbol system and is discussed further in this chapter.

Symbol Systems and Learning

In light of this concept, it must be stated that the media are modes of expression and communication based on technologies that give rise to new symbol systems or to new blends of symbol systems (Salomon, 1979, 61). By examining the symbol systems associated with each medium, we can focus on the essential characteristics of each medium or what facilitates learning. By focusing on media as combinations of symbol systems, an underlying assumption is that the differences between symbol systems are correlated with differences in meaning and information processing or that symbol systems play different roles in cognition and learning. There is no theoretical, common agreement in regards to the assumption that differences among symbol systems play a significant role in cognition and learning; however, some research has identified structural characteristics of a medium and investigated their relationship to learning, commonly television (Salomon, 1979, 63). Research on other media also points to differences in cognition and learning based on various media's structure. In line with Salomon's research, I will discuss the ideology that symbol systems will vary with respect to the amount of mental translation required for extracting knowledge, the kinds of mental skills required for that purpose, the meaning one can construe from their messages, and the mental skills they cultivate.

First, symbol systems address themselves to different aspects while excluding others. Some emphasize expression, like ballet, description, such as graphs, or depiction, such as photographs, and other are less restrictive, like language (Salomon, 1979, 64). Some are designed to capture such a narrow range of information, that they are often misinterpreted or misunderstood, such as dance movements. Symbol systems, each, have unique capacities and each set parameters upon what can be conceived and expressed. For example, in a photograph of a car accident, we are only allowed to know what the photo tells us and in a newspaper article on the same accident, we are only allowed to know what the article tells us. How we perceive information from a medium depends on the symbol systems used. However, symbol systems used by media are not mutually exclusive in regards to what they render. Barring cases in which, as symbol system is not equipped to represent some aspect of content, there are overlaps between the symbol systems and media (Salomon, 1979, 65), such as when film tried to convey the content of a novel. While some material may transfer, there is still some degree of information lost due to the different symbol systems each medium employs by nature. Some symbol systems are better suited to carry particular content than others. If one medium has the means to represent a particular aspect while another does not, then this characteristic must be held true. Language allows a speaker to inform a listener of past, present, future, possible, or conditional states of affairs, but pictures cannot perform such functions (Gombrich, 1974). Another way of looking at this aspect is by looking at the resemblance between the presented and the represented. One symbol system that more closely resembles the referent can better convey it (Salomon, 1979, 66). However, there is no one way that the world really looks. Rather one can speak of “the correspondence between how an aspect of the world is presented and the image, conceptions, or the schemata into which it is assimilated” (Salomon, 1979, 66). The factor that makes one mode of presentation better than

another is the correspondence between the coded message and the mode in which it could best be internally represented and processed by a given person. Psychologically, it has been found that, over time, cross-modal association in the brain allows increased combinations between incoming modalities, as the left hemisphere of the brain plays a major role in the processing of linguistic, notational symbol systems and the right processes dense figurative ones (Gazzaniga, 1974). It becomes reasonable to assume that different symbol systems are processed by different cognitive systems or “externally coded messages need then to be transformed, elaborated on, and translated into one’s preferred internal symbol system” (Salomon, 1979, 68). Novels and movies are easier to comprehend when the natural order of events is maintained than when they are full of flashbacks and reversals, but since the latter invite deeper processing, they are more interesting to read and/or watch (Kintsch, 1977, 315). The amount of mental elaboration has an effect on the correspondence or match between the communication and internal representation within the brain. For example, the amount of mental elaboration required by a sentence depends on the distance between the presented surface structure of the sentence and its internal base structure. Because of this, symbol systems can put a heavier or lighter burden on the receiver of the message, depending on the symbol presented and the receiver’s schemata. The closer correspondence between the two, the better processing of the message. As Cronback and Snow write, “The learner with low verbal ability is poor at formulating in words what he observes, hence, it would be reasonable for the treatment to provide verbal statement for him. The high-verbal learner who is weak in visualization might be supplied with extensive diagrams and left to generate his own verbal representations” (Cronback and Snow, 1977, 170). The comprehension of text is assumed to be aided by the generalization of imagery like meanings and this generalization requires elaborations (Salomon, 1979, 70) and thus when children who are asked

to learn prose are given ready made pictures to accompany it, their learning improves. By providing them with images, the process of mentally generating images is circumvented and allows the facilitation of learning to occur by saving additional elaborations. Television, a pictorial based medium, may, in fact, short-circuit imagery generation and become easier for an individual to understand. Different symbol systems require different amount of mental translation. However, while this example applies to children, age can make a difference. Salomon points out that older children can process verbal information more so than pictorial and need the assistance of visual guides less. Cognitive development plays an important role in the amount of mental translation required for comprehension (Salomon, 1979, 71). For a learner who is more proficient at internal verbalization, a pictorial person may be more demanding than a verbal one (Salomon, 1979, 71). Another factor that may play a part in the amount of elaboration needed to comprehend the contents of a medium is the task to be performed or the task one selects to perform. For example, studying a list of paired associates in a rote manner requires less mental elaboration than attempting to generate sentences or images that interrelate the paired associates (Salomon, 1979, 72). According to Olson and Bruner, information is dependent on or is limited by the purpose for which it was acquired (Olson and Bruner, 1974, 127). One symbol system communicates better, or mental easier, than another because one symbol system can present information in a better correspondence to the mode of internal representation that an individual with a given cognitive make-up can utilize (Salomon, 1979, 73). With this in mind, pictures do not communicate better than verbal or textual descriptions, rather they can communicate better to the extent that the symbolic code they use comes closer to the internal representation that the receiver can generate. On the same token, if a person needs verbal presentation to assist in mental elaboration, then verbal presentation would facilitate his

performance. Along these same lines, it could be said that television could facilitate learning to the extent that its pictorial symbolic components are used to short circuit critical mental elaborations that viewers may have trouble carrying out (Salomon, 1979, 74). This is especially true in children, however, would vary in an older audience.

In regard to mental skills, one may ask if the content were held constant, would the same mental skills be necessary for an extraction of knowledge? In this context, skill is the same as mental processing. As touched upon earlier, different symbol systems correspond with different parts and functions within the brain, even circumventing some. It is logical to conclude that different skills are utilized when different symbol systems interact with different process in the brain. Symbol systems are neither better nor worse but are simply different as the degree of notationality varies and as they differ in style of information processing they require of the viewer or the reader (Perkins and Leonard, 1977, 9). However, language based skills, such as reading, are required by the very nature of language or script. It is unreasonable to expect these mental processes to be the same as those that would be used to deserver other forms of media, that are say, picture-based. The same could be said for picture-based media, as they would employ different mental skills than those that are driven by text. Due to their different natures, symbol systems in media vary to the amount of mental skill they require in the exercise of extracting and processing (Salomon, 1979, 77). One has to transform or recode a message from one code to another to obtain meaning from it. A mastery of reading skills does not translate to a master of skills needed for watching television, composing music, or even reading maps (Salomon, 1979, 78).

With the concept of different mental skills in mind, one could ask themselves, if content were equal, would different symbol systems lead to extraction of information and consequently,

to the same meaning? As symbol systems are different, one could state that the meaning of the information, regardless of identical content, would be formulated differently. However, it has been stated by Olson and Bruner that symbol system may diverge as to the skills they require but converge as to the knowledge they specify because knowledge is always mediated or specified through some form of human activity and that knowledge acquired through any such activity has two facets – knowledge about the world and knowledge about the activity used in gaining knowledge (Olson and Bruner, 1974, 132). While the knowledge about the world reflects the content of the message, knowledge about the activity reflects the symbol systems within the process. Knowledge, however, does not necessarily stay in the system in which it was initially processed nor does it stay unconnected to other reliable knowledge. As we have a wider knowledge base pertaining to some entity, the less symbolically specific it is likely to be (Salomon, 1979, 79). The newer information is, the more its processing will be symbol system specific. Furthermore, more novel information requires more mental elaboration. As more elaboration needs to take place and as symbol systems specific skills are evolved, different meaning ought to be constructed. The extent to which different symbol systems yield different meanings, other things will be equal, is a function of the novelty of the conveyed information (Salomon, 1979, 80). For example, it may not matter through what symbol system an individual acquires information on automobiles, but it may matter if it was from an article or a television program. Each mode of presentation has unique characteristics in regards to how they carry knowledge. Because most media is not held constant, rather people are free to chose what form they take in and how often, it is fair to say that different media are found to serve different functions and provide different types of benefits (Salomon, 1979, 81). As discussed earlier, if television allows easier processing because many mental aspects are circumvented by the visual

presentation it provides, then the meaning one would gain from television is likely to be less elaborate than the meaning one would gain from reading, which requires more mental elaboration than television (Salomon, 1979, 81). The meaning from television is likely to be segmented, concrete and less inferential and the meaning from reading has a higher likelihood of being tied to ones stored knowledge.

