CORNERSTONE
MINNESOTA STATE UNIVERSITY MANKATO

Speaker & Gavel

Volume 42 | Issue 1 Article 6

January 2005

Reading is Remembering: The Effect of Reading vs. Watching News on Memory and Metamemory

Hesham M. Mesbah
Rollins College, hmesbah@rollins.edu

Reading is Remembering
The Effect of Reading vs. Watching News on Memory and Metamemory

Hesham M. Mesbah

From which news medium can audiences acquire information best? To what extent does the news source affect receivers' feelings of knowing? Will the effect of a news source on confidence in knowledge, if any, stay over time?

Exposure to either print or electronic news media is a daily habit for an average person in today's world. Computerized news transmitted via networks and online services led to more diversification in news presentations. Such diversity inspired many scholars to investigate the comparative effectiveness of news media on memory processes. The study reported here examines the effect of exposure to different news media on the variance in subjects' levels of recall immediately after exposure and two hours later. The three media used in the experiment are television, newspapers, and computer. Special attention to subjects' metamemory, or their awareness of what they have learned is also given in this paper. Metamemory is tested immediately after exposure, and two hours later.

McLuhan (1964: 22) argued that effectiveness of any source of information is determined by their mechanical nature. He defined radio as a "hot" medium as it extends one single sense in "high definition" and is low in "receivers' participation," whereas he identified television as a cool medium that gives out little visual information compared to the movie. Therefore, a hot medium like radio has very different effects on the user from a cool medium.

However, the reason behind this comparative effectiveness of news sources might be more multifaceted than McLuhan puts it. The mechanical nature of a given news medium is one thing; and its contextual features that characterize exposure to it is another thing. A newspaper occupies space and is there whenever needed, whereas broadcast media are volatile. Some experimental studies sought to control this factor. Stauffer et al. (1980) divided their subjects into viewers, listeners, and readers. Each group was exposed once to a variety of news stories. The readers were not allowed to read the story more than once, yet they showed better levels of recall. Applying a similar design, Gunter and his colleagues (1984) came up with consistent findings.

Wicks and Drew (1986), on the other hand, did not find differences between television and newspapers in terms of subsequent recall levels. They attributed this equality between the two media to the experimental conditions that differ from normal exposure at home. Accordingly, contextual factors might not be sufficient in explaining this variance in news recall among news consumers. In a later study, Wicks (1995) found out that subjects exposed to certain televised news stories recorded higher recall scores immediately after exposure and two

days later. He suggests that televised images might have this potential of stimulating accelerated recall better than do equivalent newspaper stories .

Another group of studies revealed that "cognitive processing requirements" explain the superiority of printed materials over electronically presented materials. The process of reading requires more cognitive effort, and this results in better levels of knowledge acquisition. Gavriel Solomon (1984) found that learning from printed materials was better than learning from television among children. He based his explanation for this result on the way children perceive both media. Television for them is an easy medium that does not require the same cognitive effort exerted while reading. Kathy Pezdek and her colleagues (1987) showed similar results among adults. This might explain the evidence from the accumulated literature that reflects the superiority of newspaper presentations over televised presentations (M. DeFleur et al., 1992; D. Graber, 1988; McLeod et al., 1982; E. Wilson, 1974). In a more recent experiment comparing television and print news, Gunter and colleagues (2001) found that children learn most from television, whereas adults learn most from print. The superior recall of print news observed with adults was attributed to "the fact that print offers more opportunity to exercise control over the processing of information than television does," whereas children could show better memory performance with redundant televised news presentations. Comparing children's recall of news stories in print , photos, and audio formats, Walma and Tom (2000), indicated that the television presentation was recalled better than any of the other media.

According to the concept of "cognitive processing requirements" newspapers are cognitively superior because they are read, not because of the context in which they are consumed. When an electronic medium is apt to be read, rather than watched, newspaper's superiority is expected to be at stake. DeFleur and his colleagues (1992) found that the levels of recall from newspaper versus computer screen presentations did not differ significantly, whereas the print media were significantly more effective than the broadcast media. However, most studies that experimentally examined the comparative effectiveness of news sources used the "talking head" format in presenting television news to control for the effect of picture (M. DeFleur, 1992; B. Gunter, 1989; W. Dommermuth, 1974; Ogilvie, 1957). When pictures accompanied television presentations, memory performance changed. Furnham and Gunter (1985) found that memory for violent news was better among male subjects who watched it on television compared to those who were exposed to the same content via newspapers or radio. Wicks and Drew (1991), using news stories that offered congruence between audio and video, failed to support research showing that television leads to less information gain than newspapers. The body of findings is inconsistent, however. DeFleur and Cronin (1991), using a visual story versus a printed version, reported that subjects in the newspaper presentation passed on more details more accurately than those in the television group.

