

## IMPLICATION FOR MEDIA CONVERGENCE ON NEWS LEARNING

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### ABSTRACT

Over the last decade, comparisons of the effects of the traditional news media and the Internet have been made in relation to comprehension and remembering. This study aims at assessing the effects of single and compound presentational elements, and making predictions for the future. One of the two main aims of this study is to measure comprehension and remembering effect of the traditional media instruments and the Internet. It includes a comparison of the media instruments and the Internet in order to find out the most effective media instrument for comprehension and remembering. The second aim of this study, after finding the most effective media instrument, is to find the preferences of the user of these instruments in terms of the presentational formats. The results of this study indicate that comprehension and remembering are not due to the individual effects of a stimulus, but rather an increase in the quantity of stimuli also increases the preference of users. When users are exposed to multiple stimuli, they select the dual-stimuli format with which they feel most comfortable, or they are most familiar.

**Keywords:** Comprehension, remembering, convergence, learning, media effect.

### Implication for Media Convergence on New Learning

The effects of the media on individuals and as a result on societies, is almost as old as the history of television. Despite hundreds of studies and tens of different effect methods, common opinions about the definite and social effects of the media (when comprehension and remembering is in question) still not come into existence. On the other hand, media effects research that was conducted on traditional media instruments until the beginning of the seventies gain a new dimension with the invention of digital technologies within these years (so called second media age). Moreover, with the intensive use of the Internet from the mid-nineties, a new perspective is added to the problem. In other words, the Internet is also added to the studies as a new medium and communication instrument besides the traditional media. The revolution that has been taking place with the digital technologies lead to the convergence of the traditional media instruments with the new communication technologies. Many communication technologies are now used on the same instrument.

In the last 50 years, numerous studies were conducted for measuring the effects of media instruments in terms of comprehension and remembering and are diverse in their implications. Many of the studies realized before the mid-1990's generally concentrated on newspaper and television. The findings of the earlier studies indicate the superiority of newspaper in comparison to television (DeFleur, Davenport, Cronin and DeFleur, 1992; Wicks and Drew, 1991; Robinson and Levy, 1986; Furnham and Gunter, 1985; Gunter Furnham and Leese, 1986). Later, at least for certain conditions, a considerable amount of research points out that users remember better from broadcast than print (Neuman, Just and Crigler, 1992; Beentjes, Vooijs and Voort, 1993; Molen and Voort, 1998, 2000; and Molen and Klijn, 2004). Moreover, particularly after the mid-1990's World Wide Web (web) as a mass media tool has been included in this comparison process (Eveland and Dunwoody, 2001; Eveland, Seo and Marton, 2002; and Althaus and Tewksbury, 2000). Furthermore, some studies observe the same effects in both newspaper and the web (Sundar, Narayan, Obregon and Uppal, 1998). On the one hand, the lack of consistency in these results suggests the necessity of investigating the problems from a different angle; on the other hand, there is a necessity to consider the up to date technological developments.

Although some of these studies were related with the structuring of the content, particularly for the television (Molen and Voort, 2000; and Molen and Klijn, 2004), in order to increase comprehension and remembering of the news whether measured immediately after exposure or delayed measure regardless of the media is very limited (Defleur and Defleur, 1998). One of the reasons is that almost all of the research realized up to now was unintentionally concentrated on the comparison of the different media instruments in order to find the effects of these tools on its users in terms of comprehension and recall. However, medium is the channel that carries the signals whereas signal (message) is the stimulator that causes the act of comprehension, storage and recall.

Particularly recent studies in this area ignore the content and technological convergence of the media. Technological developments and media trends currently point towards convergence, a concept entailing two distinct aspects: convergence of content, and technological convergence of the media instruments. The Internet and the opportunities it provides is the main starting point for assessing such trends. The opportunities provided by the Internet foreground the question of content convergence. The news gathered for different media at different times and places, and using different technologies, is now centrally restructured into a format applicable to all media instruments (Riefler, 2002). Many media organizations, beside publishing daily papers, also own

radio and television stations. This economic convergence has led to a structural one in news content production, eroding the traditional pattern of discrete production units maintained by the separate media organizations. It could hence be asserted that difference between print media, radio, and television are diminishing.

When compared with print media, radio and television news presentation is more immediate. Print compensates for this disadvantage by presenting the same news in depth. In general, it is possible to assert that these two aspects are complementary. By watching only television or listening to the radio, it is possible to miss some necessary information, resulting in the possibility of inaccurate inferences due to misunderstanding and incorrect interpretation. Gibbons Vogl and Grimes (2003) state that:

Commercial television news stories often employ complex story lines involving complicated relationships among characters. The confusion is so great that people who appear in these news stories are unintentionally defamed because some viewers come away having misattributed illegal actions to the wrong person. The human information process might be motivating these misattributions.

However, the convergence of the media will overcome these problems, especially in terms of the problem of reliability of the information obtained from the media due to each media instrument's individual structure. News received at different times through different channels, each with its specific properties (audio, audiovisual, text), which act differently on mind, creates a problem for the user in maintaining 'unity in perception', leading to uncertainty about the 'reality' of the news.

According to the Dual Coding Hypothesis (Paivio, 1971; 1975; 1986), audio-visual stimulus is stored in memory in the form of two separate but related codes whereas textual information is stored in a single code. The information stored in two separate codes is better remembered because, when trying to recall visual information, audio information acts as a clue. The studies on children of Molen (2001) and Molen and Voort (2000) show that audio and visual stimuli employed together have more effects on comprehension and understanding than either an audio or video stimulus alone. Molen and Klijn (2004) further show that, by using good semantic overlap, the effects on comprehension of audio-visual information are greater than the effects of text on its own. Iding (2000) further shows that a group of college students who read a text with an added figure performed better in a multiple-choice test on the material than a group which read only the text. Mayer and Moreno (1998) also mention that audio and visual information increase comprehension and remembering only when both forms are presented together, appropriate and related. Moreover, as Hussain and Adeeb (2009) mention, mobile technologies are appropriate for effective communication and interaction and according to Zhang, Zhang, Duan, Fu and Wang (2010), the psychological process of learning is positively influenced by the features of new communication and information technologies.

