



RHETORICAL STRUCTURE AND GRAPHIC ORGANIZERS: EFFECTS ON LEARNING FROM A HISTORY TEXT

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This paper describes the effects of different methods to enhance students' understanding and learning from a text. We compared the efficiency of a text revision procedure ("from the text") and inferential activity engagement ("toward the text") in the comprehension and recall of a History text. A total of 338 undergraduate students (aged 19-20) participated in the study. We wrote five versions of the same expository text, showing different rhetorical structures: Causation, antecedent-consequent; Causation, consequent-antecedent; Collection; Problem-solution; and Comparison. The first version, clarifying the causal structure and the temporal order of the events, had a significant effect in the delayed recall of the subjects. The task of filling an incomplete causal diagram also showed significant differences. This inferential activity, which involves the reader in the causal representation of the events, could be more useful than providing a previously elaborated graphic representation. Implications for educational practice and relevant related issues are discussed.

Key Words: textbooks, learning from text, rhetorical structure, text revision, instruction of History

INTRODUCTION

Since the invention of the printing press, expository texts have been the main means of cultural transmission and a fundamental tool for school learning, particularly in certain areas such as History. However, the question of what makes reading an efficient activity for learning remains unresolved. Current cognitive models consider reading comprehension an essentially inferential activity, aimed at the elaboration of cognitive representations at progressively more complex levels (Kintsch, 1998). Educational research has made great efforts to study the efficiency of the different procedures that can facilitate such

processes in order to enhance the student's understanding and learning from a text. At the beginning, interest lay in reading comprehension strategies. The teaching of strategies has mainly aimed to improve the reader's ability to learn from texts with different topics. More recently, two other approaches have mainly focussed on facilitating or generating inferences about a specific text: text revision processes and activities to enhance inferential processes at the moment of understanding and learning.

From the text: reviewing procedures of a History text

Text revision starts from specific material, usually textbook. This source material is then rewritten or segments are added to make comprehension easier. This process can be carried out intuitively or in an *ad hoc* manner. However, researchers have concentrated on designing and evaluating systematic procedures which can be generally applied to a certain range of narrative or expository texts (Beck, McKeown, Sinatra & Loxterman, 1991; Britton and Gugolz, 1991; Gilabert, Martínez and Vidal-Abarca, 2005; Linderholm *et al.*, 2000; Vidal-Abarca, Martínez and Gilabert, 2000). In short, a distinction is made between four methods based on quite different text revision principles or rules: shallow, referential, rhetorical and elaborative procedures.

The first systematic precedents for *text revision* were based on equations which attempted to predict readability from very *shallow* linguistic cues. These features –such as lexical frequency of proper nouns and numerals, redundancy rate, length of sentences or punctuation marks- were present in apparently more comprehensible texts (Rodríguez, 1987).

Subsequently, other methods were developed and proved to be much more efficient, depending on the subject area and the degree of difficulty of the text as well as on the reading skill of the reader. Britton and Gugolz (1991) showed that referential procedures had positive effects on comprehension and recall. According to the Construction-Integration model (Kinstch, 1988), the limits of our working memory lead us to process information in cycles, of approximately one sentence. Thus revision mainly consisted in reordering and repeating terms in adjacent sentences as well as inserting very explicit connectors and anaphoric devices that contribute to the local cohesion of the text (Halliday & Hasan, 1976). Consequently, this procedure could make it easier to grasp the gist of the text. However, Vidal-Abarca, Martínez and Gilabert (2000) found that the benefits to be reaped from this procedure do not go further than improved inferential and recall scores.