This presents study examines the relative effectiveness of print versus electronic news media using a television news story accompanied by redundant video track. Building on the notion of 'cognitive requirements', it is expected

that subjects who read the news in either newspaper or computer presentations would show better performance than those who watch the same news story. Furthermore, the style of news writing (inverted pyramid vs. narrative reporting) is sought to be controlled by presenting the written version of news story in both styles.

H^1: Verbal recognition scores will be significantly higher for news that is 'read' than for news that is 'watched'.

The comparative effectiveness of different media as sources of news might be explained according to how much individuals are confident in what they learn from each medium. Certain news media might be perceived as prestigious, serious, or deep, whereas other media are considered common or entertaining by definition. This raises two questions here: (1) does confidence in news recall vary according to the type of news source used? (2) Is there a relationship between confidence in answers and levels of memory performance?

Various studies suggest that there is a relationship between people's confidence in their performance and their accuracy. Lichtenstein and Fischhoff (1977) reported improved confidence-accuracy calibration. They concluded that the confidence-accuracy relationship is likely to be best calibrated at about 80% accuracy levels. There is a marked degree of agreement in the cognitive literature that there is a moderate yet robust positive relation between subjects' confidence evaluations and their performance (Perfect et. Al., 1993:144). Schneider and Laurion (1993), testing memory for radio news, reported strong positive confidence-accuracy relationships.

H^2: Levels of verbal recognition scores of news facts will be affected by levels of subjects' confidence in their answers.

To date, investigators have rarely examined whether levels of confidence in retrieval are affected by the type of news source. Such a psychological factor may add to explaining the comparative effects of news media. New news sources, such as computers, are perceived as a novelty by many receivers in Egypt. Accordingly, acquiring information via computers might lead to higher levels of feeling-of-knowing reflections. Consequently, the third hypothesis is formulated as follows:

H^3: There is a significant relationship between the kind of news source and subjects feeling of knowing.

On the other hand, does the variance in confidence levels according to the type of news source used hold over time? Hovland and Weiss (1951) reported that the effect of the message source on opinion change tends to dissolve over time. When subjects were tested four weeks after the experiment, the percentage of those exposed to a high credibility source who had changed their opinions decreased. The percentage of opinion change among those exposed to a low

credibility source tended to increase in the second test. The authors termed this the "sleeper effect". In a later experiment conducted by Kelman and Hovland (1953), similar results were reported. It has been predicted that although the subjects might have not forgotten the source, they apparently had dissociated the content from the source of communication.

The sleeper effect did not receive much attention in memory studies, however. Long-term memory was tested to either assess retrieval of stimuli that were not recalled shortly after exposure (reminiscence), or examine improvement in recall over time (hypermnesia). Effect of type of source on long-term recall still needs to be clarified. By the same token, different levels of confidence in answers caused by exposure to different kinds of news sources are susceptible to change significantly over time. Applying the sleeper effect perspective, information may be stored in and retrieved from long-term memory in isolation from its source.

H^4: There is a significant difference in the degree of confidence in answers between the first test immediately after exposure and the second test two hours later.

Subject

One hundred and twenty subjects volunteered to participate in the experiment. All subjects were senior students studying mass communication at Cairo University. Subjects were 90 females and 30 males who took the memory test immediately after exposure and two hours later.

Design and Stimulus Material

Using name rosters of students, subjects were randomly assigned to four groups. Each group comprised 30 Ss who were exposed to one news story presented through different media according to the experimental conditions.

The news story used in the experiment consisted of approximately 300 words. It is actually a news report on AIDS in the world, which was broadcast on the Egyptian television in April 1996. Different criteria were used in selecting this particular story material for the experiment. First, previous exposure will be controlled as the story was aired years ago. Second, subjects' background knowledge will be ruled out as well, because all the facts and figures mentioned in the story are now history or have changed dramatically. Third, the global nature of the topic dealt with in the story is of general interest that is not restricted to the local community.