In such case, the continuation of the existing studies, become much more difficult particularly with the new and converging media instruments. One-to-many structural forms, which is one of the main aspects of the traditional media instruments, with the new communication technologies turn into the structural form of one-to-one. In other words, the concept of mass weaken, time and space limitations are gradually disappearing. In such a case where the individual come to the fore, the degree that the individual affected from the media and its manner becomes directly proportional to the degree of comprehension and manner of the individual. Learning, on the other hand, motivation and moreover the preferences of the learning instrument and the presentational format which is the reasons for the individuals to preferring these instruments is directly related. Therefore, in order to increase comprehension, the measurement of the preferences of the individuals related with the message that are presented by the media instruments in different formats, need to be considered together.

### RESEARCH QUESTIONS AND HYPOTHESES

The common point of the studies mentioned above is the measurement of the effects of media instruments. In these studies, the stimulator which creates learning is the message. On the other hand, the content and the technological convergence of the media instruments bring an opportunity to present either single or multiple stimulus combination on different media instruments. In such a situation, more than the effects of a medium, the effect of a stimulus becomes a significant issue. The aim of this study is neither to measure the effects of technological developments nor to compare technologies currently in place. Hence, primarily audio, visual, and text and their various combinations need to be measured for increasing comprehension and remembering. Therefore, the present study poses three questions:

**RQ1:** Which stimulus or stimuli-components maximize comprehension and remembering, and thus learning?

**RQ2:** What arrangement of stimuli components, in terms of the format and instrument employed maximizes user comprehension and learning?

**RQ3:** To which stimuli in compound presentations do users pay the greatest attention?

This study is composed of two similar experiments to measure the effects of a variety of stimulus and stimuli-components. The last stage, depending on the outcome of the first two experiments is to determine the best presentational format for different stimulus or stimuli-components. There is also a need to consider the form and frequency of users' utilization of the media instruments. Thus:

**H1:** There is a positive relation between the frequency of use of the mass media instruments, and media sources from which news is obtained, trust in the media instruments, and comprehension and understanding.

Anderson (1995) states that people find it easier to recall information, if they can revise the emotional and physical state in which they learned the information. On the other hand, Lang, Potter and Grabe (2003) mention that revised stories are remembered and evaluated better. Therefore, it is expected that:

**H2:** In repeated exposures, for every stimulus or compound-stimuli presentation comprehension and remembering increases.

### **Stimulus Materials**

Radio and television present news *en bloc* and in sequence, but in print and online, the amount and order of reading news is under the control of the user. In an experiment, if news is presented to the participants in complex packets, some of the news may attract attention and some may not. Moreover, some may already have information about this news. Eveland, Seo and Marton (2002) note that when compared with television news presentation, news presented in the newspapers is distinguished by its inverted pyramid structure. They also point out in their comparison that if the text version of the television news also appears in print, its ecological validity will be reduced. They further claim that there is more factual information in print newspapers than in the evening news on television and draw the attention to the limitations of the semantic overlap hypothesis of Molen and Voort (2000). By referring to the studies of Brosius, Donsbach, & Birk (1996), Graber (2001) and Grimes (1990), who point out that the visual information in most television news is not compatible with the audio information with a resultant decrease in external validity. Therefore, to increase external and ecological validity and to minimize the problems encountered in the other studies, the stimulus materials for both of the present experiments were prepared according to the inverted pyramid structure and the audio-visual materials prepared in accordance with Molen and Voort's (2000) semantic overlap hypothesis, in which 45% of the total presentation time is supported with relevant visual materials. The stimulus material for the first experiment lasted for 102 seconds and for the second experiment 136 seconds. The use of the extreme topics such as violence, war and disaster that were suspected to increase comprehension and attention was avoided (Philo, 2002; Nathanson, Eveland, Park, Paul, 2002; Lang, Newhagen, 1996; and Newhagen and Reeves, 1992). Therefore, unbiased subject items were selected as presentational materials by considering the age, education, social environment and common culture of the participants. Moreover, when using more than one news item in presentations, there is the possibility that some may attract the participants' attention more than others. Thus, there is the possibility that information may be better retained. To prevent such a biased outcome, in contrast with earlier studies, a single news item was selected as the presentational material this study. Attention was also paid in the preparation of the presentational materials not to use the presentational attribute formats of one media instrument more than the others. The news story for the first experiment was the benefits of breast-feeding to the mother. For the second experiment, the subject of the news story concerned the benefits of celery. All texts included factual items such as names particular to the topic and dates. Both the news stories are presented in Appendix A in their original versions in Turkish.

For both experiments, equal amount of time was given to the participants for each presentational format. In the final stage of the research, participants were asked which presentational format they preferred in terms of the effectiveness of their stimuli components. For each of the news stories, the questions used to measure comprehension and remembering were selected from a pool prepared by eight colleagues at the Faculty of Communication and Media Studies (FCMS) of the Eastern Mediterranean University (EMU).

