

The effects of headlines and summaries on news comprehension and recall

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Abstract. In two experiments, we attempted to analyze the effects of newspaper article headlines and summaries on final comprehension and recall. During the first experiment, the participants consisted of 117 high school students from the 9th grade, 68 from the 11th grade, 79 first year Psychology students from the Autonomia University of Madrid and 66 fifth year Journalism students from the Complutense University of Madrid. The subjects were randomly required to read a news report in one of the following experimental conditions: (1) the whole news article (headline, summary and text), (2) the headline and text, (3) the summary and text, and (4), the text only. The data from immediate and delayed free recall tasks were recorded. The results showed that the structure of the news article did not influence the recall and that there were differences among groups in the amount and quality of recall. The headline and the summary modified by the use of macrostructural criteria constituted additional elements introduced into the second experiment to provide a contrast with the original headline and summary. The results showed that an improvement in article recall did occur with the modified version in comparison with the original version. These two experiments have confirmed that the aims and criteria of journalists differ from those held by the authors of scientific texts and question whether the reading strategies applied are the same in both cases.

Key words: Headline, Summary, News article comprehension and recall, News article structure, Text comprehension, Young readers

Introduction

The press is one of the most important forms of expression available. In the last few years, emphasis has been put on the need to incorporate newspapers into education as an instrument for transmitting knowledge and as a means of establishing significant links between pupils and society. Ultimately, it is reasonable to maintain that one of the central aims of any educational system is to produce citizens capable of understanding aspects of the world around them. However, in spite of this laudable aim, hardly any fundamental links have been set up between the cognitive investigation of text comprehension and didactic experience with text books in schools. There has been only limited interest in an area that we consider to be essential: the way that readers understand and recall newspaper articles and how text variables influence readers' comprehension of the articles.

Cognitive psychological research has provided an increasingly precise understanding of the factors that influence the comprehension of written material, such as its structure or the role played by summaries and titles. These aspects have been widely researched in academic and scientific texts. One of the areas of text comprehension investigation which has most interested psychologists and researchers concerns the processes that occur during the comprehension and summarising phases. A generally acknowledged tendency consists of habitually using the summary in order to emphasize and organize the most relevant contents of the text. Although the summary concept is imprecise, the summaries themselves hold a significant place in scientific texts while their effectiveness in improving comprehension and recall is generally recognised (Hartley & Trueman 1983). So, when we comprehend a passage, we tend to form a nucleus of information, a core concept which represents a general vision of the text. This core information forms the 'macrostructure'. Although there exist several theories concerning the interpretation of the effects associated with the improvement in comprehension and recall brought about by the initial summary, perhaps the macrostructural version put forward by Kinstch & van Dijk (1978; van Dijk & Kinstch 1983) is the most widely accepted. According to this theory, the initial summary assists the memory by operating like a 'retrieval programme'. In this way, the summary helps to create a concise, organized mental representation of the text.

This theory states that the correct processing of a summary has at least two positive effects on the memory. On the one hand, it tends to reduce the information storage of the text macropropositions expressed in the summary. On the other hand, the retrieval is made easier by the integrated structure of the macropropositions already stored. The storage and retrieval of the macropropositional contents will certainly be more enhanced than those of the micropropositional contents, the latter being identified with information relating to detail. These macrostructural mechanisms can also be applied to the study of titles. A significant number of theoretical and empirical works suggest that the introduction of well-written headlines or headings equally promotes both the comprehension and the correct processing of written information. Some good examples of this type of work can be found in articles from the seventies, such as the significant contributions made by Bransford & Johnson (1972), Anderson & Pichert (1978) or Glynn (1978). More recently, the most prominent works have been published by Loman & Mayer (1983), Lorch & Lorch (1986, 1996), Spyridakis & Standal (1987), Whilthite (1988, 1989), Lorch (1989), León & Carretero (1992, 1995), and Grant (1993). Admittedly, the majority of these works apply to expository texts whose titles are to be interpreted as words or sentences pointing out the relevant

information to be covered in the text. A common feature of all these studies is the use of titles whose brief contents represent the essential macrostructural information. Several ways in which titles can make text processing easier have been identified. One of these, perhaps the most important, is to activate the necessary mental scheme(s) in order to understand what has been read and, in this way, to direct the reader's previous knowledge (Whilhite 1988, 1989). This is true to such an extent that, for some researchers, it is essential to read the title before the written contents so as to understand the text (Grant 1993; León & Martín 1993). Another theory, related to the previous idea, is that the title accentuates the links between concepts (Kozminski 1977; León & Carretero 1992). A third theory, more associated with the memory, is that the title provides a core content which promotes the retrieval of the information that it represents (Brooks et al. 1983; Hartley & Trueman 1983; León & Carretero 1995). Moreover, the title can provide additional interest and greater motivation to read texts which are especially long and difficult to understand (Hvistendahl 1968).

On the other hand, some research has been carried out concerning the effects of the factors just described on the comprehension and recall of newspaper articles. In some cases, this research has been aimed at comparing different versions of the same text and analysing their effects on comprehension and recall. For example, in the Graves et al. work (e.g. Graves & Slater 1986; Graves et al. 1988) several passages from a standard American history textbook were revised by three pairs of writers: text linguists, college composition instructors, and former Time-Life editors. They found that the Time-Life editors' revisions of a high school history text improved eleventh grade students' recall, while revisions made by other teams did not. However, in another study, Graves et al. (1991) did not bear out their earlier studies. Graves et al. (1991) found that the composition instructors' revision was the most effective in the students' recall. These last data are consistent with results obtained by Britton et al. (1989, 1991) and Duffy et al. (1989). Other research has argued that it is more appropriate to view language as a social process where writers and readers attempt to make contact than as information exchange (e.g., Hunt 1987; Vipond & Hunt 1987), to study its discourse and persuasion aspects (van Dijk 1988a, b; León 1996) or to analyze lexical and syntactical aspects of headlines (e.g., Perfetti et al. 1987).

It is sometimes difficult to break down the different elements present in a newspaper article. Very often, the large number of elements is surprising. As a result, it is not easy to analyse their functions. As far as the order of presentation is concerned, a newspaper article is usually preceded by several headlines. The first is an introductory headline of secondary importance. This is made up of a sentence containing smaller print than the main headline. The

function of this smaller print is to place the introductory headline in the context of the overall information. Next comes the ‘proper’ headline. This is the most prominent headline and is printed in large letters. In articles containing less important news, it is the only headline element present. Finally, there exists a supplementary headline whose function is to express additional points not covered in the main headline. This supplementary headline usually appears in print larger than that used in the rest of the article but smaller than in the main headline.