A third procedure, more global in nature, is based on the reorganization and clarification of the rhetorical structure of a text. On the one hand, the

reorganization of the ideas in a text has proved to be particularly efficient in the comprehension of causal chains in History (Beck, Mckeown, Sinatra & Loxterman, 1991), especially when dealing with complex passages (Linderholm *et al.*, 2000). The comprehension of multi-causal historical phenomena requires the reader to distinguish, initially, between multiple and dynamic relationships. In other words, they need to imagine relationships between multiple causes contributing simultaneously to the development of a consequence, and to picture consecutive chains of events. These features are often separated from each other in the text. They usually interact or are expressed without a definite temporal order, which requires a greater effort of attention by the reader to understand the causal structure. On the other hand, multi-causal explanations are often constructed in abstract language to reframe events (Coffin, 2004). Causal explanation may be explicitly marked through connectors, conjunctions, causal verbs and other linguistic devices that construe agency (Achugar & Schleppegrell, 2005).

Finally, an additional procedure focussed more specifically on helping readers to make elaborative inferences from their prior knowledge, in order to construct a much more adequate global meaning representation of the text. In order to reduce inferential demands, the content is semantically expanded by adding new information to clarify the meaning of some sentences or to improve macro-structural coherence. Vidal-Abarca, Gilabert and Abad (2002) successfully evaluated, more recently, software allowing the elaboration of a map with implicit and explicit semantic relationships in a specific text. This tool can determine the kind of information needed and the part of the text where it should be placed in order to make relations more dense or more explicit. The relations can be descriptive (including exemplification), causal, narrative, argumentative, etc.

In the case of causal historical texts, other studies have found evidence showing that the information should be based on two principles: first, to clarify the goals of characters or human groups, i.e. the *intentional explanation*; second, to improve causal coherence when its causal markers are separated from each other in the text, the relationship is multi-causal or inaccurate explanations may arise (Voss & Silfies, 1996; Linderholm *et al.*, 2000; Montanero & Lucero, 2011). According to this approach, textual changes not only result in differential recall measures or direct inferences, but also in elaborative inferences typical of deeper comprehension (Vidal-Abarca *et al.*, 2000). In another study the revised version of a history text, aimed at fostering the reader's inferential activity, benefited low and high-knowledge readers on memory recall and inferences (Gilabert, Martínez y Vidal-Abarca, 2005).

The effects, however, are not straightforward. Some studies have found that revising the causal structure of a History text may be influenced by the reader's prior knowledge (Roller, 1990; McKeown, Beck, Sinatra & Loxterman, 1992; Sinatra, Beck & McKeown, 1993; Voss & Silfies, 1996). Contrary to expectations, in a test with open-ended comprehension questions, readers with greater knowledge can even obtain less positive results with a revised text than with the original (McNamara & Kinstsich, 1996). Low knowledge readers benefit from coherence marking, whereas high knowledge readers benefit from a more implicit text. This effect could be conditioned by text structure and genre. Kamalski, Sanders and Lentz (2008) have found that linguistic marking of coherence interacts with prior knowledge in the informative texts, but not in the persuasive genre.

Toward the text: engagement activities

In the last decade, research on reading comprehension has evolved from strategy teaching to the analysis of activities promoting constructive learning (Chi, 2000). Student engagement refers to the pupil developing type of active interchange with the text. The comprehension of an academic text requires readers to constantly evaluate, elaborate and review textual information in line with their goals and prior knowledge. Those inferential activities promoting an active role in the task may improve the quality of these processes. Although some devices take for granted a more or less strategic use, they do not necessarily explicitly presuppose teaching comprehension strategies. The approach emphasizes readers making connections with the text via student reflexion and discussion about the meaning of the contents. Some kind of *engagement activities* are summarizing, asking and answering questions, *thinking aloud* during reading and designing graphics.