### **Participants**

The population of the study consisted of 10,705 students who were enrolled at the Eastern Mediterranean University (EMU) in the year 2003 excluding those in the English Preparatory School and postgraduate education, and those studying at the Faculty of Communication and Media Studies (FCMS). The students studying at the FCMS may be more conscious about the news and media; this is the reason for excluding the students of the FCMS from the sample. A random sampling strategy was used for selecting the participants. For the first experiment, 240 students were selected from students who had gained between 2.00 and 2.50 out of a 4.00 cumulative grade average (CGPA) in fall semester. The reason for this was to avoid any effect that the

academic success level of the participants might have on the results. 113 (47%) are male and 127 (53%) of the participants are female. 162 (67.5%) of the participants are Turkish Republic and 78 (32.5%) of the participants are Turkish Republic of Northern Cyprus citizens. 11% of the participants are between 17 and 18, 48% of the participants are between 19 and 20 and 29% of the participants are between 21 and 22 years of age. 10% are above 25 years age. 14% of participants are freshmen, 35% of participants are sophomore, 35% of participants are junior and 15% of participants are senior year students. 41% of the students have basic income or lower, the rest 59% have higher income levels.

In the second experiment, 112 participants were selected in two groups, according to their cumulative grade average (CGPA) from the semester mentioned above. The first group (n=56) had cumulative grade average scores, equal to or below 1.99, while the second group (n=56) had cumulative grade average scores of 3.00 or above to search for the effect of academic success level on comprehension and remembering. 56 (50%) are male and 56 (50%) of the participants are female. 66 (58.9%) of the participants are Turkish Republic and 46 (41.1%) of the participants are Turkish Republic of Northern Cyprus citizens. 22 (19.6%) of the participants are between 17 and 18, 40 (35.7%) of the participants are between 19 and 20, 36(32.1%) of the participants are between 21 and 22 and 11(9.8%) are between 23 and 24 years of age. 3(2.7%) are above 25 years age. 21.4% of participants are freshmen, 32.1% of participants are sophomore, 31.3% of participants are junior and 15.2% of participants are senior year students. 37.5% of the students have basic income or lower, the rest 62.5% have higher income levels.

For the final stage of the study, 80 participants were asked to place text and audio-video stimuli materials on a television screen or on a web page. After informed consent was obtained and it was ascertained that participants had no audio or visual disabilities, the students were invited to the study.

### **Procedure**

For the experimental environment, the television studios of FCMS were selected. For the first experiment, groups, each with 20 participants, were formed. Each group was exposed to one of the following stimuli or stimulus-components: print, audio, audio-visual and audio-visual-text. Before the presentations, students were informed about the nature of the experiment and were asked to complete a questionnaire consisting of two different sections. The first section was composed of demographic questions and the second involved questions, in the form of a five-point Likert scale, about the participants' daily uses of the television, radio, newspaper, and internet. Immediately after the completion of each presentation, a set of factual and open-ended questions about the subject of the stimulus material were asked, in order to measure the levels of comprehension and understanding of the participants. Grimmes and Rimmer (1994) note that participants, who are tested immediately after the exposure, remember more than participants tested after a period of time (e.g., 48 hours).

In all presentations, the duration of the reading of the text materials was kept constant. In coding the questions used for measuring comprehension, "1" was given for fully correct answers, "0.5" given to half-correct answers, and "0" given for wrong answers. Similarly, for memory questions, "1" was given for correct answers and "0" for wrong answers. In order to provide consistency, the entire coding process was carried out by the researcher. In order to test the internal validity of the results obtained from the first experiment, and to observe the behaviors of the different groups in terms of comprehension and understanding, the second experiment was realized under the same conditions.

Most recent studies have concentrated on comparisons of television and print, television and the web or print and the web but excluded audio stimulus alone. This stimulus was included in the first experiment of the study and, new communication technologies capable of presenting the three stimuli at the same time were favored.

The demographic questions sought to explore the gender, age, and income level of the participants. The attitude-scale questions set out to investigate the use of the media by the participants. The open-ended questions posed following exposure to the presentations sought to find out about comprehension and remembering. Finally, one multiple choice question was asked to explore students' evaluation of their behaviors when exposed to the double- and triple-component presentational stimuli.

### **FINDINGS**

At the first stage, preliminary analysis of both experiments indicated that there were no significant differences in the gender, age and family income level of the participants. For the attitude scale questions, the value scale extended between one (least important) and five (most important). The reliability of the five-point attitude-scale for the first experiment is:  $\alpha=0.811$  and  $\text{mean}=3.40$ .

When the data obtained from the correct answers given to the factual and open-ended questions are analyzed, the calculated mean and standard deviations for different stimuli presentations are given in Table I. In this experiment, in order to find out whether there is a significant difference among the presentational stimuli, ANOVA test is applied. According to between group factor analysis ( $F(4,59)=16.758, p<0.05$ ), there is a significant difference among the presentational stimuli in terms of comprehension and remembering. In this study, a variable is generated by summing the correct answer for each question. The results of the Tukey HSD multiple comparison test (scores=dependent variable) carried out according to between group factor analysis of the three components stimuli compared with single and double component stimuli, namely, audio stimulus, textual stimulus, audio-visual stimuli and audio-text stimuli. Three component stimuli proved to be more effective in terms of comprehension and remembering. Between audio-text and audio-video double stimuli presentations, audio-text and text presentations and audio-video and text presentations at the level of  $\alpha=0.05$  there is no statistically significant difference in terms of comprehension and remembering. At the same time, audio-video and audio-text double presentations are more efficient in terms of comprehension and remembering, when compared with single audio presentation. Finally, according to the results of the experiment, no significant difference is observed between the text and audio presentations in terms of comprehension and remembering. In the second analysis of the experiment, a relationship is sought between the frequency of use of the media instruments, instrument(s) used to obtain news and the trust to the media instrument(s) used to obtain news and the answers given to the questions of comprehension and remembering in the experiment by the participants. To explore whether this relationship exists, answers given to the comprehension and remembering questions and answers given to the attitude scale questions are analyzed by the ANOVA test. The result obtained from this test shows that according to the between groups factor ( $F(4,19)=0.117, MS=0.115, p=0.974$ ) there is no significant difference between comprehension and remembering and the frequency of use of the media instruments. Similarly, there is no significant difference between comprehension and remembering and the instrument(s) used to obtain news ( $F(4,19)=0.114, MS=0.450, p=0.976$ ) and between comprehension and remembering and trust in the media instrument(s) used to obtain news ( $F(4,19)=0.266, MS=0.226, p=0.895$ ).