News articles include an outline, introduction or summary containing the basic aspects of the overall information, and the answers to the usual questions asked about any kind of event. This summary is normally printed in bold type. Among other possible functions, headlines seem to play the role of highlighting and contextualizing the article within the apparently destructured organization of the newspaper’s contents. Likewise, the summary is intended to anticipate a part of the information, with the aim of giving the reader an idea of what the article is about. Although there exist relatively small differences in style among the most important newspapers in Spain, they all include at least one headline and an initial summary in their articles. But some important questions need to be answered. What is the function of these headlines and summaries?, Do scientific texts differ from newspaper articles in the criteria followed when creating titles/headlines and summaries?, Do they affect, in some way, comprehension and recall?, Do both kinds of texts require the same reading strategies from the reader? The overall aim of our work has been to ascertain, by means of two experiments, whether the headline and the initial summary which appear in the standard format of a newspaper article bring about an improvement in the comprehension and recall of the information read.

Experiment 1: Assessment of the headline and summary in original newspaper articles

Objectives. The main objective of this experiment was to explore the influence of the headline and the initial summary on comprehension and recall of the newspaper article. More specifically, we attempted to determine whether the headline and/or the initial summary appearing in a standard newspaper article improve the comprehension and recall of the information read (as in the case of expository texts). Another aim was to detect possible differences in the answers given by the subjects, who represented four different educational levels.

Method

Subjects. A total of 330 subjects participated in this study. They were from four educational levels: The first two groups came from a Madrid high school, 117 from the first year (aged 14 to 15) and 68 from the third year (aged 16 to 17). A third group was made up of 79 first-year students from the Faculty of Psychology at the Autonoma University of Madrid. The fourth group consisted of 66 fifth-year Journalism students from the Faculty of Information Science at the Complutense University of Madrid.

Material. The text selected for this study was taken from a Spanish newspaper article entitled 'Scientists use Imagination to put out Kuwaiti Oil Well Fires'. The article consisted of a headline, a summary and the news item itself, which we referred to as the *Basic Text* (BT). The whole text was comprised of 824 words distributed in the following way: 11 words in the headline, 109 in the summary and the remaining 704 making up the Basic Text (BT). The entire news item was presented on just one page in the usual news articles format. The text structure analysis was performed according to the pattern proposed by Meyer (1985a, b). This consisted of 10 hierarchical levels, the first 5 corresponding to the macrostructural level and the remainder corresponding to the micropropositional level. The text structure was based on the main logical relationship and the problem-solution model (see Appendices 1 and 2).

Procedure. Within the school timetable and in the classroom itself, each subject had to read a randomly assigned text which corresponded to one of four possible conditions: (1) the Complete Original Article (COA), including the original Headline, followed by an initial Summary and the Basic Text; (2) the Basic Text preceded by an initial Summary (S + BT); (3) the Basic Text preceded by the Headline (H + BT); (4) the Basic Text only (BT). After a maximum reading time of 15 minutes, all the subjects performed an immediate free recall task. In a second session, one week later, they were required to perform a delayed recall task without previous warning.

Assessment. Of the possible scores, we were most interested in those which assessed the quantity and quality of the information that each reader was capable of recalling. We used an adaptation of the assessment procedure put forward by Meyer (1985b).

An answer was assessed as 'correctly remembered' on the basis of the similarity of the semantic content expressed in the original text to the answer given by the subject, without taking into account the syntactic form used in the response. Once an idea had been considered as 'correct', it was classified according to the category which it occupied in the original text, even if it had

been placed differently in the subject tasks. Omissions and errors in the recall tasks were not taken into account. By contrast, the reader's own language was accepted – synonyms, analogies, paraphrasing – as long as the meaning and the structural links of the original content were retained. The final data corresponding to each subject were grouped around three quantitative indices:

(1) The number of rhetorical relationships present in the recall (R scores). We consider those logical relationships that connect the main concepts situated at the highest levels of the content structure of the passage. In fact, these rhetorical relationships connect the concepts that represent the macrostructure of the text. They can be a Response (problem-solution), a causation (antecedent-consequence), a comparison between two concepts, a description and a collection. For the text chosen, a total of 16 are present. These relationships can be seen in Appendix 2.

(2) The number of idea units corresponding to the highest levels (1–5). They represent the macrostructure of the text (M scores). There are 60 in the text.

(3) The number of idea units corresponding to the lowest levels (6–10). They represent the microstructure of the text (m scores). There are 67 in the text.

Design. A $4 \times 4 \times 2$ mixed factorial design applied with two between-subject factors (Group and Condition) and one within-subject factor (Free Recall task). We performed three ANOVAs corresponding to the three dependent variables (R, M and m scores) described in the previous section. The comparisons of averages were made by following the Sheffé method.

Results

Evaluation of logical relationships (R scores)

With this score, we attempted to measure the subject's skill in recalling the Logical Relationships linking the main ideas in the text. These relationships became necessary in order to establish coherence among the ideas. We took into account only those ideas affecting the relevant contents, sixteen altogether. As far as the Group variable is concerned, the results obtained show significant differences among the chosen groups [$F(227.21) = 38.95$; $p < 0.001$]. The university groups obtained significantly higher scores in the immediate recall task than did the high school groups ($p < 0.001$). Likewise, this tendency, although considerably less in evidence, continued in the delayed recall task. The superiority of the first year Psychology group over the baccalaureate group was significant ($p < 0.001$ for the first year High School group and $p < 0.05$ for the third year high school group). In addition, the fifth year Journalism group showed superiority in delayed recall when compared with the first year High School group ($p < 0.05$).