This televised news story was transcribed and printed in a column format and font characteristic of newspapers. Two versions of the story were presented in the newspaper form. The first one was just a typical recitation of the voice over of the story. This format was termed 'the broadcast-style printed version'. The other version was edited according to print journalism standards. Two specialized news editors were asked to rewrite the story in the print format using typically the same information and words in the original story. Another version

of the story was prepared using the computer. The story was written in its original format and it occupied 36 lines on the screen.

Each subject was told at the beginning of the experiment that she/he would be asked several general questions on the news story presented. Subjects were not allowed to take any notes during reading or viewing the story. They either read or viewed the material just once. Subjects in the newspaper and the computer conditions were closely watched by the experimenters to make sure that the instructions were clear and thoroughly followed. Two hours later, subjects were asked to take the same recognition and confidence test again. During the time lapse between the two tests, the students were seated for a lecture on a totally different topic. This was done to prevent any interpersonal communication among the students concerning the experiment or the story presented.

Measurement

Memory was measured by giving the students a twelve-item multiple choice test on the content of the presented news story. The total number of the correct answers on this test was the measure of aided recall for factual information in the experiment.

As subjects answered each multiple-choice item, they also rated to what extent they were confident that their answer was correct. This was done using a 5-point-Likert type scale, ranging from not at all sure (1), to completely sure (5).

Analysis and Results

***Effect of source*.** The mean recognition score immediately after exposure for the news story was calculated for each group. The findings showed consistency with research literature that reveals superior cognitive effects of written materials. Readers in both computer and newspaper presentations showed better performance on the test.

Table 1: ANOVA of Immediate Memory According to Type of News Source

Source of Variance	df	F Ratio	P Probability
Between groups	3	3.86	0.01
Within groups	116		
Total	119		

Subjects in the computer group remembered the story best (M=8.23). Those who read the story written in broadcast style were able to remember details (M=8.17) more than those who read the story written according to the traditional Inverted Pyramid style (M=7.77). Memory performance was at its lowest among those in the television group (M=6.73).

Analysis of variance (ANOVA) was used to examine the significance of difference between these different levels of immediate memory.

As Table 1 illustrates, the effect of type of news source produced a statistically significant difference ($F= 3.86$, $p< 0.01$) supporting the hypothesis that differences between groups in terms of news recall are statistically significant. In order to identify whether each medium differed significantly from each other, Benferroni test with significance level 0.05 was further run (see Table 2).

Table 2: Significant Differences Between Groups (Benferroni Test)

Mean	Medium	Television	Newspaper	Broadcast Style	Computer
6.73	Television				
7.77	Newspaper				
8.17	Broadcast Style	*			
8.23	Computer	*			

*Denotes significance in difference between new media

The data in Table 2 supports the hypothesis that subjects' recognition scores in the 'reading condition' are significantly higher than those in the viewing condition. However, only two groups who read the story (computer (M= 8.23) and broadcast style (M= 8.17) presentations) showed significantly better memory performance than subjects in the television group (M= 6.73). No significant difference was detected between the television group and the newspaper group (M= 7.77). This suggests that "reading" the news is more cognitively effective than "watching" it.

Table 3: ANOVA of Delayed Memory Scores according to News Media

Source of variance	df	F Ratio	F Probability
Between groups	3	1.96	0.12
Within groups	116		
Total	119		

***Delayed memory and news source*.** The influence of the type of news source was not found when subjects' recognition memory was tested again after two hours. As Table 3 suggests, there is no significant difference between groups in terms of recognition memory performance two hours after exposure to the news story ($F= 1.96$, $p> 0.12$). Mean of correct answers in each group in both tests is displayed in Table 4.

Table 4: Mean Recognition Scores for News Facts varied by Source of News and Time of Testing

News source	Mean (time 1)	Mean (time 2)
Television	6.73	7.10
Print	7.77	7.79
Broadcast format	8.17	8.23
Computer	8.23	8.00

Memory performance in both the "TV" and "print" groups improved slightly when retested. Although memory for news facts was better for "read" materials, superiority of written presentation of news was not confirmed statistically when delayed memory was tested. This could be explained according to the familiarity of the test. In the second time, the students were more familiar with the multiple-choice questions. Reading the items again might have triggered long-term memory traces and led to almost equal performance among the four groups.