The ideology that different symbol systems in media calls for different mental skills also leads to an individuals ability to call on and cultivate successful utilization of these skills. A mode of presentation can cultivate a skill to the extent that it reinforces its use on a higher level and as the skill requirements of symbol systems differ, so do the mental skills they cultivate (Salomon, 1979, 82). Although this may differ from the previously stated idea that some symbol systems in media save mental effort, the ability used in reading a chart, graph or pictures is still a developed skill. Each form of experience, including the symbol systems tied to the media, produces a unique pattern of skills for dealing with or thinking about the world and it is in these skills that we can call intelligence (Olson and Bruner, 1974, 149). Along these lines, it is possible to see symbol systems serving a dual function: they serve as communication and as internal representations (Salomon, 1979, 84). Some symbol systems can be internalized to serve as vehicles of thought and they vary to the mental skills they call upon and cultivate. Regardless, learning occurs, not only in regards to the exposure to symbol systems and the content they carry, but how mentally to interpret symbol systems as an individual is exposed to them.

Application of the Symbol Systems Theory and the Introduction of Hypotheses

The characteristics outlined above make up what Salomon coined, the symbol systems theory. According to Salomon, each medium is capable of conveying content via certain inherent symbol systems and information from symbol systems, not the specific content, leads to retention.

Furthermore different symbol systems are characteristics of different media and there are different aspects within each symbol systems and the individual taking in the information that leads to learning. It has been suggested throughout this chapter that television, especially in younger audiences, may lead to improved levels of cognition because pictorial elements often surpass much of the work the mind has to do in regards to connecting symbolic representation. Print, on the other hand, requires the reader to call upon his or her own knowledge and makes the connection from the word to an mental image, making it, at least on the surface, seem as the more difficult or mentally taxing, to comprehend. However; in regards to fostering learning, it has been suggested that learning and the development of mental skills is fostered by material that calls for more invested mental effort, such as reading. While television may foster comprehension better within children because it requires the use of less mental skill, reading leads to a greater level of knowledge because of the amount of mental effort required, it remains in the mind of the reader and is not easily discarded.

Salomon's defines print media as a "hard medium" because more mental effort is involved in obtaining information, thus leading to higher levels of retention, and television is a "easy medium" because it requires less mental effort to retain information thus leading to lower levels of retention. Salomon stresses that media is about representation and without images or text the messages are lost. In turn, a person may acquire information about a subject they are familiar with equally well from a different medium but their ability to gain or understand and retain novel information may be significantly influenced by the symbol systems used in different media. In essence, the symbols discussed by Salomon are made up of the very items that make up the media: text for print media and images, audio, and text for television. As discussed in the pervious section, Salomon made a distinction between the amount of mental effort involved in

understanding and comprehending knowledge from printed text and that from retaining or understanding information as it pertains to a television program. Later, Salomon termed this concept as AIME or the amount of invested mental effort. However, the meaning extracted from a given medium depends upon the learner. Thus, a person may acquire information about a subject they are familiar with equally well from different media but comprehension may be significantly influenced by different media for novel information.

In looking at studies regarding retention levels in print and televised media, it is my belief that retention levels will be greater in those who prefer to receive their news via newspapers and magazines rather than television. According to the studies reviewed, print media takes more AIME and remains in the minds of individual audience members more so than that of television news. News learning is obtained at a more in-depth, information rich level through print media. As supported by Gunter and Williams, the superiority of the print medium lends support to the hypothesis that reading engenders a deeper and more effective level of cognitive information processing than does viewing or listening (Gunter and Williams, 1987, 122). Furthermore, the authors point out that 57% of a survey sample were able to recall, in fair detail, news stories they had read about in the newspaper during the previous 24 hours, whereas only 45% could recall news stories they had seen on the nightly news equally as well (Gunter and Williams, 1987, 117).

Although Salomon makes the claim that comprehension occurs within audiences more so from television based on the relative ease in which the media is comprehended, he also states that this is a commonality in children and that as a child begins to develop, his or her mental schemata increase and, therefore, reliance on visual images to learn decreases. He is also quick to point out that the fostering of mental skills is done more in the avenue of reading or print. In this

aforementioned 1984 article, Salomon also found that students judged television to be easy, so they invested less effort, and students judged print to be difficult, so they tried harder and, in turn, the print group was able to make more correct inferences. Therefore, my first hypothesis for this study is:

H1: Retention levels will be higher among individuals or audiences that obtain their news or current events from print forms of media, specifically newspapers, than individuals or audiences that obtain their news from televised news programs.

Furthermore, it has been discussed within the context of this chapter that mental skills can be cultivated over time by exposure to media and their symbol systems. Interpretation and retention of messages within a symbol system is increased over time with continuous exposure to these forms of media, leading individuals to become, mentally, better equipped to apprehend knowledge when presented with a familiar symbol system. Taking into account Salomon's belief that reading fosters greater retention of information because of the increased amount of mental effort used over the pictorial-based symbol systems employed by television, it is my belief that frequent readers of the various forms of print media will have a better overall grasp on current events as a whole and their interpretations of newsworthy events are going to be more in-depth and detailed than will the interpretations of those who receive their news and information through televised news broadcasts. Because the use of AIME is much more invested, or as Solomon termed it, "hard," it is logical to conclude that frequent newspaper reading audiences will retain the information they have for a longer period of time and thus will have better recall when questioned about their overall level of knowledge in regard to current events. Therefore, my second hypothesis for this study is:

H2: Newspaper reading audiences or individuals will have a better overall knowledge of current events than those audiences or individuals who obtain their news from television news programs.

In the next chapter, I will discuss the material used in this experiment and the experimental design.

CHAPTER 4

EXPERIMENTATION AND METHODS

Past Research Experiments

In determining a method for such an experiment, I think it is important to look at the experiments conducted in the primary research listed within this thesis. Experimentation in regard to Salomon's concept of symbol systems, at times, appears to be challenging. The concept of symbol systems and the concept that the symbol systems within the various forms of media foster learning and retention rather than the message itself is more of a justification theory. Within the body of work I studied in regard to this research, I found no particular statistical method employed by Salomon. In regard to similar studies conducted by Salomon's peers, a variety of statistical methods were used in testing the results of research conducted. In the study discussed earlier, Beentjes and van der Voort used 44 fourth- and sixth-graders, exposed half of the children to the written story *The Ravine* and exposed the other half to the television movie *The Drawling Half*. After said exposure, the authors tested both groups of children on their levels of retention of the information they were provided with. The children were grouped according to reading level, with the top reader and bottom reader each ending up in the same group and so on, so all the groups were balanced in terms of reading ability.

Each child was tested separately and the authors found that, contrary to their hypothesis, the children retained the information from the television movie more so than that of the material that was read. However, the experimenters also used two different forms of information and formats, thus leaving the results of the experiment disputable. A more reliable experiment would have used the same content and would have made the testing materials identical.

Tripp's experiment was similar in that he tested individual audiences, exposing one group to print and one to the same passage in an audio format. In accordance with Tripp's hypothesis, the students exposed to print yielded higher retention scores and the t-test statistic found that the mean differences between the two groups were significant. Using college students might explain the retention differences, as they would have higher levels of education. Plus, Tripp used the same content, changing only the formats in which the content was provided, thus enabling him to have a fair comparison in regard to retention levels.

In the articles discussed above, quantitative research methods were used in the process of gathering and interpreting information. In the Beentjes and van der Voort articles, the authors were able to control the environment the studies were conducted in, the information that was provided, and in what manner that information was provided. Without the power to control what types of print and television media were provided in the experiment, the findings would mean little. In my opinion, providing the subjects with the same media and content will lead to a more substantial measure of retention and comprehension in a test audience. In an experiment such as this, it is important to control as many factors or variables as possible to get the most accurate results.

Salomon states in his 1984 article that the effectiveness of a medium, when it comes to retention, depends on its match with the learner, the context, and the task involved. "For effective instructional communication, a match needs to be established between the cognitive demands of a learning task, the skills that are required by the codes of the message, and the learner's level of mastery of these skills" (Salomon, 1984, 112).