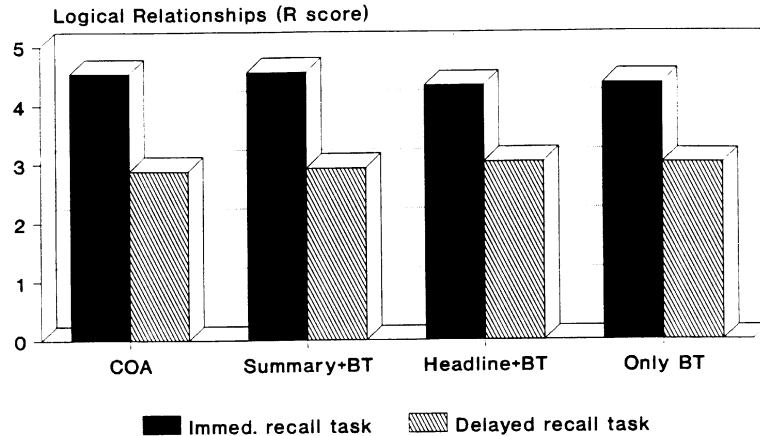


Figure 1. Average R score (Logical Relationships) obtained in each of the conditions for the Type of News Presentation variable (COA = Complete Original Article; Summary + BT = Summary and Basic Text; Headline + BT = Headline and Basic Text; Only BT = Only Basic Text (BT), and those obtained in each of the Free Recall Tasks (Immediate and Delayed).

Regarding the second variable, Type of News Presentation, no significant differences were observed [$F(0.87) = 0.15$; $p = 0.930$].

This absence of significance among the different conditions presented occurs both in an assessment of data from all the groups and when only the data from within each group are considered. In this sense, it should be pointed out that in no instance did the different types of news presentation cause an interest effect in terms of the R scores. In other words, the article does not improve the recall of the main logical relationships either as a result of the headline or through the introductory summary.

As expected, significant differences occurred in the recall variable between the immediate and delayed free recall tasks [$F(373.68) = 160.52$; $p < 0.001$]. However, the different behaviour of the groups in each of the recall tasks caused a significant interaction between these two factors [$F(44.98) = 19.32$; $p < 0.001$]. This function supports the concept of recall that we formed in earlier research (León & Carretero 1992). In general, the university students are more selective when remembering the most rhetorical relationships that organized the relevant information, resisting the passing of time. On the contrary, the undergraduate students and especially the youngest students, do not show any kind of preference for the relevant information, but try to retain all possible information in the immediate free recall task. Much information was lost in the delayed free recall task.

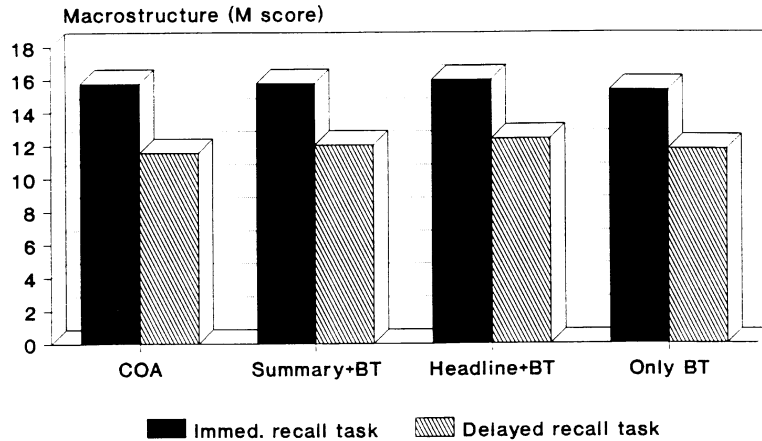


Figure 2. Average M score (Macrostructure) obtained in each of the conditions for the Type of News Presentation variable (COA = Complete Original Article; Summary + BT = Summary and Basic Text; Headline + BT = Headline and Basic Text; Only BT = Only Basic Text (BT), and those obtained in each of the Free Recall Tasks (Immediate and Delayed).

Assessment of the text macrostructure (M scores)

The purpose of the M scores was to evaluate the number of main ideas recalled in each of the memory tasks by each of the subjects from the groups analyzed. Regarding the Group variable, the results obtained show clear differences among the groups analyzed [$F(1956.93) = 39.88$; $p < 0.001$], as in the previous case. The university groups obtained significantly higher scores than the high school groups ($p < 0.001$) in the immediate free recall task. However, in the delayed free recall task, only the Psychology group showed significant differences in comparison with the other groups ($p < 0.001$). These differences were highly significant in the case of the two high school groups ($p < 0.001$) and less significant as far as the Journalism group was concerned ($p < 0.05$).

In this task, the third year high school group and the fifth year Journalism group showed substantial losses of information. This corresponds to the significant interaction between the Group and Memory factors [$F(351.39) = 35.01$; $p < 0.001$]. On the other hand, significant differences between the two recall tasks can also be detected in relation to the Recall variable [$F(2817.61) = 280.76$; $p < 0.001$].

As regards the Type of News Presentation variable, no significant differences can be seen [$F(23.47) = 0.47$; $p = 0.704$] among the different conditions presented in both between-subject and within-subject assessment. This finding again confirms that a news article does not improve the recall for this score. However the article is presented, with or without the headline and the initial summary, the result is the same.

Assessment of the text microstructure (m scores)

As far as the Group variable is concerned, the results are similar to those obtained previously in that they reflect differences among the groups [$F(479.95) = 31.39; p < 0.001$]. The main difference was to be found between the University groups and the high school groups. Likewise, significant differences were also detected between performances in the two recall tasks in the Recall variable, immediate recall being superior [$F(783.7) = 150.79; p < 0.001$].

With regard to the Type of News Presentation variable, no significant differences were observed [$F(26.06) = 1.70; p = 0.167$]. In this case, once again, no differences exist among the various conditions presented to the subject groups.

Discussion

The results obtained in this investigation have been diverse. As expected, we detected significant differences in the information obtained from the groups of readers, the university groups retaining most information. The results are similar to those obtained in earlier studies (e.g., Meyer et al. 1989; León & Carretero 1992; León et al. 1992). On the other hand, the results obtained with the Type of News Presentation variable were clearly different from those expected. In this sense, the possible influence of the headline and the summary on the subject's memory completely disappeared, since no significant differences were observed among the different experimental conditions present in the study. This absence of significant differences can be observed in both a collective analysis of the group data and also when the results for each group are considered in isolation. Moreover, this fact can be repeatedly verified by all of the measures applied, especially in the logical relationships (R scores) and in the macrostructural information (M scores).