Table I. Mean and Standard Deviations for different stimuli presentations.

	Mean	Standard Deviation
Triple Stimuli	44.92	9.85
Double Stimuli (Audio-Video)	30.67	7.33
Double Stimuli (Audio-text)	33.42	7.33
Single Stimulus (Text)	26.12	9.77
Single Stimulus (Audio)	11.58	8.46

Finally, participants were asked to evaluate their behaviors when exposed to the double and triple-component presentational stimuli, using a multiple choice question: ‘*What are you doing while exposed to the presentational stimuli?*’ Respondents were asked to select one of the stimulus-components to which they were exposed: merely reading, merely listening, reading and watching, listening and reading, watching, listening and watching, listening and reading. The relationship between the responses given to this multiple-choice question and the number of correct answers given by the participants to the comprehension and remembering questions after double and triple-stimuli presentations were explored. ANOVA test was used to determine the relationship between the responses of the participants to the audio-video double-stimuli alternative and merely audio stimulus. Within groups factor ( $F(1,16)=5.468, MS=48.375, p=0.033$ ) yield a statistically insignificant difference between the behavioral responses obtained from single and double stimuli forms. Therefore, in this double-stimuli presentation, instead of only listening, participants prefer both listening and watching. Similarly, the behavioral forms for the audio-text double-stimuli and text, audio and audio-text alternatives are tested by ANOVA. Within group factor analysis yield the conclusion that the participants behaviors in audio-text double stimuli presentation rather than merely listening or reading prefer both reading and listening at the same time (for audio-text and text  $MD=5.33$  and  $p=0.027$  and for audio-text and audio  $MD=11.11$  and  $p<0.001$ ). The results of these two tests show that when the participants are exposed to double-stimuli presentation, instead one stimulus, participants prefer to follow both stimuli at the same time. In the triple-stimuli presentations, participants, instead of following single stimulus either text or audio, double-stimuli such as audio-video, and triple-stimuli text-audio-video, indicate that they show preference towards following one of the double-stimuli alternatives such as audio-text and text-video alternatives (see Table II). According to the results of the experiment, audio stimulus presentation yields lower effects when compared with the others in terms of comprehension and memorization.



Table II. Descriptive Statistics for Participants Behavior

		Mean	Std. Dev.
AV	Audio	9.0	3.27
	Audio-Video	16.66	9.27
AT	Text	7.55	3.6
	Audio	1.77	0.97
	Audio-Text	12.88	5.96
AVT	Text	0.77	1.30
	Audio	0.44	0.72
	Audio-Video	4.0	3.24
	Audio-Text	5.22	2.94
	Text-Video	5.22	4.17
	Audio-Video-Text	0.77	0.97

According to the results of the first experiment in the first stage, audio stimulus presentation yields lower effects when compared with the others in terms of comprehension and remembering. However, audio stimulus is the common factor in the double-stimuli presentations. Therefore, audio stimulus alone was not examined in the second experiment.

In order to test the internal validity of the results obtained from the first experiment and for observing the behaviors of the different groups in terms of comprehension and remembering, the second experiment was administered under the same conditions.

For the second experiment, the invited students were divided into two sets according to their CGPA scores. Each set is then divided into four groups (n=14). In this experiment, one group from each set is exposed to one of the audio-video-text, audio-video, audio-text or merely text stimuli presentation.

28 students participated in each session of the second experiment. At the beginning of each session, participants were asked to answer questions that would provide information about their identity and the use of the media. After the exposure to the presentational stimuli, participants are asked to answer the questions of comprehension and remembering and their behaviors during exposure process. After having the answers of the questions, participants are not allowed to leave the experimental environment. For the second time, participants are exposed to the stimuli materials and once again are asked to answer the same questions.

In the analysis of data obtained from the experiment, the General Linear Model was used. The scores that participants obtained from the comprehension and memorization questions and for the first and the second steps according to their cumulative grade averages (CGPA) and the stimuli materials to which they were exposed are given in the Table III.

Table III. Descriptive statistics for the second experiment.

	Stimulus	CGPA	Mean	Std Deviation
First Score	A-V-T	Below 2.00	7.86	0.86
		Over 3.00	10.71	1.33
	A-V	Below 2.00	7.36	1.01
		Over 3.00	9.50	0.76
	A-T	Below 2.00	7.57	1.09
		Over 3.00	9.29	1.07
	T	Below 2.00	6.07	1.00
		Over 3.00	7.07	0.83
Repeated Scores	A-V-T	Below 2.00	11.00	0.78
		Over 3.00	12.93	0.62
	A-V	Below 2.00	9.50	0.76
		Over 3.00	11.36	0.74
	A-T	Below 2.00	9.43	1.02
		Over 3.00	11.29	0.99
	T	Below 2.00	7.64	0.50
		Over 3.00	8.86	0.66

A 2(CGPA below 2.00 vs. CGPA over 3.00) x 4(audio-visual-text vs. audio-visual vs. audio-text vs. text) factorial analysis of variance test is used for the first scores and the repeated scores. For the first scores test of between-subject effects shows that there is a significant relation between the CGPA and stimulus factors ( $F(3,104)=4.181$ ,  $MS=1.014$ ,  $p=0.008$ ) at the 0.05 level. On the other hand, no significant relation is observed for the repeated scores between the CGPA and stimuli factors ( $F(3,104)=1.30$ ,  $MS=0.604$ ,  $p=0.278$ ) at the 0.05 level.