Television and Newspaper: Identical Twins

I think it is important that the content of the two forms of print and televised news used match up identically. However, when looking at the formats for newspaper and television, that is almost an impossible task. In fact, Salomon states that symbol systems differ to the types of content they represent, hence “it would be virtually impossible to manipulate experimentally only symbol systems without at the same time, varying content” (Salomon, 1979, 88). Furnham and Williams acknowledge this problem, stating that the research in the area of media and cognition confounds the stimulus and medium for which they are prepared. “The media contains different information in terms of content, length, style and pictorial content and thus, it is impossible to separate channel or media from the content of the advertisement itself” (Gunter and Williams, 1987, 118). Newspapers, by nature, are much more in-depth and detailed, content-wise, than television news broadcast. While the average newspaper article might be 12 to 14 inches in length, television news can take the same topic and compact it into a two- to three-minute sound bite or less. Using these two formats would yield misleading results and would provide an unfair, inaccurate testing criterion. There are two possible solutions to this problem. First, one could create a fictional news broadcast and create a corresponding fictional newspaper article that would contain the same material in the news broadcast. However, a more exact method would be to find a television news broadcast that would more closely resemble the content you would find in a newspaper article. Therefore, one of the many television “news magazines” would provide the in-depth content that one would be looking for in an experiment such as this. For this experiment, I used a news clip from the November 30, 2003 edition of Dateline NBC dealing with the safety of luxury SUV automobiles in the event of an accident. I do feel that a more dated, or older, news broadcast would provide a more exact measurement of the retention levels

of the participating audience because a dated news clip would more likely be out of the short-term cognitive memory of the experiment's participants, eliminating the likelihood that the participants' prior knowledge of a subject would skew the results of any retention studies or scores. However, due to availability, this particular broadcast will serve the purpose of this study. The clip, lasting less than six minutes, was then transcribed and laid out in a newspaper format using the newspaper design program Quark Express 5.0. The text from the news broadcast yielded over 26 inches of text in a 1.5-inch column, similar to what you would find in a typical six-column tabloid newspaper. That much text would be considered an in-depth investigative article in a newspaper. For the purposes of this study, the article was laid out in a typical US Letter, 8.5 by 11 inches format with four columns. The title of the news story was used as the article's headline and the article's subheading, with the reporter's name, Andrea Thompson, going as the article's by-line. The introduction provided by NBC anchorman Stone Phillips was used as a deck on the article. While images for the two formats are not identical, the photo used in the print version of the television report came from an image shown during the news broadcast. The designed document is attached as Appendix A of this research thesis.

In accordance with past experiments cited previously in this chapter and in Chapter 2, the design of this experiment will involve exposing two audiences to the two forms of media in question: television and newspaper. Each participant was asked to watch or read the corresponding material. The television news broadcast, which lasted 6 minutes and 42 seconds, was shown in its entirety. Those who were exposed to the newspaper article were asked to read all aspects of the article. They were instructed to read the article only one time and asked not to go back at any time during the process to reread any material. They were then instructed to turn the article over upon completion, which was then collected from the participants. The audience,

in both experiment groups, were administered a questionnaire. Fourteen questions dealt with the content from the news clip and the newspaper article. They were also asked to answer seven questions to measure their overall media knowledge. These questions dealt with current issues in the news over the past six months, from June through November 2003. In composing the questions based on the story used in the newspaper article and the Dateline NBC feature, I watched both the program and read the transcripts to note all of the material that was presented in each. I took notes and went back several times to make sure that the questions at hand were clear and that these were aspect discussed thoroughly throughout the article and television feature. I also noted the text used in the transcript/print article in terms of the level of difficulty in decoding the symbol system. For example, it has been discussed that television does much of the work form the audience in term of mental comprehension; however, the reader has to do that work on their own. I wanted to make sure the text would allow the individuals who were exposed to be able to comprehend the information. The remainder of the questions pertained to the participants' personal media intake, such as what form of media they prefer to get their news from, the average time per week they read the newspaper, how many hours they watch television news, and why they prefer particular forms of media over others. A copy of this questionnaire can be found in Appendix B of this research thesis.

The number of questions they got correct on the questionnaire measured the levels of retention exhibited by the individuals in each group. To determine which medium yielded a higher level of news learning, I simply compared the mean averages for each group and tested the statistical significance of the differences using a t-test.

It is important to note that the questionnaire in this experiment tested the individual participants' cued recall of the information presented within the forms of media. Cued recall is,

generally speaking, one's ability to recall information when there are specific cues in place, such as multiple choices for the corresponding questions from the content in this experiment. This allowed for a more static form of testing. The other option would have been to test the participants' free recall, which would have asked them to simply write down what they learned from the content within the exposed material. This method would have been more difficult to test and might have broadened the range of responses, making comparisons more difficult. Plus, Salomon stated that information that may be new to the audience for which it is exposed is better tested with cued recall in a relatively short amount of time to better gain an understanding of the information learned (Salomon, 1979).

Participants and Procedure

Over a two-day period, 58 University of Georgia undergraduates, juniors and seniors, from the Grady College of Journalism and Mass Communication participated in this study. The students were enrolled in Telecommunications 3210 for the Fall 2003 semester. The students were randomly assigned into two groups, one consisting of 28 and the other consisting of 26 people. Gender was not an issue in this study, as the participants broke down as 26 males and 28 females with 14 males and 12 females in the newspaper group and 12 males and 16 females in the television group. All of the students in the participating samples were white. All of the participants indicated that they were between the ages of 18 and 24.

The group of 28 was exposed to the television program on December 2, 2003, while the group of 26 was exposed to the newspaper article on December 4, 2003. Both tests occurred at the end of the students' class that day. They were asked to answer 14 questions of the video or newspaper article and 7 questions on their overall media knowledge that covered current events over the past six months. The students were made aware of the fact they were being tested when

exposed to the independent variable or the content of each form of news. The remainder of the questions measured their preferred form of media, how often they are exposed to television news and the newspaper, and why they prefer a particular medium. The students were instructed to not talk during the administration of the test and were asked to not talk about the material they were tested on outside of class. They were also told that they would remain anonymous, as all forms of identification, with the exception of age and gender, were not on the questionnaire. They were also told that they were not obligated to participate and they were free to leave at any time. The students were made aware that their course work would not be affected in any way by their participation in the experiment. The test was administered after each group took in each form of media. They were allowed to leave the testing room once they had completed the questionnaire and were supplied with information to contact me if they had any questions or concerns about their participation in this experiment. The results of this experiment are discussed in the next chapter.

CHAPTER 5

RESULTS

Description of Data

The number of questions he or she answered correctly determined the individual retention scores of the 54 participants. For hypothesis one, the first 14 questions pertained to the information found in the television news story and the newspaper article. The following seven questions asked about information that was prevalent in the news over the past six months. The last eight questions asked about the participant's individual media use. An initial perception of the information appears to show a difference between groups. The mean averages for the newspaper group on questions 2 through 15, which measures their retention of the newspaper article is at 9.69 out of 14, which is higher than the mean score of the television group, which is at 9.03 out of 14. The mean averages of the correct answers for the 7 questions measuring the participants overall level of knowledge in terms of current events also appears to be higher for the television group than the newspaper group; 5.46 out of 7 to 5.10 out of 7. However, there were only nine individuals who indicated that they preferred newspapers to television for their source of news, leaving the figures to be skewed. Since the participants were asked to measure the amount of time they spend reading the newspaper, the second hypothesis of this experiment could be tested again. Rather than looking at which form of media they preferred, I looked at the actual frequency in which the participants read newspapers. With a sample of 23 participants who either read a newspaper daily or four to six times a week, I felt that a comparison with those who read the newspaper less might yield the results I was looking for. The group that was considered a frequent reader of the newspaper had an average mean score of 5.52 out of 7, which

was higher than the 5.09 out of 7 mean average for individuals who were exposed to newspapers less frequently. These findings and potential statistical significance will be discussed further in this chapter. Below is a chart listing the questions asked in the questionnaire along with the frequency of answers for each of the choices. The underlined answer under each question is the correct answer.

TABLE 4-1: Distribution of answers between newspaper and television groups

QUESTION	NEWSPAPER	TELEVISION
1. Did you: A. Read the news article? B. Watch the news program?	A – 26 B - 0	A – 0 B - 28
2. What was the subject of the article/television program you just read/watched? <u>A. Crash testing of midsize SUVs on the market.</u> B. Crash testing of new luxury cars on the market. C. Crash testing of old, vintage cars. D. Both A and B.	A – 20 B – 0 C – 0 D – 6	A – 21 B – 0 C – 0 D – 7
3. What organization tested the cars in the article? <u>A. The Insurance Institute for Highway Safety.</u> B. The Institute for Vehicle Safety. C. The Insurance Adjusters of America. D. The National Institute for Highway Safety	A – 17 B – 4 C – 0 D – 5	A – 16 B – 7 C – 0 D – 5
4. How does the organization in the article/television program acquire the vehicles used in the testing? A. They have already been in an accident. B. They steal them. C. They failed the governmental safety standards. <u>D. They bought them.</u>	A – 0 B – 0 C – 1 D – 25	A – 0 B – 0 C – 1 D – 27