From these results, we can conclude that the previous reading of the headline and/or the summary of a newspaper article, like the one selected, does not necessarily bring about an improvement in the comprehension and retention of the contents. Rather, from the point of view of macrostructural theory, the headline and the summary prove to be ineffective in better organising the information processes in the memory. Several factors may be influential here. The first refers to the subjects chosen for this study (high school and university students). The second is the methodology used. The third factor concerns the very structure of the article. These possible causes will now be analysed.

With regard to the subjects chosen for these tests, we may conclude that they were unsuitable as most of them did not read the press very much. However, this factor was taken into account while selecting the groups. For example,

we deliberately involved groups as diverse as first year high school students and fifth year Journalism students from a university, the latter being regular newspaper readers and mostly having an educated opinion of the news and the press. This is true to such an extent that important differences in the variables studied have been detected among the groups as a result of the application of previous knowledge and reading strategies. Thus, the differences found in the amount and type of information recalled suggest that readers from different groups apply different strategies aimed at detecting and organizing the relevant information and the assimilation of this information (delayed recall). So, the first year high school students did not usually discriminate between relevant and irrelevant information. These students even opted to retrieve the least relevant information when, one week later, they were asked about what they had learned. In this sense, there exists some empirical confirmation (e.g., León & Carretero 1992). On the other hand, the fact that no differences were found among the experimental conditions in the Journalism group is another reason for dispelling doubts as far as the choice of groups is concerned.

In relation to the methodology used, some deficiencies can be pointed out. In this area, mistakes in the choice of measures or in the codification applied to the subjects' answers could explain the lack of significance in these data. However, the measures and text structure analyses chosen in this research have been successfully applied in a considerable number of experiments which have included newspaper articles and other kinds of texts (e.g. Kintsch & Keenan 1973; Meyer 1975; Meyer et al. 1989; León 1991; León & Carretero 1992; León et al. 1992). In addition, the answer assessment criteria have been evaluated in great detail to the extent that all of the recall tests have been repeated by two different groups of examiners. Identical results have been obtained.

A third possible explanation concerns the peculiar characteristics of newspaper articles. The difference between scientific texts and newspaper articles may be even greater than they appear at first sight. These may be reflected in the function and use of the title/headline and the summary. Consequently, the objectives set and the strategies applied in constructing the title/headline and the summary may also be very different. Thus, the title of a scientific text tends to be the 'superstructure' of subsequent contents, with the summary being their 'macrostructure'. By contrast, the effectiveness of newspaper headlines shows a tendency to be linked to the capacity to suggest and to attract attention. These criteria are not always fully understood (Gomis 1991; Perfetti et al. 1987; León 1996). To achieve this effect, headline writers and journalists sometimes use aspects or elements of the 'microstructure' in order to highlight a section or piece of information. Moreover, the headline is intended to direct the reader's attention toward a certain piece of information, pointing

out the topic in question in a way that is not always objective and which is sometimes spectacular. The techniques used often concern apparent truth, spoken, for example, in an interview or 'the rhetoric of facticity' (Tuchman 1978; Almeida 1992). In some cases, the article headline is merely distinguished by a different form of type. In other words, the intention is simply to make a physical contrast between the headline and the subsequent article. In other cases, the design of the headline depends on the amount of space available. As a result, the headline often becomes a telegraphic message in which words fulfilling important grammatical functions are omitted.

This discrepancy in the criteria used to select the headline and the summary leads us to the conclusion that the article format usually adopted in a national newspaper need not therefore follow macrostructural theory guidelines. This format consists of the headline, the initial summary and the basic information. For this reason, it can be concluded that neither the headline nor the summary meet the same objectives as those met by the title and the summary in text books. The discrepancy outlined above can be seen in the newspaper article chosen in this study (see Appendices 1 and 2). We can observe that the headline 'Scientists use Imagination to put out Kuwaiti Oil Well Fires' is incorrect from a macrostructural point of view. Although it summarizes a part of the central idea, it omits essential information about other relevant people who play important roles in this particular situation such as businessmen and the Kuwaiti government (see Appendix 2). As far as the summary is concerned, the journalist chose to focus on the interest of the Kuwaiti representatives in trying to find solutions. The journalist also opted to quote the opinion of one of the representatives. In addition, the figures concerning the supposed number of oil wells on fire were presented in order to give an impression of truth. The journalist resorts to the 'rhetoric of facticity' rather than bringing out the macrostructure of the complete article. If the previous assertions are correct, they could offer a possible explanation for the absence of significance among experimental conditions. Therefore, we were able to assume that the modification of the headline and the summary of the original text in a subsequent experiment following macrostructure criteria would show comprehension and recall differences in comparison with the results obtained using the original version.

Experiment 2: Assessment of the headline and summary in modified newspaper articles

Objectives. As in the previous experiment, the main aim was to explore the influence of the headline and the initial summary on the comprehension of newspaper articles. However, in this case, we drew up an alternative headline

and summary based on the article which had been chosen in the earlier experiment, following the macrostructural criteria used in scientific texts. In this way, we intended to ascertain the effects of both the original and the modified versions on the comprehension and recall of the article read by the subjects.

Method

Subjects. As all the groups of subjects had reacted to the presentation of the article in a similar way during the previous study, we did not need to test all the subjects from all the educational levels again. For this reason, only the 98 new first year Psychology students from the Autonoma University of Madrid participated in this experiment.

Material. The text chosen was exactly the same newspaper as in the previous experiment. But, in this case, we introduced an alternative headline and summary, following macrostructural criteria. Both of the headlines and summaries were of similar length and were presented in a similar way. In addition the analysis of the text structure was made according to the model proposed by Meyer (1985a, b) and consisted of the 10 hierarchical levels already described.

Procedure and assessment. Each subject read a version of the text which had been randomly assigned in the classroom within school hours. This version included one of the following five conditions: (1) the Complete Modified Article (CMA), consisting of a Modified Headline followed by an initial Modified Summary and the original Basic Text; (2) the Basic Text preceded by an initial Modified Summary (MS + BT); (3) the Basic Text preceded by the Headline, also Modified (MH + BT); (4) only the Basic Text (BT); (5) the Complete Original Article (COA), consisting of the Original Headline, followed by the Original initial Summary and the Basic Text. The reading and recall activities were the same as in the earlier experiment. With regard to the assessment, the criteria applied were exactly the same as in the previous experiment.