According to the results of the test conducted in the first phase of the second experiment, pair-wise comparison of the four stimuli presentations (audio-visual-text, audio-visual, audio-text, text) shows that for those participants who were exposed to the triple stimuli presentation ( $F=56.37$ ,  $MS=57.14$ ,  $p<0.001$  result obtained from the test of significance for the first scores using unique sums of squares) compared to double stimuli (for audio-visual  $F=31.71$ ,  $MS=32.14$ ,  $p<0.001$  and for audio-text  $F=20.29$ ,  $MS=20.57$ ,  $p>0.001$ ) and single stimulus ( $F=6.91$ ,  $MS=7.00$ ,  $p=0.01$ ) presentations, comprehension and remembering is higher. Those students who were exposed to double-stimuli show the same performance whereas those who were exposed to a single stimulus show weaker performance. Similarly pair-wise comparison of the two CGPA levels show that those participants with a CGPA of three and over have higher performance in terms of comprehension and remembering than those with a CGPA below two ( $F(1,104)=102.732$ ,  $MS=1.04$ ,  $p<0.001$ ).

According to the results of the repeated test, conducted at the second phase of the second experiment, pair-wise comparison of the four stimuli presentation shows that, the participants who were exposed to the triple stimuli presentation ( $F=43.08$ ,  $MS=26.04$ ,  $p<0.001$ ) yield higher level of comprehension and memorization compared to double-stimuli ( $F=39.95$ ,  $MS=24.14$ ,  $p<0.001$  for both audio-visual and audio-text) and single stimulus ( $F=17.08$ ,  $MS=10.32$ ,  $p<0.001$ ) presentations. Those exposed to double-stimuli presentations show the same performance whereas those exposed to a single stimulus show weaker performance.

Similarly, pair-wise comparison of the two CGPA levels for the repeated scores show that those participants with a CGPA of three and over have a higher performance in terms of comprehension and memorization than those with a CGPA below two ( $F=136.14$ ,  $MS=0.604$ ,  $p<0.001$ ). On the other hand, according to the one way analysis of variance method between groups factor reveals that no significant difference is observed between the frequency of use of the media instruments ( $F(3,7)=6.48$ ,  $p=0.51$ ), instrument(s) used to obtain news ( $F(3,7)=4.251$ ,  $p=0.098$ ) and trust in the media instrument(s) used to obtain news ( $F(3,7)=5.254$ ,  $p=0.071$ ) and the answers given to the questions of comprehension and remembering in the experiment by the participants.

In the last part of the second experiment, respondents were asked to explain their behaviors when exposed to double and triple-stimuli presentations. Statistically no significant difference has been observed between the results obtained from the double-stimuli presentations and the triple-stimuli presentations in terms of the participants' forms of behavior ( $F(3,111)=0.143$ ,  $MS=0.561$ ,  $p=0.934$ ). In the triple-stimuli presentation ( $M=3.93$ ), participants showed preference towards audio-video and audio-text stimuli. As to the audio-visual double-stimuli, participants prefer to follow audio and visual stimuli together ( $M=4.79$ ). Similarly, instead of following merely the text or merely the audio, participants prefer to follow audio-text stimuli together.

In the second stage of the study, 80 participants were asked to place text and audio-video stimuli materials on a television screen or on a web page. The results show that 57 participants divided the screen into two equal parts. Among these, 45 of them divided the screen vertically and placed the audio-visual materials on the left side of the screen and the text on the right side whereas 12 of them divided the screen horizontally into two, and placed the audio-visual materials on the top and text materials at the bottom. 12 participants divided the screen into four equal portions and placed the audio-visual materials on the left upper quarter and the text on the remaining three quarters of the screen. The remaining 11 participants placed the audio-visual materials on the upper part (covering 70% of the screen) and the text at the bottom.

## DISCUSSIONS AND CONCLUSIONS

In response to the first research question, the results of the experiments indicate that performance of the participants is better in the triple-stimuli presentation when compared with the double-stimuli and single-stimulus presentations. Similarly, as far as the comprehension and remembering are concerned the double-stimuli yields better results than that of the single-stimulus presentations. These findings, in return, answer the second research question and show that following double-stimuli increases comprehension and remembering more than the single stimulus. While in the triple-stimuli presentation of the experiment, participants tended to follow the audio-video, audio-text and text-video. Indeed, this result indicates that comprehension and remembering are not based on the effect of the stimuli: the increase in the number of stimuli increases the

number of alternatives for the participants. They show preference towards the double stimuli as the one which is the most appropriate and familiar for them.