***Memory-confidence relationship*.** Analysis of subjects' metamemory suggests that they are primarily aware of what they know. Aggregate score of confidence ratings correlated significantly with total number of correct answers in both immediate test of memory ($r= 0.57$, $p< 0.001$) and delayed test ($r=0.55$, $p< 0.001$). This result supports the hypothesis that subjects' feeling of knowing positively correlates with their levels of memory performance.

***News source and metamemory*.** Subjects differed in their degrees of confidence in answers according to the type of news source. Differences were greater in the first test (time 1), whereas in the second test (time 2) the gap tended to be closer (see Table 5).

Table 5: Mean Confidence Scores Varied according to Medium and Time

News source	M (time 1)	M time 2)
Television	39.87	41.03
Broadcast format	43.67	45.30
Computer	45.10	44.47
Print	45.50	45.03

In both tests, television was the least initiator of the feeling of knowing among the four groups. The other written presentations of the same news story contributed to higher levels of confidence, however. Analysis of variance was used to examine the significance of differences in subjects' metamemory based on medium and time of testing.

The data supports the hypothesis that both style of news presentation and time of testing exert effects on subjects' metamemory (see Table 6).

Table 6: Analysis of Variance in Confidence Scores According to Medium and Time

Source of variance	df	Time 1		Time 2	
		F Ratio	*p*	F Ratio	*p*
Between groups	3	4.19	0.007	1.97	0.12
Within	116				
Total	119				

Significant differences in levels of confidence were uncovered immediately after exposure, whereas no such significance was detected when subjects were tested two hours later ($F= 4.19$, $p< 0.007$ at time1; $F= 1.97$, $p> 0.12$ at time2). In other words, the effect of medium on feeling of knowing tended to diminish over time.

Discussion

The study aimed at examining the effect of the news source on both memory performance and feeling of knowing. The results show consistency with previous research in showing superiority of written news over televised news. Reading news via a computer screen or a newspaper is a cognitively more demanding task that results in better levels of memory recognition. Subjects who read the news story either on a computer screen or via a traditional newspaper clipping showed a significantly higher level of recognition compared to the television groups. On the other hand, memory performance in the "newspaper" group and "computer" group was almost similar. This finding is consistent with the body of literature that shows similar cognitive effects of reading the news via printed materials or the screen. For example, Sundar and colleagues (1998) examined memory from print and online versions of a newspaper article. The found no significant differences in memory for news across different media. The structure of reading the news in both the "newspaper" and "computer" conditions was linear, reading from beginning to end. Adding the structural norm in hypermedia to computerized news text is expected to introduce some variance in memory performance, however. Several studies showed that print conditions have higher memory scores than other nonlinear conditions (Eveland and Dunwoody, 2001b; Tewksbury and Althaus, 2000).

This could be explained according to how highly subjects evaluate computer as a sophisticated source of news that is handled with attention. This might also explain the high levels of confidence in answers among the computer group.

Moreover, the study reveals that the traditional format of IP (Inverted Pyramid) is not necessarily the most relevant for writing print news. Many feature and human interest stories are better formulated in the narrative style common in currently in both print and broadcast journalism.

On the other hand, the delayed test of memory showed equality among the different news sources utilized in the study. Performance among the television group was improved to be almost similar to the other groups. Confidence in answers was not an exception. Repeated testing of the subjects might be responsible for this leveling. When taking the test again, subjects might have performed inner rehearsals that facilitated retrieval of correct answers in time 2.

Finally, the sleeper effect materialized significantly in the study. When subjects were tested immediately after exposure, they showed varying degrees of confidence in their answers. Confidence-accuracy relationship appeared to be positively significant.

When tested two hours later, confidence levels turned out to be almost equal among the four groups. Applying the concept of the sleeper effect, subjects might have associated information with its source in the first test, whereas dissociation was more prevalent in the second test. When dissociation took place, confidence scores were leveled out, and the effect of the type of news source on the feeling of knowing was neutralized.

On the other hand, the results suggest that while broadcast news media are gaining popularity and prominence, they are less effective in initiating stronger memory traces for the news compared to print materials or the news that are presented in a "written" format. Consequently, broadcast news could strive for more effectiveness by using additional techniques such as captions, superimposed statements, figures, and excerpts. Television news stories need to be "verbalized" as much as they have been "visualized." The use of factoids (lists of boiled-down facts) inside the televised news items could be one of the answers. On the other hand, the writing styles for different news media should be developed to meet the requirements of new technologies. Although print and online journalism are organized in space, they do have inherent dissimilarities that dictate the use of different news writing styles for both media. Professionals agree that he Inverted pyramid style is more suitable for print news, whereas the square format is more relevant to broadcast news. Agreement on the most suitable writing style for online news is still lacking, however.