Design. A 5×2 mixed factorial design was applied with one between-subject factor (Type of News Presentation) and one within-subject factor (Free Recall Task). We performed four ANOVAs corresponding to each of the three dependent variables (R, M and m scores) described in the previous section. The comparisons of averages were made by following the Sheffé method.

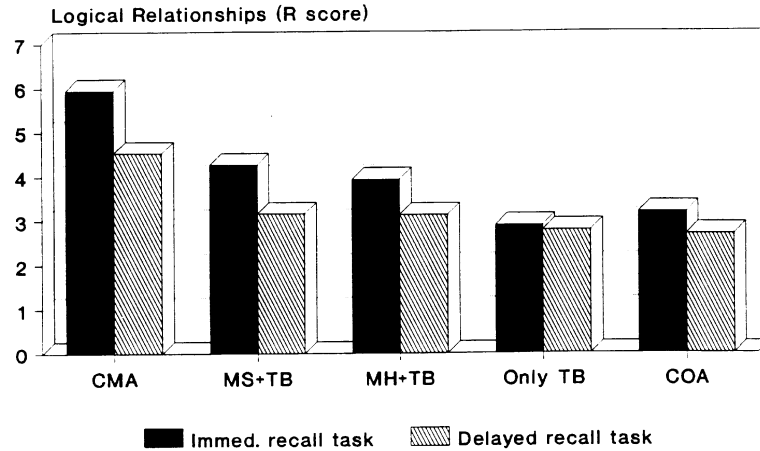


Figure 3. Average R score (Logical Relationships) obtained in each of the conditions for the Type of News Presentation variable (CMA = Complete Modified Article; MS + BT = Modified Summary and Basic Text; HM + BT = Modified Headline and Basic Text; BT = Only Basic Text; COA = Complete Original Article), and those obtained in each of the Free Recall Tasks (Immediate and Delayed).

Results

Evaluation of logical relationships (R score)

With regard to the Type of News Presentation variable, we can observe in Figure 3 that significant differences occur with these scores [$F(34.05) = 9.34$ ($p < 0.001$)]. The contrast of averages reveals significant differences between the Complete Modified Article (CMA) and the Complete Original Article (COA) in the two free recall tasks. The recall also significantly improved for the modified summary compared with the original version. As expected, significant differences occurred between the immediate and delayed free recall tasks in the Recall variable [$F(26.73) = 18.22$; $p < 0.001$].

Evaluation of the text macrostructure (M score)

By using this M score, we attempted to assess the number of main ideas from the text recalled by each one of the subjects from the groups studied in every memory test. Concerning the Type of News Presentation variable, no significant differences were observed, as can be seen in Figure 4 [$F(94.66) = 2.34$; $p = 0.062$]. As expected, significant differences occurred between the immediate and delayed free recall tasks in the Recall variable [$F(234.54) = 28.28$; $p < 0.001$].

Evaluation of the text microstructure (m score)

In relation to the Type of News Presentation, no significant differences were observed [$F(5.98) = 0.37$; $p = 0.833$]. Neither did there exist differences among

Table 1. Average R, M and m scores obtained in each of the conditions for the Type of News Presentation variable (CMA = Complete Modified Article; MS + BT = Modified Summary and Basic Text; HM + BT = Modified Headline and Basic Text; BT = Only Basic Text; COA = Complete Original Article), and those obtained in each of the Free Recall Tasks (Immediate and Delayed)

Experimental condition	Immediate recall task			Delay recall task		
	Mean scores			Mean scores		
	R	M	m	R	M	m
CMA condition	5.95	13.89	5.10	4.53	9.37	2.68
MS + BT condition	4.26	11.16	3.42	3.16	10.26	2.69
MH + BT condition	3.93	11.26	4.53	3.13	9.20	3.53
BT condition	2.89	9.22	4.50	2.77	7.83	2.72
COA condition	3.18	9.00	3.98	2.68	6.19	2.56

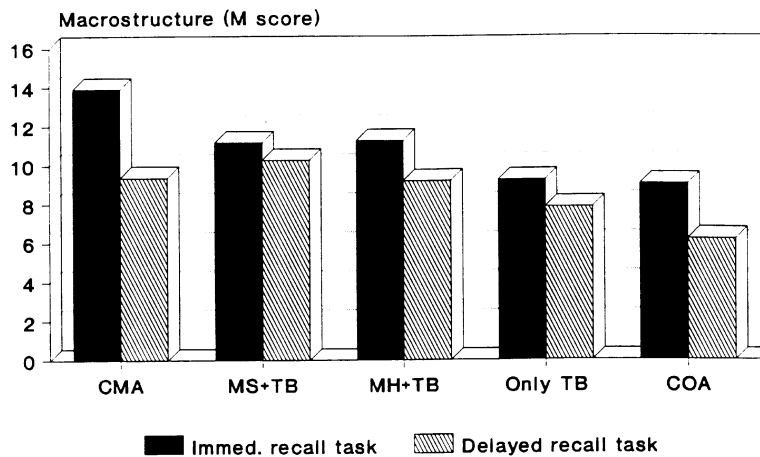


Figure 4. Average M score (Macrostructure) obtained in each of the conditions for the Type of News Presentation variable (CMA = Complete Modified Article; MS + BT = Modified Summary and Basic Text; HM + BT = Modified Headline and Basic Text; BT = Only Basic Text; COA = Complete Original Article), and those obtained in each of the Free Recall Tasks (Immediate and Delayed).

the various conditions presented. This result could have been expected, since any improvement in news article comprehension caused by the headline or the summary would have exclusively affected the logical relationships. As in every previous case, the immediate free recall task showed significantly better recall than the delayed free recall task, as we can see from the ANOVA performed on the Recall variable [$F(92.15) = 16.44$; $p < 0.001$].

General discussion

We began the study with the aim of comparing two headlines and two initial summaries from the same article in terms of their influence on the comprehension and retention of the information read by the chosen subjects. According to the results obtained, the modified version brought about an improvement in the comprehension and retention of the news article. On the other hand, the headline and the summary of the original version did not produce the desired effect. The results obtained from reading the original version were similar to those obtained from reading only the Basic Text (BT). The second experiment complements the first in the sense that it offers a possible explanation for the absence of significant differences among the conditions presented in the first. The fact that differences between the original and the modified version have been found in the R scores suggests that the modified version improves reading comprehension and that it probably changes reading strategies. This study has shown in an experimental way that the criteria followed by journalists in creating a headline or a summary do not necessarily correspond to the organizational structure in scientific texts which emphasize macrostructural information to a greater extent. Therefore, we should not be surprised at the clear differences existing between scientific texts and newspaper articles. We will attempt to describe these differences as accurately as possible, bearing in mind the educational implications.