On the other hand, the responses in both experiments show that, during the compound-stimuli presentations, participants tend to follow and pay attention to the double-stimuli rather than single stimulus or triple-stimuli. Although these findings show that following double-stimuli increases comprehension and remembering more than the single stimulus, this contradicts with the outcome of the third study: comprehension and remembering is higher in triple-stimuli presentations than in the single and double-stimuli presentations, but participants who are exposed to either triple or double-stimuli tend to follow two stimuli at the same time during the presentation. While in the triple-stimuli presentation of the first experiment, participants tended to follow the audio-video, audio-text and text-video. In the triple presentation of the second experiment, participants tended follow the text-video and text-audio double components. Indeed, these results indicate that comprehension and remembering are not based on the effect of the stimuli: the increase in the number of stimuli increases the number of alternatives for the participants; and when they are exposed to triple-stimuli, they prefer the double stimuli as the one that is the most appropriate and familiar to them. These findings support Darley's (1999) hypothesis, which states that the style of information processing is related to the user's perception of the media. It should also be emphasized that since the participants are university students and their proficiency in reading skill is a significant factor that contributed to this outcome. On the other hand, the analysis of the data obtained from the experiments shows that there is no relationship between frequency of use of the media instruments, and trust in the media instrument(s) used for obtaining news by the participants and on their comprehension and remembering. In other words, these results do not support the first hypothesis of the study. Results obtained from the first and second experiments show that the findings, in terms of comprehension and remembering, are directly related with each other. Also the study revealed that repeated exposure increase comprehension and understanding. This outcome supports the second hypothesis.

Finally, in order to answer the third research question, the data obtained from the last stage of the study is analyzed. In this study, participants placed the audio-visual and text materials, in order to maximize comprehension and remembering, on two equal portions of a presentational instrument. In other words, they give the same importance to the text and audio-visual materials.

According to the findings of the second experiment, the academic success of the participants and their comprehension and remembering performances are directly proportional with each other. When the responses given to the comprehension and remembering questions are investigated without considering the medium, there is a significant difference between the participants with lower and higher levels of academic success. This indicates that the differences in comprehension and remembering depend not only on the instrument but also on the individuals. In other words, affected from the media is not directly related with the media instrument but it is directly proportional with their stimuli combination and presentational formats which are increase the learning.

This study has some limitations. The most evident limitation of the study is the external validity of the experiments. In existing presentational instruments, presentational materials consist of several news items. In both experiments, a single news item was used. This highlights problems due to the attention differences in natural and experimental environments. The concept of comprehension and memorization, and hence understanding, is related to the news for which different media channels emphasize various properties. In other words, in showing preference to the topic areas that convey information, education, and entertainment are avoided. This study is limited in terms of the participants, because the results that will be obtained by the research, apply only to students of EMU. In other words, the participants represent only certain age groups and level of education. Hence this study has limited applicability of the results to different age groups and educational levels. Related to this limitation, since the participants are students, there is also a possibility that the reading skills of the participants are developed. This can be the reason why they find this stimulus more effective. Such a possibility implies inequality of effect among the different stimuli. On the other hand, the measure of comprehension and memorization used in this study differs from many other studies undertaken in this area. The absence of a common measuring instrument for comprehension and remembering creates a problem for the internal validity of the experiments performed in the study. Finally, it was noted above that the use of still pictures in combination with text contributes to comprehension and remembering.

In conclusion, in order to create effective presentational information, there is a need to exploit both current and developing communication technologies. The opportunities that these technologies provide should be evaluated considering the habits of individuals and societies. The increase in the number of news presentation tools needs to be directed towards the sense of making an influence and increasing. Otherwise, pluralism tends to promote disorder and ineffectiveness. This study explored which presentational format might create maximum effect,



both in terms of its technological properties and content, parallel to the developments in convergence. Considering the technical properties, content, and speed-dependent attributes, for sending equally represented multiple stimuli as the presentational environment creates the maximum effect.