<p>5. How many cars are used in this study?</p> <p>A. 6 B. 7 C. 8 <u>D. 9</u></p>	<p>A – 9 B – 4 C – 3 D – 10</p>	<p>A – 1 B – 2 C – 4 D – 21</p>
<p>6. Of the vehicles tested, which of the following was deemed the worst as far as safety is concerned?</p> <p>A. The Nissan Murano. <u>B. The Kia Sorento.</u> C. The Toyota 4Runner. D. The Cadillac SRX.</p>	<p>A – 1 B – 22 C – 1 D – 2</p>	<p>A – 1 B – 27 C – 0 D – 0</p>
<p>7. When tested last year, which of the following cars had airbags that didn't release on time?</p> <p>A. Lexus RX330. <u>B. Infiniti FX35.</u> C. Cadillac SRX. D. The Toyota 4Runner</p>	<p>A – 3 B – 16 C – 5 D – 2</p>	<p>A – 8 B – 14 C – 1 D – 5</p>
<p>8. A representative from Mitsubishi used which of the following words to describe the organization's testing procedures?</p> <p>A. Effective. B. Severe. C. Unnecessary. <u>D. Pleasing</u></p>	<p>A – 18 B – 1 C – 1 D – 6</p>	<p>A – 12 B – 0 C – 0 D – 16</p>
<p>9. The organization's president said "There's no question the manufactures have been listening and they've been working to improve performance." What was that person's name?</p> <p>A. Ed O' Neill B. Dan O' Neill <u>C. Brian O' Neill</u> D. His name was not used in the article/television broadcast.</p>	<p>A – 6 B – 6 C – 12 D – 2</p>	<p>A – 11 B – 6 C – 7 D – 2 NA-2</p>
<p>10. Which of the following cars was modified after testing to meet the organization's standards as a best pick?</p> <p>A. Lexus RX330. <u>B. The Honda Pilot.</u> C. The Toyota 4Runner. D. Cadillac SRX.</p>	<p>A – 0 B – 23 C – 1 D – 2</p>	<p>A – 2 B – 23 C – 1 D – 22</p>

<p>11. What was the price of the most expensive car used in this experiment?</p> <p><u>A. \$44,000</u></p> <p>B. \$52,000</p> <p>C. \$34,000</p> <p>D. \$62,000</p>	<p>A – 18</p> <p>B – 3</p> <p>C – 1</p> <p>D – 4</p>	<p>A – 21</p> <p>B – 6</p> <p>C – 0</p> <p>D – 1</p>
<p>12. What was the price of the cheapest car used in this experiment?</p> <p>A. \$20,000</p> <p><u>B. \$24,000</u></p> <p>C. \$26,000</p> <p>D. \$34,000</p>	<p>A – 4</p> <p>B – 20</p> <p>C – 2</p> <p>D – 0</p>	<p>A – 7</p> <p>B – 20</p> <p>C – 0</p> <p>D – 1</p>
<p>13. What was the highest rating a vehicle could receive?</p> <p>A. Good</p> <p><u>B. A best pick</u></p> <p>C. Excellent</p> <p>D. Satisfactory</p>	<p>A – 8</p> <p>B – 17</p> <p>C – 1</p> <p>D – 0</p>	<p>A – 11</p> <p>B – 17</p> <p>C – 0</p> <p>D – 0</p>
<p>14. What types of injuries were suffered when the Mitsubishi Endeavor was crashed?</p> <p>A. An arm injury.</p> <p>B. A neck injury</p> <p>C. A leg injury.</p> <p>D. A and B.</p> <p><u>E. B and C.</u></p>	<p>A – 0</p> <p>B – 0</p> <p>C – 0</p> <p>D – 1</p> <p>E – 25</p>	<p>A – 0</p> <p>B – 8</p> <p>C – 0</p> <p>D – 0</p> <p>E – 20</p>
<p>15. What was the title of this article/video?</p> <p>A. Luxury SUVs: Death trap or safe haven.</p> <p>B. Not so tough? SUV crash tests.</p> <p><u>C. Midsize SUV crash tests: Which SUVs have results to back up their tough images?</u></p> <p>D. Blood on the highway: SUV safety standards.</p>	<p>A – 0</p> <p>B – 4</p> <p>C – 22</p> <p>D – 0</p>	<p>A – 1</p> <p>B – 21</p> <p>C – 5</p> <p>D – 0</p> <p>NA-1</p>
<p>1. At the conclusion of the United States war with Iraq, which of the following members of the U.S. government will oversee the reconstruction of Iraq’s government?</p> <p>A. Dick Cheney.</p> <p><u>B. Donald Rumsfield.</u></p> <p>C. Colin Powell.</p> <p>D. George Bush.</p>	<p>A – 2</p> <p>B – 11</p> <p>C – 8</p> <p>D – 5</p>	<p>A – 2</p> <p>B – 9</p> <p>C – 13</p> <p>D – 4</p>

2. What was the name of Scott Peterson's wife, who he is accused of killing? A. Lori. B. Layne <u>C. Laci</u> D. Lana	A - 3 B - 0 C - 23 D - 0	A - 3 B - 1 C - 25 D - 0
3. From which country did SARS originated? A. Hong Kong. <u>B. China.</u> C. Canada. D. Japan.	A - 6 B - 18 C - 1 D - 1	A - 3 B - 22 C - 1 D - 2
4. Which of the following bests describes the new Georgia state flag? <u>A. Red and white strips with the state seal of Georgia.</u> B. Peach colored, with a Peach in the center of the state. C. A picture of a grinning Sonny Perdue. D. The Confederate flag.	A - 25 B - 0 C - 0 D - 1	A - 28 B - 0 C - 0 D - 0
5. A firefiight in Iraq broke out this past weekend. How many Iraq's were killed in that firefiight? A. 20 <u>B. 46</u> C. 67 D. 200	A - 7 B - 18 C - 1 D - 0	A - 12 B - 9 C - 4 D - 3
6. What drug did Rush Limbaugh go to rehab for? A. Cocaine. B. Heroin <u>C. Prescription medication</u> D. Alcohol	A - 1 B - 0 C - 22 D - 3	A - 0 B - 1 C - 23 D - 4
7. Who is John Allen Muhammad? A. A high-ranking official in the Iraqi government. B. A wide receiver for the Carolina Panthers. C. A member of Al-quidia <u>D. The D.C. Sniper.</u>	A - 0 B - 0 C - 3 D - 23	A - 1 B - 0 C - 3 D - 24
1. The participants' sex: <u>A. Male.</u> B. Female.	A - 14 B - 12	A - 12 B - 16

<p>2. You are between the ages of:</p> <p>A. 18-24 B. 25-30 C. 31-35 D. 35 or older</p>	<p>A – 26 B – 0 C – 0 D – 0</p>	<p>A – 28 B – 0 C – 0 D – 0</p>
<p>3. The highest level of education you have obtained:</p> <p>A. Some high school B. High school diploma/GED. C. Some college D. Associate degree E. Undergraduate degree F. Graduate degree</p>	<p>A – 0 B – 5 C – 21 D – 0 E – 0 F – 0</p>	<p>A – 0 B – 0 C – 24 D – 3 E – 1 F – 0</p>
<p>4. Which form of media do you prefer to get your news from?</p> <p><u>A. Television.</u> B. Newspaper/Magazines C. Radio D. Internet E. Other</p>	<p>A – 16 B – 5 C – 1 D – 4 E – 0</p>	<p>A – 20 B – 4 C – 0 D – 3 E – 1</p>
<p>5. If you prefer to get your news from newspaper than television, indicate why.</p> <p><u>A. It's more in depth and I feel I get more information out of it.</u> B. I simply prefer to read the news rather than watch television. C. I can't afford a television or do not own one. D. I get my news from both equally. E. Other</p>	<p>A – 0 B – 2 C – 0 D – 2 E – 1</p>	<p>A – 3 B – 0 C – 0 D – 3 E – 0</p>
<p>6. If you prefer to get your information from television news rather than newspaper, indicate why.</p> <p>A. I don't have the time to read a newspaper. B. I prefer to watch the news. C. I feel I learn more from television news. D. I get my news from both equally. E. Other.</p>	<p>A – 2 B – 7 C – 0 D – 5 E – 2</p>	<p>A – 4 B – 11 C – 3 D – 3 E – 1</p>
<p>7. How many times a week do you read a newspaper?</p> <p>A. Daily B. Four to six C. One to three D. None</p>	<p>A – 6 B – 4 C – 12 D – 4</p>	<p>A – 4 B – 8 C – 13 D – 2</p>

8. How much time do you spend watching television news? Please include time spent watching news magazine programs, such as 20/20, Dateline and 48 hours. A. 14 or more hours B. 7 to 13 hours C. 1 to 6 hours D. None.	A – 1 B – 0 C – 25 D – 0	A – 1 B – 3 C – 23 D – 1
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A study of the individual questions and the results yielded by each seems to indicate that the information was tested for varies accordingly. The only question that may be problematic seems to be #15, which asked what the title of the article is. The newspaper group had very little trouble with this question, as 22 of the 26 participants answered correctly. However, the television group had only 5 correct responses, with 21 people in the group indicating that the title of the piece is “Not so tough? SUV crash tests”, which was never used in the television clip. Outside of this question, there seems to be an even distribution of answers for each question among the groups. I felt comfortable with this aspect of the experiment. I also believe that the questions on the overall level of knowledge should have been a little more specific; however, there is a level of difficulty in determining a list of questions that would measure the media knowledge of both television and newspaper audiences. After all, according to the work cited in this study, different forms of media contain different symbol systems and, in turn, lead to different levels of news learning. I also believe that seven questions to measure a person’s media knowledge are not enough. The number of questions should have been increased and more in-depth. As far as demographical and media intake information, I, again, was pleased. Through the questionnaire, I was able to find out information I’m not sure if the participants in the study were even aware of. Of the 54 individuals who participated, only nine indicated that they prefer getting their news from the newspaper than television. What I found of particular interest was the fact that 23 of the