The results (R scores) are consistent with results obtained by Graves & Slater (1991), Britton et al. (1989, 1991) and Duffy et al. (1989) in the sense that the data favored the version of the headline and summary rewritten in an instructional version over the original version. Probably, the information acquired from reading the headline and summary varies in its accessibility from memory. In general, the accessibility of a text depends heavily on the degree to which certain statements are integrated into the other contents. In the case of scientific texts, statements tend to be well remembered if they subsume other contents in the hierarchical representation of the text (e.g. Kominsky 1977). In the case of the headline and summary of the news articles, they probably depend on the other connections and statements. The data (R scores) suggest differences in the criteria used to compile the headline and the initial summary of newspaper articles in comparison with those applied to the creation of scientific texts. Thus, some journalists regard an introductory paragraph not as a *content-based* summary but as an *interpretative* summary. The difference lies in the fact that a content-based summary depends solely on the contents of the text whereas the initial summary of a newspaper article contextualizes the news item in question according to the journalist's preferences. Unlike scientific texts, newspaper headlines and the initial summaries of news articles are not of a general, abstract nature but, instead, provide

specific information in an interpretative way. In another sense, the creation of the macrostructure of a news text seems to correspond less to a logical sequence of events than to the so-called 'principle of importance or relevance' (Cebrián 1990; Nuñez 1991). This principle is so powerful that it is capable of cancelling out any strategy involving a hierarchical organization of the contents.

From a cognitive viewpoint, in contrast to other contexts, the title which appears in scientific articles or textbooks represents the relevant core information. A correct title should include, in a few words or in a sentence, the main idea based on the contents of the text. Likewise, the summary is content-based, since it is used with the aim of emphasizing and organizing the most relevant contents of the text. The summary contributes to the creation of a condensed and organized mental representation of the text, making the following processes earlier: the identification of the main ideas, the storage of the macropropositions in a smaller representation, and the hierarchical linking of the secondary contents to the macropropositions.

As journalists do not necessarily apply macrostructural criteria, what, then is the role of the headline and the summary in newspaper articles? The headline and the summary allow the reader to take in the most prominent information while scanning the article. Once the reader has ascertained the main ideas present in the article, the reading and comprehension of the article will become easier because he will not have to build the macrostructure himself; it will also be easier to understand secondary details and to appreciate coherence if the reader is already familiar with the topic and the overall coherence. The information appearing first, albeit briefly in a summarized form, is that which the journalist considers to be the most important or relevant, the details being presented later in the article itself. What often emerges from this approach is a markedly inconsistent structure in the news articles that appear in daily newspapers. This means that if the reader attempts to apply the rules or macrorules of the superstructure scheme, he will find that important information will appear at several different points in the texts, sometimes apparently at random. If this occurred in the case of scientific articles or narrative texts, we would perhaps 'lose the thread', in other words, overall coherence of the text.

These and other observations should be corroborated by further research in this field. For example, as we have seen, the reader should play a much more active role in this type of text on account of the apparent destructure of the news in a daily newspaper. Therefore, according to van Dijk (1988b), once the article has been selected he/she must activate many more reading resources in order to (1) encode the information from the headlines and the summaries, (2) activate previous knowledge connected with what has been

read, (3) create a provisional macrostructure, (4) assess the interest of the topic, (5) store the topic temporarily if it is found to be of interest, (6) locate the section with the desired information, (7) locate the article, (8) read the whole article, (9) recreate the macrostructure, (10) store the macrostructure in the memory, once interaction with previous information has taken place, (11) filter the information, removing the effect of journalistic strategems and techniques (e.g., the rhetoric of facticity), (12) locate the interpretive context of the news, (13) form a separate opinion on the subject, (14) continue reading other news articles, and then (15) repeat the process.

On the other hand, the reading of the headline and/or the previous summary in a particular format can produce different types of inferences. Bearing in mind the prerequisite that inferences must exist in any reading situation in order to guarantee local coherence, the most commonly elicited inferences will, in all probability, be those which tend to indicate the context of the information expounded in the text. These inferences would have the basic function of facilitating the representation of the text information in abstract form and identifying the essential information as it is set out in the text. This does not necessarily imply that inferences are the sole instrument by which readers derive meaning from the text and create their own mental model. However, in this type of situation, the presence of text-based inferences is guaranteed. On the other hand, when the reader is confronted by a headline or summary composed by a writer who intends to give a different impression from the overall content of the macrostructure, another kind of inference may occur. This stems from the previous knowledge of the reader (reader-based inference) and is essential in reaching an adequate level of interpretation. The reader requires a profound personal knowledge, not within the capability of everyone, in order to grasp the political, ideological or sociological nuances present in an article or to appreciate the style or genre in which it is written (León 1996).

The demands made by these initial processes could explain why young readers reject the press or confine themselves to reading very specific articles. Perhaps one of the reasons why subjects learn material from content-based summaries better is that they are unable to isolate the main ideas. Studies show that only good readers are capable of detecting the important points and that less able readers tend to find them by chance (e.g., Smiley et al. 1977). Consequently, it seems reasonable to assume that less able readers might derive greater benefit from reading summaries than good readers.

These aspects lead us to the conclusion that reading the press is a slow, continuous process requiring different reading skills and strategies from those applied to expository texts. The fact that the news article text contains features that vary greatly from the scientific text or those in academic publications

(to which young people are more accustomed) does not, in general, help to promote more consistent reading of the press. On the other hand, if the adolescent reader does not have a basic motivation to explore new contents, he will probably take refuge in a type of sensational publication which requires less sophisticated strategies. If a more individual method is chosen, reading the press becomes a more laborious and less fruitful exercise which can only be enjoyed by few individuals. It then turns into an even slower process which may re-emerge some years later when the reading of specialized publications (on Economics, Politics, Computers, etc.) becomes necessary for the professional reasons. Introducing the press into the classroom and combining the contents of its sections with the material already available in class could be useful as long as it involves the active and effective participation of the student. The teacher and the students should share and explore ideological intricacies, rhetorical techniques or other features of the newspaper article. In conclusion, a teaching method based on group learning could significantly improve reading skills. It may prove especially useful in achieving more effective reading and in heightening the subject's powers of critical analysis.