## REFERENCES

- Althaus, S. L., & Tewksbury, D. (2000). Patterns of Internet and Traditional News Media Use in a Network Community. *Political Communication*, 17 (1), 21-25.
- Anderson, J. R. (1995). *Learning on Memory: An Integrated Approach*. New York: John Wiley and Sons.
- Barrow, L. C., & Westley, B. H. (1959). Comparative Teaching Effectiveness of Radio and Television. *Audio-Visual Communication Review*, 7, 14-23.
- Beentjes, J. W., Vooijs, M. W., & Van Der Voort, T. H. (1993). Children's Recall of Televised and Printed News as a Function of Test Expectation. *Journal Of Educational Television*, 19, 5 - 13.
- Brosius, H. B., Donsbach, W., & Birk, M. (1996). How Do Text - Picture Relations Affect the Informational Effectiveness of Television Newscast? *Journal of Broadcasting and Electronic Media*, 40.
- Darley, W. ... (1999). The Moderating Influence of Style of Information Processing on Media Perception and Information Exposure. *Journal of Marketing Communications*, 5, 181 - 184.
- DeFleur, M. H., & DeFleur, M. L. (1998). Developing an Integrated Theory of Recall of News. *AEJMC Conference Paper*, Available at: <http://list.msu.edu/cgi-bin/wa?A2=ind9812d&L=aejmc&F=&S=&P=4263>.
- Defleur, M. L., & Ball-Rockeah, S. (1998). *Theories of Mass Communication*. New York: Longman Publication.
- DeFleur, M. L., Davenport, L., Cronin, M., & DeFleur, M. H. (1992). Audience Recall of News Stories Presented by Newspaper, Computer, Television and Radio. *Journalism Quarterly*, 69 (4), 1010 - 1022.
- Eveland, W. P., & Dunwoody, S. (2002). An Investigation of Elaboration and Selective Scanning as Mediators of Learning from the Web versus Print. *Journal of Broadcasting and Electronic Media*, 46 (1), 34-53.
- Eveland, W. P., & Dunwoody, S. (2000). Examining Information Processing on the World Wide Web Using Think Aloud Protocols. *Media Psychology*, 2 (3).
- Eveland, W. P., & Dunwoody, S. (2001). User Control and Structural Isomorphism or Disorientation and Cognitive Load? Learning from the Web Versus Print. *Communication Research*, 28, 48-87.
- Eveland, W. P., Seo, M., & Marton, K. (2002). Learning from the News in Campaign 2000: An Experimental Comparison of the TV News, Newspapers, and Online News. 4, 353-378.
- Furnham, A., & Gunter, B. Sex, Presentation Mode and Memory for Violent and Non - Violent News. *Journal of Educational Television*, 11, 99 - 105.
- Gibbons, J. A., Vogl, R. J., & Grimes, T. (2003). Memeory Misattributions for Characters in a Television News Story. *Journal of Broadcasting and Electronic Media*, 47 (1), 99 - 112.
- Gökçe, O. (2003). *İletişim Bilmine Giriş: İnsanlararası İlişkilerin Sosyolojik Bir Analizi*. Ankara: Turhan Kitabevi.
- Graber, D. A. (2001). *Processing Politics: Learning From the Television in the Internet Age*. Chicago: University of Chicago Press.
- Grimes, T. (1990). Audio - Video Correspondence and its Role in Attention and Memory. *Educational Psychology*, 4, 15 - 25.
- Grimes, T., Rimmer, T., & Boiarsky, G. A. (1994). TV News Simulations and their Interaction with Viewer Memory. *Communication Reports*, 7 (1), 11 - 19.
- Gunter, B. (1985). *Dimension of Television Violence*. Aldershot UK: Gower.
- Gunter, B., Furnham, A., & Leese, J. (1986). Memory for Information from a Party Political Broadcast as a Function of Channel of Communication. *Social Behavior*, 1, 135 - 142.
- Harris, R. J. (2004). *Cognitive Psychology of Mass Communication*. Mahwah, NJ, USA: Lawrence Erlbaum Association.
- Hussain, I., & Adeeb, M. A. (2009). Role of Mobile Technology in Promoting Campus - Wide Learning Environment. *Turkish Online Journal of Educational Technology*, 8 (3), 48 - 57.
- Iding, M. K. (2000). Can Strategies Facilitate Learning from illustrated Science Texts? *International Journal of Instructional Media*, 27 (3), 289 - 302.
- Lang, A., Newhagen, J., & Reeves, B. (1996). Negative Video as Structure: Emotion, Attention, Capacity and Memory. *Journal of Broadcasting and Electronic Media*, 40 (4), 460 - 477.
- Lang, A., Potter, D., & Grabe, M. E. (2003). Making News Memorable: Applying Theory to the production of Local Television News. *Journal of Broadcasting and Electronic Media*, 47 (1), 113-123.
- Mayer, R. E., & Moreno, R. (1998). A Split Attention Effect in Multimedia Learning: Evidence for Dual Processing System in Working Memory. *Journal of Educational Psychology*, 90, 312 - 320.
- Nathanson, A. I., Eveland, W. P., Park, H., & Paul, B. (2002). Perceived Media Influence and Efficacy as Predictors of Caregivers' Protective Behaviors. *Journal of Broadcasting and Electronic Media*, 46 (3).

- Neuman, W. R., Just, M. R., & Crigler, A. N. (1992). *Common Knowledge: News and the Construction of Political Meaning*. Chicago: University of Chicago Press.
- Newhagen, J., & Reeves, B. (1992). This Evening's Bad News: Effects of Compelling Negative Television News Images on Memory. *Journal of Communication* , 3, 25 - 41.
- Paivio, A. (1975). *Imagery and Long Term Memory*.
- Paivio, A. (1971). *Imagery and Verbal Processes*. New York: Holt.
- Paivio, A. (1986). *Mental Representation: A Dual Coding Approach*. Oxford, UK: Oxford University Press.
- Perry, D. K. (2001). *Theory and Research on Mass Communication: Context and Consequences*. Mahwah . NJ, USA: Lawrence Erlbaum Association.
- Philo, G. (2002). Television News and Audience Understanding of War, Conflict and Disaster. *Journalism Studies* , 3 (2), 173 - 186.
- Riefler, K. (2002). *Internet Çağında Gazetecilik*. (S. Yedig, & H. Akman, Dü) Istanbul: Metis Yayınları.
- Robinson, J. P., & Levy, M. R. (1986). *The Main Source: Learning From Television News*. Beverly Hills, CA: Sage Publication.
- Schramm, W. (1997). *The Beginnings of Communication Study in America. A Personal Memoir*. (S. H. Chaffee, & E. M. Rogers, Eds.) London, UK: Sage Publications Inc.
- Severin, W. J., & Tankard, J. W. (1997). *Communication Theories: Origins, Methods, and Uses in the Mass Communication*. (Fourth, Ed.) London.
- Sundar, S. S., Narayan, S., Obregon, R., & Uppal, C. (1998). Does the Web Advertising Work? Memory for Print vs. Online Media. *Journalism and Mass Communication Quarterly* , 75, 55 - 68.
- Tremayne, M., & Dunwoody, S. (2001). Interactivity, Information Processing and Learning on the World Wide Web. *Science Communication* , 23, 111-163.
- Walma Van Der Moolen, J. H. (2001). Assessing Text-Picture Correspondance in Television News: The Development of a New Coding Schema. *Journal of Broadcasting and Electronic Media* , 45 (3), 483-498.
- Walma Van Der Moolen, J. H., & Klijn, M. E. (2004). Recall of Television Versus Print News: Retesting the Semantic Overlap Hypothesis. *Journal of Broadcasting and Electronic Media* , 48 (1), 4 - 29.
- Walma Van Der Moolen, J. H., & Van Der Voort, T. H. (2000). Children's and Adults Recall of Television and Print News in Children's and Adult News Formats. *Communication Research* , 27, 132-160.
- Walma Van Der Moolen, J. H., & Van Der Voort, T. H. (2000). The Impact of Television, Print, and Audio on Children's Recall of the News. *Human Communication Research* , 26 (1), 132 - 160.
- Wicks, R. H., & Drew, D. G. (1991). Learning From News: Effects of Message Consistency and Medium on Recall and Inference Making. *Journalism Quarterly* , 68 (1), 155 - 164.
- Williams, D., Paul, J., & Ogilvie, J. (1957). Mass Media, Learning and Retention. *Canadian Journal of Psychology* , 11, 157-163.
- Wilson, C. E. (1974). The Effect of Medium on Loss of Information. *Journalism Quarterly* .
- Wimmer, D. C., & Dominic, J. R. (1991). *Mass Media Research. An Introduction* (Third ed.). California, USA: Wadsworth Publishing Company.
- Yüksel, E. (2001). *Medyanın Gündem Belirlirme Gücü* (5 ed.). Konya: Çizgi Kitabevi.
- Zhang, L., Zhang, X., Duan, Y., Fu, Z., & Wang, Y. (2010). Evaluation of Learning Performanca of E – Learning in China: A methodology based on change of Internal Mental Model of Learners. *Turkish Online Journal of Educational Technology* , 9 (1), 70 - 82.