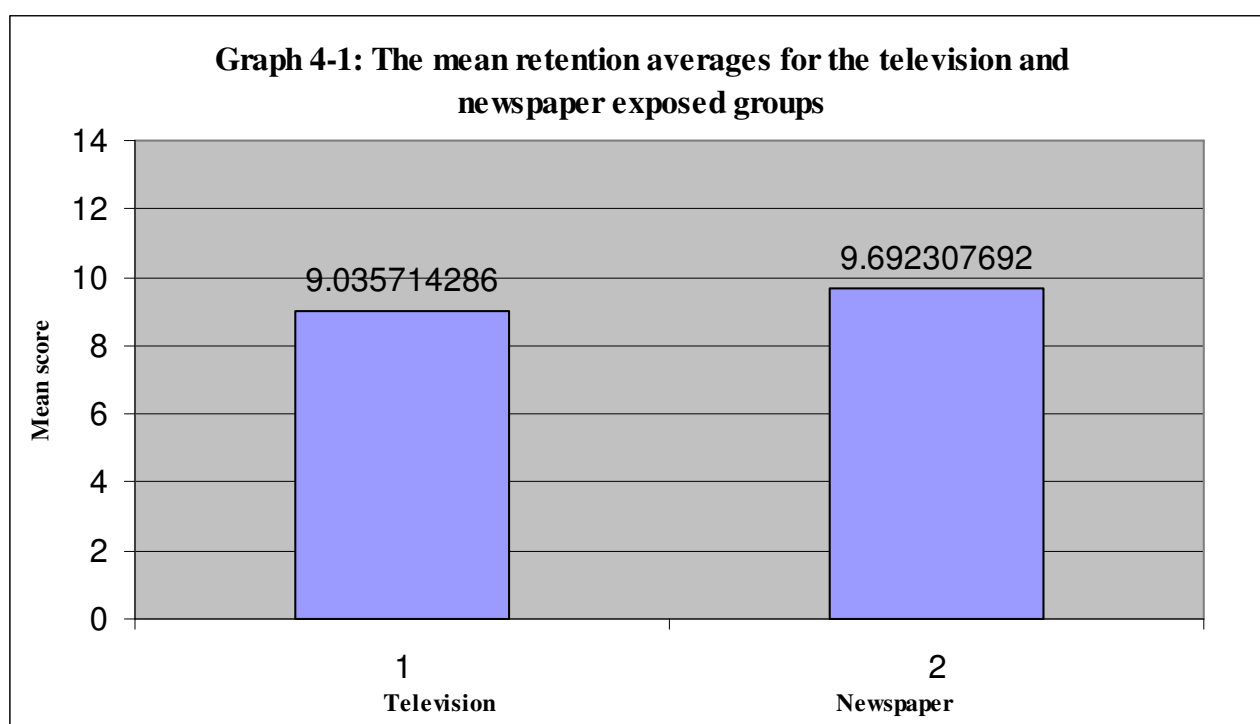
participants read the newspaper anywhere from four times a week to daily and all 23 of these individuals also indicated that they watched television news one to six hours a week, yet they preferred getting their news from television rather than newspaper. With many people reading the newspaper with a degree of consistency, I felt that this, rather than asking what the participants preferred was a better measurement of the degree in which they get news from newspaper and, in turn, measures the level of mental skill that has been in sighted by frequent exposure to one form of media. Again, in retrospect, I find it to be a little presumptuous on my part to use only seven questions to measure an individual's knowledge of the news. In the future, any work I do in this area is going to be much more extensive, and I think the topic should be one that is even less known about than SUV's. Plus, I think it would be worthwhile, rather than find television content that would match up to a newspaper article, to find newspaper content that would readily be adaptable to television. Since a fake newspaper article was composed in this experiment, who is to say that a fake television news broadcast couldn't be staged for a similar experiment. One could say that there was no statistical significance in the finding was that, in reality, the same symbol systems were at work; however, the symbol systems aren't based on content, but rather the modes of media they are present in. Conducting an experiment in which the content of both media were converted to the other may definitely put such questions to rest.

Results for Hypothesis 1: Retention levels are higher among individuals or audiences that obtain their news or current events from print forms of media, specifically newspapers, than individuals or audiences that obtain their news from televised news programs.

The results from the experiment found that the mean average of retention scores in the newspaper group were higher than the mean average of retention scores of the participants

exposed to the television program, 9.69 (69%) to 9.035 (64%). The scores were based on the number of questions the participants got right out of 14 that dealt specifically with the content of the newspaper article and the television program.

The average participants in both groups scored 9.40 (67%). This finding does support the first hypothesis that individuals exposed to the newspaper article would demonstrate higher levels of retention than those exposed to the television program. Graph 4-1 provides a visual illustration of the differences in mean retention scores between the two groups.



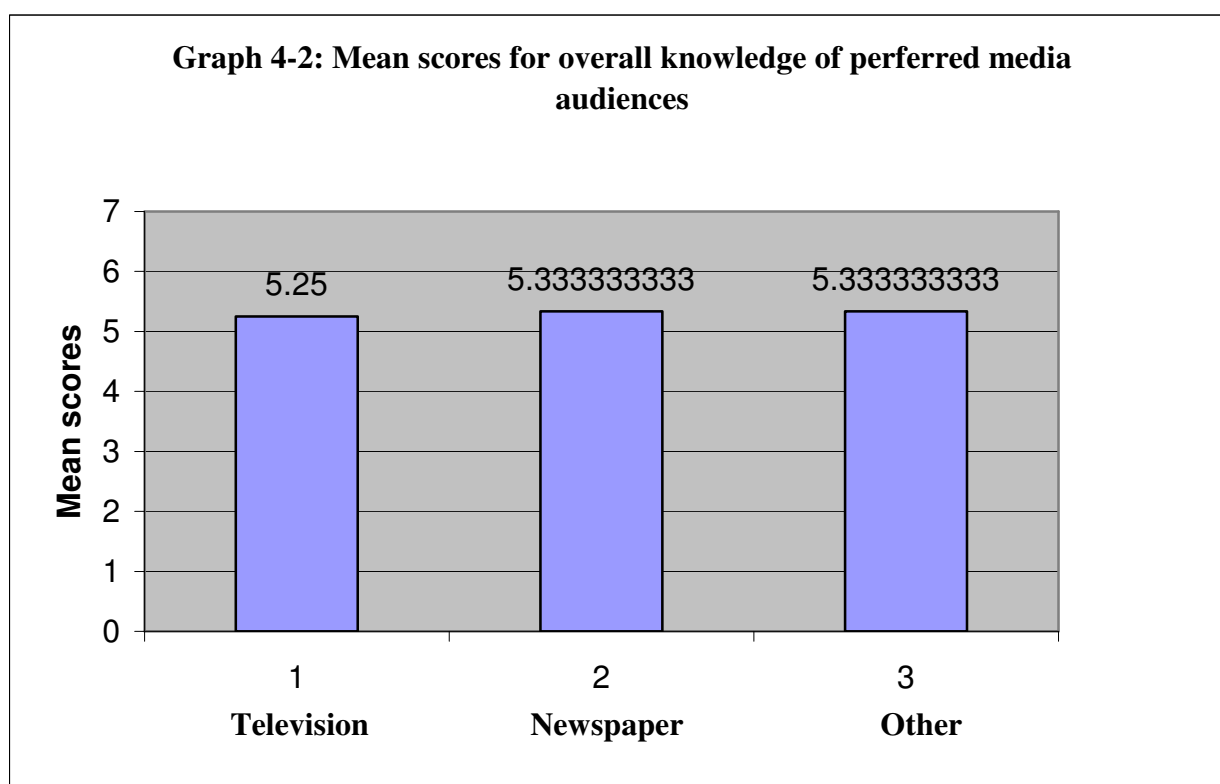
However, a t-test has to be administered to find out if the difference between the mean averages is statistically significant. A two-tailed t-test made up of independent samples yielded a t-score of -1.316 , with the level of occurring probability in a one-tailed test being $.096968$ and $.193936$ for a two-tailed test. To reject the null hypothesis, which is that individuals exposed to a newspaper article will not illustrate higher levels of retention than those exposed to television news, the score associated with the level of confidence and the degrees of freedom (df) is

desired. Since the degrees of freedom is 52, then the level of confidence at the standard .05 probability level is 1.6759, which means that for our t-test score to be significant, we would either have to be greater than 1.6759 or less than -1.6759. Our score, -1.316 or 1.316, is neither greater than 1.6759 or less than -1.6759, which means that there is no statistical difference between the level of retention illustrated by the audience exposed to the newspaper article and one exposed to the television news program. Although it is clear that there is a difference in the retention scores of the newspaper group over the retention scores of the television group, there is no significant difference between the two, meaning that we have failed to reject the null hypothesis. A further measure of the illustration of the t-test would be to look at the levels of probability. With the standard significance level of .05, you can disprove the null if the probability of the t-scores is less than or equal to .05. However, both .096968 (one-tailed) and .193936 (two-tailed) are greater than .05; again, leading one to believe that there is no statistically significant difference between the two groups.