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Appendix 1

Headline and summary of the original and modified versions of the news articles selected in this study

Original version

SCIENTISTS USE IMAGINATION TO PUT OUT KUWAITI OIL WELL FIRES

The Kuwaiti authorities, anxious to avoid further losses in addition to the barrels of oil already burning in the 520 oil-wells on fire, are travelling around the world in search of innovative solutions. 'We are very keen to analyze these ideas and to convert them into strategies which can be used in fighting the fires', commented Mustafa al Adsani of Operations Management, the Kuwaiti Oil Company, after attending a meeting in Washington a few days ago. As a result of these meetings and the interest of those hoping to make

huge profits from the operation, an urgent search is underway to find new methods of extinguishing the fires which have turned the Kuwaiti oil fields into a raging inferno.

Modified version

SEARCH FOR NEW WAYS OF PUTTING OUT KUWAITI OIL WELL FIRES

Following the Gulf War, hundreds of Kuwaiti oil wells are still on fire. In view of the limitations of traditional firefighting methods, scientists, inventors and businessmen from different countries are joining forces in order to develop innovative systems capable of extinguishing the fires that have occurred in the Kuwaiti oil fields. Various solutions have been put forward: robots propelling chemical products to put out the flames, mobile vehicles giving out extremely cold foam, air cannon forcing open a path to the oil wells, explosive charges to block the pipelines and enormous 100-ton concrete slabs able to put out flames hundreds of metres high.

Appendix 2

Basic text of the news articles chosen in this study

Traditional methods have proved ineffective in attempting to quickly put out the flames which tower over hundreds of oil wells in this worst ever oil disaster.

The mines

A massive problem must be overcome: how to locate and clear thousands of mines scattered by Iraqi troops. New firefighting strategies have been analyzed not only at open scientific meetings but also during discreet discussions involving those hoping to obtain huge profits. The Kuwaiti authorities, anxious to limit further losses in addition to the millions of barrels already burning in the 520 oil wells on fire, are traveling around the world in search of innovative solutions. 'We are very keen to analyze these ideas and to convert them into strategies which can be used in fighting the fires', commented Mustafa al Adsani of the operations management of the Kuwaiti oil company, after attending a meeting in Washington a few days ago. Sponsored by the Union of Concerned Scientists, an environmental protection group based in Cambridge, Massachusetts, the meeting assembled dozens of leading experts in an attempt to find ways of speeding up the work of extinguishing the fires, which could go on for a period of between two and five years if the operation is limited

to techniques already known. 'We hope that this period can be reduced', said Henry Kendall, the Nobel prize winner for Physics. This is the biggest ever fire caused by man and it will have serious repercussions on health and the environment. Moreover, the financial cost is immense: 100 million dollars per day. All of this makes it necessary to control the fire as soon as possible.

The search for new methods could also help to solve the specific problems which make the work in Kuwait difficult. At the scientific conference in Washington, Kuwaiti representatives praised the proposal to use a large air cannon to clear the minefields which are making the task of the firefighters so difficult. Its flexible arm, hung from a crane, could clear mines from narrow strips of land by blasting out air.

Another idea arising from the conference was that of placing rings of explosives around the pipes through which the oil emerges and carrying out controlled explosions so that the effect of all the charges would simultaneously converge on the centre. On sealing the pipe, this implosion would simultaneously put out the fire and stop the flow of oil. Advanced methods of implosion have been used for decades by the designers of atomic bombs. In addition, Chichlow, a technician from the Oklahoma School of Oil Engineering, pointed out during an interview that he and his partners are establishing the basis of a new (and secrete) firefighting system.

Chemicals and foam

A director of Petroleum Firefighters was rather more forthcoming on referring to the efforts made by his company. He said that it had developed a system which mixes chemical products with ultracold foam to combat oil well fires. The director explained that a certain type of fire can be dealt with by the use of robots propelling chemical products onto the flames. Gene Pearcey, chairman of a company working with concrete structures, suggested an alternative consisting of the construction of a concrete dome 12 meters in diameter and weighing 110 tonnes. The dome could be lifted over the oil well, extinguishing the flames as the supply of oxygen failed. At the first two oil wells where fires have been extinguished, a new system has already been used consisting of placing a kind of funnel over the burning well and then injecting liquid nitrogen. Despite the emergence of this new technology and the likely introduction of other techniques in the next few months, the leading company in the oil well firefighting sector (Red Adair) is sceptical: '99.9% of the ideas come from people who have never seen an oil well. The ideas that might be used now are the ones we've been using for years'.