References

DeFleur, M. & Cronin, M. (1991). Completeness and accuracy of recall in the diffusion of the news from a newspaper vs. a television source. Sociological Inquiry, 61, 148-166.

DeFleur, M. L., Davenport, L., Cronin, M., & DeFleur, M. (1992). Audience recall of news stories presented by newspaper, computer, television, and radio. Journalism Quarterly, 69, 1010-1022.

Dommermuth, P. (1974). How does the medium affect the message? Journalism Quarterly, 51, 441-447.

Eveland, W. P., Jr., & Dunwoody, S. (2001b). User control and structural isomorphism or disorientation and cognitive load? Learning from the Web versus print. *Communication Research*, 28, 48-78.

Fox, D. F. (1964). “Clues for advertising strategies” in Dexter L. A. & David M. White (Eds.). *People, society, and Mass Communication*. London: Free Press.

Furnham, A., & Gunter, B. (1985). Sex, presentation mode and memory for violent and non-violent news. Journal of Educational Television, 11, 99-105.

Gunter, B., Furnham, A., & Gietson, G. (1984). Memory for the news as a function of the channel of communication. Human Learning, 3, 265-271.

Hovland, C. C. & Weiss, W. (1951). The influence of source credibility on communication effectiveness. Public Opinion Quarterly, 17, 635-650.

Kelman, H. C. & Hovland, C. C. (1953). Reinstatement of the communication in delayed measurement of opinion change. *Journal of Abnormal and Social Psychology*, 48,327-335.

Lichtenstein & Fichhoff, B. (1977). Do those who know more also know more about how much they know? *Organizational Behavior and Human Performance*, 26, 149-174.

McLuhan, M. (1964). *Understanding the Media: The extension of man*. New York: McGraw Hill.

Perfect, T. J., Watsman, Emma L., & Wagstaff, G. F. (1993). Accuracy of confidence ratings associated with general knowledge and eyewitness memory. *Journal of Applied Psychology*, 78, 144-147.

Pezdek, K., Simon, S., Stoeckert, J., & Kiely, J. (1987). Individual differences in television comprehension. *Memory & cognition*, 15 (5), 428-435.

Schneider, S. L. & Laurion, S. K. (1993). Do we know what we’ve learned from listening to the news? *Memory & Cognition*, 21(2), 198-209.

Solmon, G. (1984). TV is ‘easy’ and print is ‘tough’: The role of perception and attribution in the processing of material. *Journalism of Educational Psychology*, 76, 647-658.

Stauffer, J., Frost, R., & Rybolt, W. (1980). Recall and comprehension of radio news in Kenya. *Journalism Quarterly*, 57, 612-617.

Sundar, S. S., Narayan, S., Obregon, R., & Uppal, C. (1998). Does web advertising work? Memory for print vs. online media. *Journalism & Mass Communication Quarterly*, 75, 822-835.

Tewksbury, D., & Althaus, S. (2000). Differences in knowledge acquisition among readers of the paper and online versions of a national newspaper. *Journalism & Mass Communication Quarterly*, 77, 457-497.

Walma van der Molen, J. *H*., & *van der* Voort, T. *H*. A. (2000). The impact of television, print, and audio on children's recall of the news: A study of three alternative explanations for the dual-coding hypothesis. *Human Communication Research*, 26(1), 3-26.

Wicks, R. (1995). Remembering the news: effects of medium and message discrepancy on news recall over time. *Journalism & Mass Communication Quarterly*, 72 (3), 666-681.

Wicks, R. H., & Drew, D. G. (1991). Learning from news: Effects of message consistency and medium on recall and inference making. Journalism Quarterly, 68, 155-164.

Hesham M. Mesbah, Dept. of Journalism &Mass Communication, Kuwait University This paper has been presented at the 28th Southeast Colloquium of the Association for Education in Journalism and Mass Communication held at Little Rock, Arkansas, March 6-8, 2002. The paper was recognized by the “Newspapers division” with Honorable Mention.