Results for Hypothesis 2: Newspaper reading audiences or individuals will have a better overall knowledge of current events than those audiences or individuals who obtain their news from television news programs.

The initial impression gained from the testing the current event knowledge of the participants in this study is that those who prefer newspaper did have a slightly higher mean average than those who prefer television as their primary source of news. Of the 54 people within the sample, 36 indicated that they preferred to watch television for their news or 66.6% of the participating sample while only 9 within the sample, or 16.7% of the sample, indicated that they preferred to get their news from a newspaper rather than television. Another 9 individuals, or 16.7% indicated that they prefer to get their news from a source other than television or a newspaper.

When asked to give a reason for their preferred in media, 18 people indicated that they simply prefer to watch television, followed by 10 people who said they got their news from both equally. Six people within the same said they didn't have time to read the newspaper, while three people felt that newspapers were more in-depth, two people felt they learned more from televised news, two people preferred to read the newspaper and three more people marked other as a reason. 10 people within the sample either preferred other forms of media or failed to answer the question. No one indicated that they preferred newspapers because they could not afford a television. Graph 4-2, below, gives a visual example of the findings of the test.



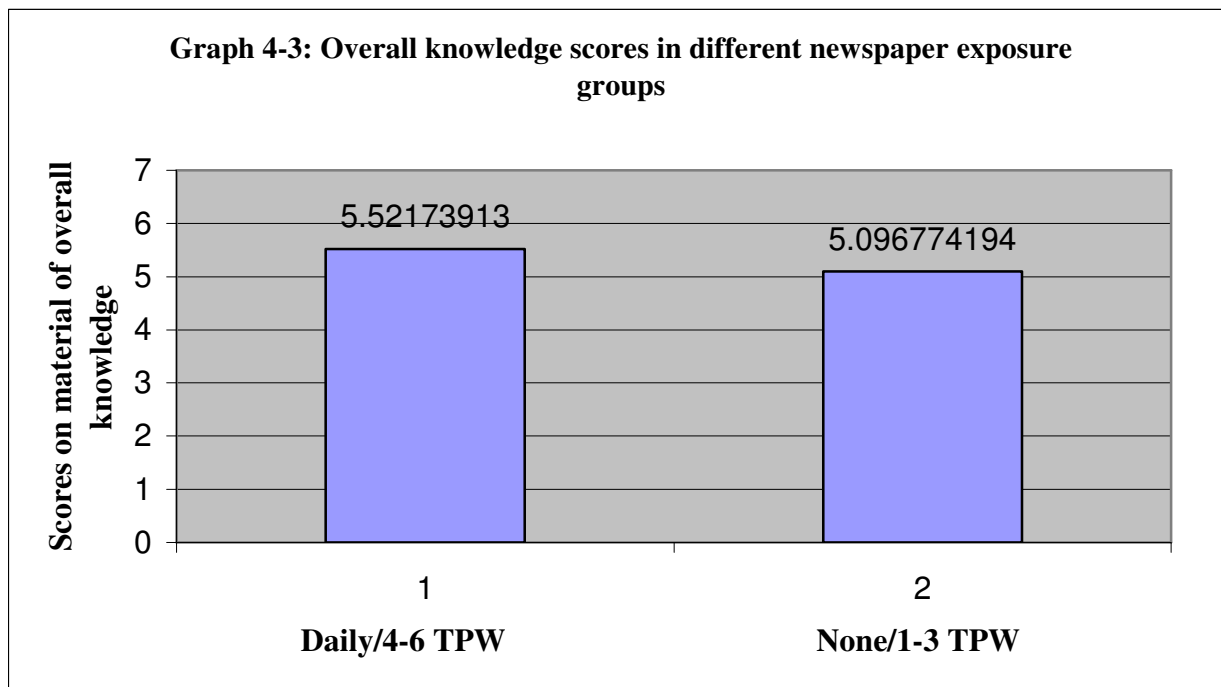
Upon first glance, those who prefer to read the newspaper yielded a higher mean average than those who prefer television, 5.33 or 76% of the questions versus 5.25 or 75% of the questions. The average person scored a 5.2778. Again, once the hard data was collected; a t-test was conducted to determine the statistical significance, if any, of the information found. The mean

score on overall media knowledge is higher with the group that preferred newspaper over television; however, to reject the null that individuals who prefer to read newspapers for their news will not illustrate a higher level of media knowledge than those who prefer television news, a significance of the two mean scores has to be established.

The t-test yielded a score of $-.21$. The test was one of independent figures in a two-tailed design. If we follow the commonly accepted $.05$ level of confidence, then with a degrees of freedom (df) of 43, then the level of significance is a score of 1.6839 or -1.6839 in the example of a two-tailed test. Since the yielded score was $-.21$, which is less than 1.6839 and greater than -1.6839 , then I have failed to reject the null hypothesis. Hence, while we do see a slight difference in the mean scores of these two groups, the difference is not enough to be considered statistically significant.

However, when looking at the individual answers from the participants in regards to the amount of time they expose themselves to either television or newspaper, a very interesting deduction can be made. Although only 9 individuals within this study indicated that they preferred the newspaper as their source of news rather than television news, 23 people indicated that they read a newspaper daily or 4 to 6 times a week. The remaining 31 people indicated that they read a newspaper 1 to 3 times a week or not at all. With this amount of exposure in mind, one could logically state that an audience that reads a newspaper daily/4-6 times a week could be considered an audience that has a high exposure to newspaper. In light of H: 2, I feel that this group would serve as a better barometer in testing my hypothesis, which states that newspaper reading audiences or individuals will have a better overall knowledge of current events than those audiences or individuals who obtain their news from television news programs.

A high exposed newspaper audience did yield better mean scores in regards to the questions that measured the individuals' general knowledge of current events, 5.5217 to 5.0968. Below, you will find Graph 4-3, which give a visual comparison of the mean averages of the two groups.



While part of this hypothesis appears to be correct, we must again look for a statistical significance within the difference of these two means. A t-test of the collected data shows a t-score of 1.48 with a degree of freedom (df) of 52. At the .05 confidence interval, the score for rejecting the null hypothesis is 1.6759 or a -1.6759 in a two-tailed test. With a score of 1.48, we have failed to reject the null, as 1.48 is less than 1.6759 and -1.48 is greater than -1.6759 . Again, while we have illustrated a difference in the mean averages, there is no statistical significance in regards to the differences of these scores. I made a similar attempt to examine the overall knowledge levels in audience that are high in watching television, however, of the 54 individuals who participated in the study, 48 indicated that they watch television news from 1 to 6 hours a

week, three indicated they watched 7 to 13 hours, two said they watched 14 hours or more and one said they watched none. I did not feel that these figures warranted a more in-depth look.

Discussion

I was, to some degree, surprised that neither of the hypotheses yielded results that would be considered statistically significant at the .05 level of confidence for a t-test. The first hypothesis, retention levels are higher among individuals or audiences that obtain their news or current events from print forms of media, specifically newspapers, than individuals or audiences that obtain their news from televised news programs, did yield data that came closest to statistical significance of the three groups that were tested. And, in accordance with the hypothesis, the average mean score of the newspaper group was higher than that of the television group; however, it simply did not meet the level of significance needed. Since the t-test is sensitive to the numbers within a sample, I may get the results I am looking for if I simply raise the number of participants within the sample. Plus, the degree of difficulty in regard to the questions could be subject to review. Although the crash test results of eight luxury SUV's may seem somewhat obscure, I think picking a topic even more obscure may generate the idea of an even playing field for both newspaper and television groups. Another interesting aspect to look at in future retention experiments would be to conduct one that measures free recall rather than cued recall. Although Salomon stated that reading yielded higher cued recall scores, testing an individual's ability to freely recall information they viewed, say, days earlier may be a better measure of what that person actually learns.