References

- Almeida, E. (1992). A category system for the analysis of factuality in newspaper discourse, *Text* 12: 233–262.
- Anderson, R.C. & Pichert, J.W. (1978). Recall of previously unrecalable information following a shift in perspective, *Journal of Verbal Learning and Verbal Behavior* 17: 1–12.
- Bransford, J.D. & Jonson, M.K. (1972). Contextual prerequisites for understanding of comprehension and recall, *Journal of Verbal Learning and Verbal Behavior* 11: 717–726.
- Britton, B.K., Gulgoz, S., Van Dusen, L. & Glynn, J.M. (1991). Accuracy of learnability judgments for instructional texts, *Journal of Educational Psychology* 83: 43–47.
- Britton, B.K., Van Dusen, L., Gulgoz, S. & Glynn, J.M. (1989). Instructional texts rewritten by five expert teams: Revisions and retention improvements, *Journal of Educational Psychology* 81: 226–239.
- Brooks, L.W., Dansereau, D.F., Spurlin, J.E. & Holley, C.D. (1983). Effects of headings on text processing, *Journal of Educational Psychology* 75: 292–302.
- Cebrian Herreros, M. (1990). Análisis general de un periódico: estructuras, contenidos y tratamiento, *Programa Prensa-Escuela*. Madrid. MEC. 125–142.
- Duffy, T.M., Higgings, L., Mehlenbacher, B., Cochram, C., Wallace, D., Hill, Ch., Haugen, D., McCaffrey, M., Burnett, R., Sloane, S. & Smith, S. (1989). Models for the design of instructional text, *Reading Research Quarterly* 24: 432–457.
- Glynn, S.M. (1978). Capturing attention by means of typographical cuing strategies, *Educational Technology* 18: 7–12.
- Gomis, L. (1991). *Teoría del periodismo: Como se forma el presente*. Barcelona: Paidós.
- Grant, R. (1993). Strategic training for using text headings to improve students' processing of content, *Journal of Reading* 36: 482–488.
- Graves, M.F. & Slater, W.H. (1986). Could textbooks be better written and would it make a difference?, *American Educator* 10: 36–42.
- Graves, M.F. & Slater, W.H. (1991). A response to 'Instructional texts rewritten by five expert teams', *Journal of Educational Psychology* 83: 147–148.
- Graves, M.F., Slater, W.H., Roen, D.D., Redd-Boyd, T., Duin, A.H., Furniss, D.W. & Hazeltine, P. (1988). Some characteristics of memorable expository writing: Effects of revisions by writers with different backgrounds, *Research in the Teaching of English* 22: 242–265.
- Graves, M.F. Slater, W.H., Roen, D.D., Reed-Boyd, T., Duin, A.H., Furniss, D.W. & Hazeltine, P. (1991). Improving Instructional Text: Some lessons learned [commentary], *Reading Research Quarterly* 26: 110–122.
- Hartley, J. & Trueman, M. (1983). The effects of headings in text on recall, search and retrieval, *British Journal of Educational Psychology* 53: 205–214.
- Hunt, R.A. (1987). Could you put in lots of holes? Modes of response to writing, *Language Arts* 64: 229–233.
- Hvistendahl, J.K. (1968). The effects of subheads on reader comprehension, *Journal Quarterly* 45: 123–125.
- Kintsch, W. & Keenan, J. (1973). Reading rate and retention as function of the number of propositions in the base structure of sentences, *Cognitive Psychology* 5: 257–274.
- Kintsch, W. & van Dijk, T.A. (1978). Toward a model of text comprehension and production, *Psychological Review* 85: 363–394.
- Kominsky, E. (1977). Altering comprehension: The effects of biasing titles on text comprehension, *Memory and Cognition* 5: 482–490.
- León, J.A. (1991). La comprensión y recuerdo de textos expositivos a través del análisis de algunas variables del texto y lector, *Infancia y Aprendizaje* 56: 51–59.
- León, J.A. (1996). *Prensa y educación: Un enfoque cognitivo*. Buenos Aires: Aique.
- León, J.A. & Carretero, M. (1992). Signals effects on the recall and understanding of expository texts in expert and novice readers. In: A.J.M. Oliveria (ed.), *Structures of communication and intelligent helps for Hypermedia Couseware* (pp. 97–111). New York: Springer Verlag.

- León, J.A. & Carretero, M. (1995). Intervention in comprehension and memory strategies: Knowledge and use of the text structure, *Learning and Instruction* 5: 203–220.
- León, J.A., Carretero, M., López-Manjón, A., Limón, M. & Jacott, L. (1992). Understanding newspapers: A study to improve news comprehension in secondary education. Paper presented at the First Conference of the 'Society for Text and Discourse', San Diego, California.
- León, J.A. & Martín Ginard, A. (1993). El título como recurso didáctico, *Comunicación, Lenguaje y Educación* 19–20: 159–170.
- Loman, N.L. & Mayer, R.E. (1983). Signaling techniques that increase the understandability of expository prose, *Journal of Educational Psychology* 75: 402–412.
- Lorch, R.F. Jr (1989). Test-signaling devices and their effects on reading and memory processes, *Educational Psychology Review* 1: 209–234.
- Lorch, R.F. Jr & Lorch, E.P. (1986). On-line processing of summary and importance signals in reading, *Discourse Processes* 9: 489–496.
- Lorch, F.R. Jr & Lorch, E.P. (1996). Effects of organizational signals on free recall of expository text, *Journal of Educational Psychology* 88: 38–48.
- Meyer, B.J.F. (1975). *The organization of prose and its effects on memory*. Amsterdam: North-Holland.
- Meyer, B.J.F. (1985a). Prose analysis: Purposes, procedures and problems, Part I. In: B.K. Britton & J.B. Black (eds.), *Understanding expository text* (pp. 11–64). Hillsdale, NJ: Erlbaum.
- Meyer, B.J.F. (1985b). Prose analysis: Purposes, procedures and problems, Part II. In: B.K. Britton & J.B. Black (eds.), *Understanding expository text* (pp. 269–304). Hillsdale, NJ: Erlbaum.
- Meyer, B.J.F., Young, C.J. & Bartlett, B.J. (1989). *Memory improved: Reading and memory enhancement across the life span through strategic text structures*. Hillsdale, NJ: Erlbaum.
- Núñez Landevéze, L. (1991). *Manual para periodismo*. Barcelona: Ariel.
- Perfetti, Ch. A., Beverly, L.B., Rodgers, K. & Faux, R. (1987). Comprehending newspapers headlines, *Journal of Memory and Language* 26: 692–713.
- Smiley, S.S., Oakley, D.D., Worthen, D., Campione, J.C. & Brown, A.L. (1977). Recall of thematically relevant material by adolescent good and poor readers as a function of written versus oral presentation, *Journal of Educational Psychology* 69: 381–387.
- Spyridakis, J.H. & Standal, T.C. (1987). Signals in expository prose: Effects on reading comprehension, *Reading Research Quarterly* 22: 283–295.
- Tuchman, G. (1978). *Making news*. New York: Free Press.
- Van Dijk, T.A. (1988a). *News as discourse*. Hillsdale, NJ: Erlbaum.
- Van Dijk, T.A. (1988b). *News analysis. Case studies in international and national news*. Hillsdale, NJ: Erlbaum.
- Van Dijk, T.A. & Kintsch, W. (1983). *Strategies of discourse comprehension*. New York: Academic Press.
- Vipond, D. & Hunt, R.A. (1987). Shunting information or making contact? Assumptions for research on aesthetic reading, *English Quarterly* 20: 131–136.
- Wilhite, S.C. (1988). Reading for multiple-choice tests: Headings as schema activators, *Journal of Reading Behavior* 20: 215–228.
- Wilhite, S.C. (1989). Headings as memory facilitators: The importance of prior knowledge, *Journal of Educational Psychology* 81: 115–117.

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