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## Appendix A

### SELERİ YE, SAKİN KAL...

Retrieved from: <http://www.hekimce.com.tr/index.php?kiid=1841>

Retrieved on: 01/07/2010

Akdeniz mutfağının önemli lezzetlerinden seleri, içerdiği maddeler sayesinde sinirliliği önlüyor. B vitamini, demir ve kireç yönünden zengin olan seleri, şeker, yüksek tansiyon ve romatizma hastalıklarına da iyi geliyor...

Öfke, yalnızlık sıkıntısı, karasevda, çekingenlik ve daha bir dizi ruhsal durumda nelerin yenmesi gerektiği sıralanmış. "Düş kırıklığı" çekenlerin ise, başlıca seleri ve havuç yemesi tavsiye ediliyor. Akdeniz mutfağının önemli yiyecekleri arasında yer alan selerinin, içerdiği maddeler sayesinde insanları sinirlilik halinden uzak tuttuğu bildirildi.

Salatası, çorbası, zeytinyağlı yemeği yapılarak tüketilebildiği gibi, yemeklere kendine özgü bir lezzet de katan seleri, içerdiği değerlerle alternatif tıpta birçok hastalığın tedavisinde de kullanılıyor. Uludağ Üniversitesi Ziraat Fakültesi Bahçe Bitkileri Bölümü Öğretim Üyesi Prof. Dr. Rahmi Türk, kış mevsiminin önemli sebzeleri arasında yer alan selerinin, besleyici özelliğinin yanı sıra sağlık açısından birçok yararı olduğunu söyledi.

Yaprak ve kök selerini olarak iki çeşidi bulunan ve anavatanı Güney Avrupa olan selerinin, deniz havası alan rutubetli yerlerde yetiştiğini ve soğuk havada kolayca don tuttuğunu anlatan Prof. Dr. Türk, lezzeti ve besin değerinde kayıp meydana gelmemesi için alırken don yememiş olmasına özen gösterilmesi gerektiğini belirtti.

### SİNİRLERİNİZE HAKİM OLMAK İÇİN

Selerinin en çok içeriğindeki "sedanonik anhidrit", "sedanolin", "limonen", "palmitik asid" ve "gayakol" gibi maddeler sayesinde zihinsel yorgunluğun giderilmesine iyi geldiğini kaydeden Prof. Dr. Türk, B vitamini, demir ve kireç içeren selerinin, unutkanlığı ve sinir yorgunluğunu giderdiğini bildirdi.

İdrar söktürücü özelliğe de sahip bulunan seleri, böbrek taşı ve kumlarının düşürülmesine yardımcı olduğunu ifade eden Prof. Dr. Türk, selerinin şeker, yüksek tansiyon ve romatizma hastalıklarına da iyi geldiğini sözlerine ekledi.

### "Emzirme, doğal bir doğum doğum kontrol yöntemidir"

Retrieved from: <http://gebelik.org/dosyalar/emzirme/emzirme2.html>

Retrieved on: 01/07/2010

Vehbi Koç Vakfı (VKV) Amerikan Hastanesi kadın hastalıkları ve doğum uzmanı Dr. Alper Mumcu, "emzirmenin, doğal doğum kontrol yönteminden kilo verme ve kanserden korunmaya kadar pek çok yararı bulunduğunu" bildirdi.

Dr. Mumcu, "1-8 Ekim Emzirme Haftası" dolayısıyla yaptığı yazılı açıklamada, emzirmenin anne sağlığı açısından yararlarına işaret ederek, bunun ayrıca doğal bir doğum kontrol yöntemi olduğunu belirtti.

Süt üretiminden sorumlu prolaktin hormonunun, beyinde yumurtlamayı kontrol eden hormonların salgılanması üzerinde etkisi bulunduğuna dikkati çeken Dr. Mumcu, "Bu etki sonucu yüksek prolaktin düzeyi varlığında, yumurtalıkta yeni yumurta hücresi gelişimi olmaz. Yumurtlama olmadığı için gebelik olasılığı da ortadan kalkar. Emzirmenin ilk 3 ay için koruyuculuğu yüzde 90'ın üzerindedir" dedi.

Emzirmenin hamilelikte alınan kiloların verilmesini de kolaylaştırdığını vurgulayan Dr. Mumcu, şunları kaydetti: "Emzirme ve süt üretimi, günde yaklaşık 500-1000 kalori harcanmasına neden olur. Emzirmeyen annelerin, bu kaloriyi yakmaları için 1 saatten daha uzun bir süre bisiklet binmesi ya da yürümesi gerekir. Emzirme ayrıca kanserden korur."