As for the second hypothesis of this experiment, that newspaper reading audiences or individual will have a better overall knowledge of current events than those audiences or individuals who obtain their news from television news programs, I also found that, individuals

who preferred the newspaper as their primary source of news did illustrate higher levels of knowledge when it came to current events than those who preferred television news, 5.333 to 5.25, but, with a t-score of $-.21$ and the level of statistical significance at 1.6839, the results of this particular test, in my opinion, prove little. The likelihood is that the number of respondents who indicated they preferred television, 36, was simply too much to find any significance with a group whose participants numbered nine. While the mean scores were higher for the frequent newspaper group, 5.51, versus the low frequency newspaper group, 5.09, the t-test generated a score of 1.48, which is still below the level of statistical significance, 1.6759. In hindsight, I really feel this was the most effective measure simply because individuals, while they might indicate that they prefer television news, may not realize how much they read the newspaper. In the future, I think time spent should take precedence over personal preference.

While none of the hypotheses were found to be statistically significant, I still stand by the hypotheses in principle. It has been said that statistical significance is overrated and a lack of significance doesn't mean the results of the experiment should be ignored. In a further examination of the information yielded from this experiment, I discovered that this experiment had a power score of $.778$, which is slightly below the $.80$ level sought in most experiments. According to power analysis, with a sample of 63 individuals, the same difference found here would have produced significance. With a larger sample and more questions pertaining to the overall media knowledge of the participant, I feel the results I was seeking might have been yielded. I also think future experimentation should be given to free recall experiments in regard to retention. I will next discuss further possible future implications of this research, my thoughts on symbol systems theory and what this means in terms of the business of newspaper and television news.

CHAPTER 6

SO WHAT MEDIUM IS SUPERIOR FOR NEWS LEARNING?

Discussion of Experimental Results

In looking back at some of the previously discussed material, the idea that print journalism would yield higher levels of retention than an audience of television news seemed to be a logical one. First, the theoretical application of the symbol systems theory states those individuals retain information, not from the messages within the media but the symbol systems embedded within that medium. It is the pure nature of that medium that leads to learning. Print, as stated in Chapter 3, has a clearly illustrated symbol scheme, the alphabet, when once it meets its field of reference, print, incites learning and allows an individual to identify within their own pre developed mental capacities, what the subject matter of the story is. Plus, print is fairly close to the notion of being notational. Television, on the other hand, does a great deal of work for its audience and doesn't require the audience to use as much mental effort as newspapers. With all of this in mind, I was, on one level, pleased with the numbers generated from the experiment conducted. The mean scores for retention levels and overall levels of knowledge were higher for the newspaper group than those for the television group. However, when tested using a t-test, which compares the mean averages of two groups for statistical significance, there was none showed, as all of the t-scores remained under the level of statistical significance. As I stated in the previous chapter, it is my belief that the sample size played a role in the fact that there was no significance found in the statistics yielded from the forms of media. However, I have no issues with the number of questions or the degree of difficulty in answering the questions.

There are a few possible reasons for a lack of statistical significance in this experiment. First off, as I pointed out in the past chapter, there may have been statistical significance if this experiment had a higher power score and a greater number of participants. Theoretically, it could be stated that, since Salomon states that, as individuals get older, there is a greater reliance on print in terms of gaining information than television, the college age audience that was used in this experiment could be in the process of making that change. That would explain why the differences between the two groups exist, however, those differences are not statistically significant. I also feel the need to acknowledge that possibility that there is not real difference between learning from newspaper and television news. It is possible that each fosters learning, using different symbol system and those systems are either more or less complex in term of the amount of information they convey.

Future research and potential impact on media

Now that the experiment has been completed, I think it is worthwhile to discuss the potential affects such an experiment could have on forms of the media and the educational aspects of the use of these media. As I have discussed in the past two chapters, while there were differences within a television group and a newspaper group in terms of mean scores, there was no statistical significance found within the differences. However, I don't think that research in the area should end and that an experiment such as this could not yield support results. Symbol systems theory can, at times, be confusing. Simply put, on one hand, supporters of the theory say that television incites learning more so than print in children but due to the development of an individual's level of overall knowledge, pictorial forms of media are required less and less for retention or news learning to occur. With this in mind, in my opinion, at least theoretically, there is no real form of media that incites news learning. While I feel that print, because of its demand on mental

cognition, incites a greater level of retention on individuals exposed to its content, confounding results have been found in support of both print and television. Because of this, I feel that future research in this area needs to continue until researchers and theories can come to some sort of consensus in regard to which form of symbol systems incites learning. Until then, print and television supporters and enthusiasts will have to keep guessing.

I also feel it is imperative in regard to the individual forms of media to ascertain at what level they incite news learning within their audiences. As I was mentioned in Chapter 1, the trend in watching television has been increasing over the past 10- plus years while in the same time, newspaper reading has been dropping. This is, perhaps, due to the symbol systems ideal that television or film, because of their convergence of symbol systems, does a great deal of mental work for their audiences, making it easier to interpret while newspaper is a hard medium because it calls for its audience to use more mental effort in decoding the material presented. Perhaps further research in this area can help both television and newspaper come to some sort of happy medium in regard to their symbol systems. Since I have supported the notion that individuals learn not from the content of the messages but from the symbol systems present in the medium, it has occurred to me that, perhaps, a scale could be developed where the level of mental difficulty found within the symbol systems can be compensated for by making the content of the message less or more complex; however, if this were the case, newspapers might begin to insult the levels of intelligence in their audiences, and if this were done in television, then television executives might be overestimating the intelligence of their audience; both theoretical fears of mine. Regardless, a conscious effort could be made by writers and their editors and television news broadcasters to change their use of language to help make their content more intellectually easy or difficult and level the amount of learning that occurs in both audiences. Rather than

having the stereotypical ideology that the educated read and the uneducated watch, perhaps a middle ground could be found and these media could open themselves up to new audiences. In other forms of media, I also believe the further testing of the symbol systems theory could lead to positive results. It is clear, as in experiments conducted by Furnham and Gunter, that there are attributes for this research in terms of advertising. By knowing which forms of media better incites the retention of an advertisement, advertisers can focus their attention on putting their content on one particular medium over the other. In their experiments, Furnham and Gunter found that print lead to better retention and name brand recognition in terms of modes of advertising. Such information today would help the overall struggling franchise known as newspapers since newspapers are kept running by advertisement sales. There is also the Internet, which, as discussed in Chapter 3, is a perfect example of the relationship between the media and technology. Like television before it, the Internet is a hybrid. It combines many different symbol systems in its communicative effort; to the extent that complete version of the daily newspaper can be found on-line. Future studies into the extent of news learning fostered by the Internet versus the print edition may help determine the future of print newspapers. It is no secret that it has been suspected by many experts that the on-line newspaper will eventually replace the daily print version. Experiments using the symbol systems theory in a comparison study between print and on-line newspapers may show that print newspapers better insight news learning than their on-line counterparts, providing another reason to halt their demise.

Another important aspect of future studies in the symbol systems theory would be educational. Again, it has been stated that television incites learning in small children because much of the mental work is done by the various symbol systems at work. But there are educational avenues that do not include children. In line with the audience that participated in

this experiment, there appeared to be a difference in which form of media in sighted learning better in a college aged audience. Learning does not stop at the age of eight. In accordance with the research conducted here and discussed at length in this thesis, print material appears to foster retention more so than television. If that is the case, more educational avenues for adults could be constructed in a print forum for individuals. In terms of children, if television does foster learning more so than newspaper, then newspapers should make an effort to cater to that audience. I am aware of the Newspaper in Education program that provides newspapers to participating schools and some newspapers even contain a children's addition, however, what good do these efforts do if children don't know or aren't taught how to decipher the symbol systems present in newspaper. Newspapers could take a more proactive roll in the education of their audiences by creating a cooperative effort between themselves and an educational outlet and a more intelligent and informed reader could be developed. Remember, long term exposure to a form of media helps develop mental skills. If print is truly better, educationally, for people, then it only makes sense to assist in that learning. It has long been said that the job of the newspaper is to inform. In some cases, informing may not be enough.

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Midsized SUV crash tests

Which SUVs have results to back up their tough images?

By **Lea Thompson**
NBC News

You either love to drive them, or love to hate them. Here are the latest crash test results for these popular SUVs from the Insurance Institute for Highway Safety. How did your SUV do?

"One of the images that SUVs have is that because they're tough and big and heavy therefore they're safe," says Brian O'Neill of the Insurance Institute for Highway Safety, a non-profit group funded by insurance companies.

They do look big and tough. But hurl them into a 320,000-pound concrete barrier at 40 miles per hour, and what do you get? A reality check.

The Institute bought nine midsized SUVs off dealers' lots and crashed them into this barrier. First up in the high speed test was the 2003 Kia Sorento. Priced at just under \$24,000, it's the least expensive in this group.

"The Kia Sorento was the worst of the nine vehicles we tested," says O'Neill. "If someone went through an event just like the dummy in this crash, they'd probably have a concussion."

There are some injuries, but not that serious. The Sorento



photo by
NBC News

A 2003 Infiniti FX35 was one of the nine midsized SUVs crashed and tested by the Insurance Institute for Highway Safety.

O'Neill. "The airbag fired late. We recorded high forces on the dummy's head. They then made a change to the design of their airbag system. We then re-tested the vehicle and got very good performance."

The result another "good" rating and a "best pick." And as with the Honda Pilot, all FX35s sold before the airbag fix are being recalled.

In a letter to Dateline, Kia said the Sorento "...meets or exceeds all federal safety regulations..." as do all the SUVs that were tested. Mitsubishi told us that it was "...pleased that the Endeavor performed well."

After eight years of crashing vehicles O'Neill says, car manufacturers are getting the message.

"There's no question the manufacturers have been listening," says O'Neill. "They've been working to improve performance. And in most cases they've succeeded."

gets the Institute's second highest rating of acceptable.

Next up was Mitsubishi's 2004 Endeavor, another economy SUV.

"There was a neck injury that we didn't like, and a leg injury," says O'Neill.

But they aren't too severe, so the Endeavor earns the Institute's top rating, good.

Then there is the 2003 Honda Pilot, moderately priced at almost \$30,000.

"The dummy's head is very far forward before that bag deploys," says O'Neill. "And you see a violent movement back of the head. That is the consequence of a very late airbag firing."

Honda was concerned and reprogrammed the airbags for a re-test. "And you

can see that now the airbag has come out in time," says O'Neill.

"The dummy's head is no longer being driven backwards violently. It's now good performance."

With the fix, this SUV earns a good and got the Institute's top honor: a best pick. Honda is recalling all of the Pilot's that were sold before the modification.

The other medium-priced SUVs tested were the 2003 Nissan Murano, the redesigned 2003 Toyota 4Runner, and the 2004 Chrysler

Pacifica. All three get good ratings as well as best picks.

In the luxury SUV category, the 2004 Cadillac SRX is the priciest, at \$44,000.

"All the first impressions are pretty good for this vehicle," says O'Neill, and so the SRX gets the Institute's highest honor, a good and a best pick, as does the redesigned Lexus RX330 and the 2003 Infiniti FX35 — after a little rejiggering.

"We had the same problem with the FX35 that we had with the Honda Pilot," says

Has your Honda Pilot / Infiniti FX35 been recalled?

Infinity is notifying 2003 FX35 owners that it will reprogram the air bag control unit currently installed in their vehicles. 2004 FX35 models are not affected by this campaign. To find out if your vehicle is eligible for this free service or if you have any other questions or concerns, you may contact an Infinity representative at (800)662-6200.

In October, Honda began the process of contacting the owners of affected vehicles. This action involves the reprogramming of the airbag system's control software and requires a short period of time to complete.

Questionnaire

My name is Jason Peterson and I am a graduate student at the Grady College of Journalism and Mass Communication at the University of Georgia. I am conducting a questionnaire based up the form of media that you just watched/read. By participating in this study, I have permission to use the results of this questionnaire in future studies. In return, the identity of the individual participant will be disclosed. The participants name will not be, in any way, published or connected with said results. Individuals have the option of not participating. Thank you for taking the time to participate in this study and I hope you have had an enjoyable experience. If you have any questions regarding this study, please contact me at jaspeter@uga.edu or by phone at (706) 227-0820.

1. Did you:
 - A. Read the news article?
 - B. Watch the news program?

2. What was the subject of the article/television program you just read/watched?
 - A. Crash testing of midsize SUVs on the market.
 - B. Crash testing of new luxury cars on the market.
 - C. Crash testing of old, vintage cars.
 - D. Both A and B.

3. What organization tested the cars in the article?
 - A. The Insurance Institute for Highway Safety.
 - B. The Institute for Vehicle Safety.
 - C. The Insurance Adjusters of America.
 - D. The National Institute for Highway Safety.

4. How does the organization in the article/television program acquire the vehicles used in the testing?
 - A. They have already been in an accident.
 - B. They steal them.
 - C. They failed the governmental safety standards.
 - D. They bought them.

5. How many cars are used in this study?
 - A. 6
 - B. 7
 - C. 8
 - D. 9

6. Of the vehicles tested, which of the following was deemed the worst as far as safety is concerned?
- A. The Nissan Murano.
 - B. The Kia Sorento.
 - C. The Toyota 4Runner.
 - D. The Cadillac SRX.
7. When tested last year, which of the following cars had airbags that didn't release on time?
- B. .
8. A representative from Mitsubishi used which of the following words to describe the organization's testing procedures?
- A. Effective.
 - B. Severe.
 - C. Unnecessary.
 - D. Pleasing
9. The organization's president said "There's no question the manufactures have been listening and they've been working to improve performance." What was that person's name?
- A. Ed O' Neill
 - B. Dan O' Neill
 - C. Brian O' Neill
 - D. His name was not used in the article/television broadcast.
10. Which of the following cars was modified after testing to meet the organization's standards as a best pick?
- A. Lexus RX330.
 - B. The Honda Pilot.
 - C. The Toyota 4Runner.
 - D. Cadillac SRX.
11. What was the price of the most expensive car used in this experiment?
- A. \$44,000
 - B. \$52,000
 - C. \$34,000
 - D. \$62,000
12. What was the price of the cheapest car used in this experiment?
- A. \$20,000
 - B. \$24,000
 - C. \$26,000
 - D. \$34,000

13. What was the highest rating a vehicle could receive?
 - A. Good
 - B. A best pick
 - C. Excellent
 - D. Satisfactory

14. What types of injuries were suffered when the Mitsubishi Endeavor was crashed?
 - A. An arm injury.
 - B. A neck injury
 - C. A leg injury.
 - D. A and B.
 - E. B and C.

15. What was the title of this article/video?
 - A. Luxury SUVs: Death trap or safe haven.
 - B. Not so tough? SUV crash tests.
 - C. Midsize SUV crash tests: Which SUVs have results to back up their tough images?
 - D. Blood on the highway: SUV safety standards.

For further research, I would now like for you to answer some questions about your overall knowledge of current events. Like in the last excerpt, please select the answer that is correct.

1. At the conclusion of the United States war with Iraq, which of the following members of the U.S. government will oversee the reconstruction of Iraq's government?
 - A. Dick Cheney.
 - B. Donald Rumsfeld.
 - C. Colin Powell.
 - D. George Bush.

2. What was the name of Scott Peterson's wife, who he is accused of killing?
 - A. Lori.
 - B. Layne
 - C. Laci
 - D. Lana

3. From which country did SARS originated?
 - A. Hong Kong.
 - B. China.
 - C. Canada.
 - D. Japan.

4. Which of the following best describes the new Georgia state flag?
 - A. Red and white strips with the state seal of Georgia.
 - B. Peach colored, with a Peach in the center of the state.
 - C. A picture of a grinning Sonny Perdue.
 - D. The Confederate flag.

5. A firefright in Iraq broke out this past weekend. How many Iraq's were killed in that firefright?
 - A. 20
 - B. 46
 - C. 67
 - D. 200

6. What drug did Rush Limbaugh go to rehab for?
 - A. Cocaine.
 - B. Heroin
 - C. Prescription medication
 - D. Alcohol.

7. Who is John Allen Muhammad?
 - A. A high-ranking official in the Iraqi government.
 - B. A wide receiver for the Carolina Panthers.
 - C. A member of Al-quidia
 - D. The D.C. Sniper.

Please fill out the following information about yourself and your media habits. This is the last section of the questionnaire. Thank you for participating.

1. The participants' sex:
 - A. Male.
 - B. Female.

2. You are between the ages of:
 - A. 18-24
 - B. 25-30
 - C. 31-35
 - D. 35 or older

3. The highest level of education you have obtained:
 - A. Some high school
 - B. High school diploma/GED.
 - C. Some college
 - D. Associate degree
 - E. Undergraduate degree
 - F. Graduate degree

4. Which form of media do you prefer to get your news from?
 - A. Television.
 - B. Newspaper/Magazines
 - C. Radio
 - D. Internet
 - E. Other

If you answered B to this question, answer question 5 and move on to question 7 and 8. If you answered A to this question, skip question 5 and answer question 6, 7, and 8. If you answered something other than A or B, move on to question 7 and 8.

5. If you prefer to get your news from newspaper than television, indicate why.
 - A. It's more in depth and I feel I get more information out of it.
 - B. I simply prefer to read the news rather than watch television.
 - C. I can't afford a television or do not own one.
 - D. I get my news from both equally.
 - E. Other

6. If you prefer to get your information from television news rather than newspaper, indicate why.
 - A. I don't have the time to read a newspaper.
 - B. I prefer to watch the news.
 - C. I feel I learn more from television news.
 - D. I get my news from both equally.
 - E. Other.

7. How many times a week do you read a newspaper?
 - A. Daily
 - B. Four to six
 - C. One to three
 - D. None

8. How much time do you spend watching television news? Please include time spent watching news magazine programs, such as 20/20, Dateline and 48 hours.
 - A. 14 or more hours
 - B. 7 to 13 hours
 - C. 1 to 6 hours
 - D. None.