Summarizing a text is one of the most common activities used by teachers to encourage their pupils to learn the content of a History text. Nevertheless, there is ample evidence showing its poor efficiency in aspects other than text recalling, even though strategy teaching is provided (Orrantia, Rosales, & Sánchez, 1998). This does not occur with the use of questions during or at the end of the reading process. Somehow, understanding History entails asking oneself questions, more or less explicitly, about the sources aiding the reconstruction of the past. The scarce familiarity of pupils with this habit would explain why some of them are able to elaborate, more or less correctly, the causal structure of the phenomenon and how they are able to identify causes and consequences not knowing the reason why they are related with each other. Thus, *asking others questions* or *answering the teacher's questions* are a valuable way to make inferences from the implicit information in the text. The

questions should focus on the more relevant causal connections between events and they should activate the relevant prior knowledge of the historical context. Sinatra, Beck and McKeown (1993), for example, asked a group of Primary students to answer, while reading several Social Sciences texts, elaborative questions posed at strategic moments for comprehension. The scores obtained in two comprehension and recall tests were higher than those achieved by those who read the original or by those who read a revised version, although differences were not statistically significant. The reason why these tests may bring about only scarce benefits could be related to the argument stating that questions asked by others are not necessarily useful for revising your own explanations (Chi, 2000). Teaching how to phrase self-questions may be closer to this purpose.

Research studies have shown how certain tasks, such as encouraging readers to *think aloud* during reading, which is meant to clarify each new idea and to relate it with the foregoing text, can achieve inferential activity in this sense (Chi, 2000). Loxterman, Beck and McKeown (1994) found that this task can also be more efficient when the text has previously been reviewed and expanded. For their part, Chi, de Leeuw, Chiu and Lavancher (1994) revealed that, as well as inferring implicit information, thinking aloud can increase the production of self-explanations in certain texts, i.e. it can facilitate revising and repairing the underlying causal model in the reader's mind when it is in conflict with textual information.

Other kind of *engagement activity* for improving reading comprehension is based on using graphic organizers. There is initial evidence that supporting the active coordination of visual and verbal information during reading can promote students' learning (Bodemer, Ploetzner, Feuerlein & Spada, 2004). Graphic organizers are superior to outlines in improving learning from text, what support the "visual argument" (Robinson & Kiewra, 1995). In a sample of Secondary and University students, who were asked to study two causal History texts, Montanero and Blázquez (2001) found that those who spontaneously sketched a diagram performed better at causal questions than those who drew a mere outline, wrote a summary or simply resorted to underlining the text. Visual text representation can relieve the burden of our working memory, and therefore facilitate generating inferences. Diagrams, network charts and other visual representations allow the reader to focus on connections between the ideas, promoting deep learning (Ainsworth, 1999). McCrudden, Schraw, Lehman and Poliquin (2007) examined the effect of studying a causal diagram on comprehension of causal relationships from an expository science text. The subjects who readied the text with the causal diagram understood better the causal sequences in the text even when study time was controlled. The results

suggest that causal diagrams improve comprehension by explicitly representing the implicit causal structure of the text in a visual format. Butcher (2006) compared the effect of studying a text with and without visual support. The results showed that mental model development can be supported when diagrams prompt learners to generate inferences that integrate information during learning.

Previous researches have two limitations. On the one hand, the texts and visual representations used in most research have been drawn from the natural sciences. Their generalizability to other domains should be researched. In the case of History, a good diagram should be able to unravel causal links between the different events and convey the conditions of historical phenomena. In this sense, it can also enable our inferential activity to be focussed on the most important or complex relations, particularly when it is the reader who draws the diagram.

On the other hand, it can be observed a tendency to focus on presented representations, rather than construction of representations by learners. Often, the participants are only required to study the materials. They are not instructed to perform any other activity, such as labelling parts of a diagram (Prangmsma, Van Boxtel & Kanselaar, 2006). Masterman and Sharples (2002) obtained positive results with software allowing pupils to elaborate their own causal diagram from the linear reading of historical events. Not only did the subjects have to categorize the properties of each event and to connect each with the others causally, they also had to explain and justify the diagram to their classmates. This simplified the thinking process and the revision of their implicit knowledge. The success of this kind of activities is, however, very dependent on the reader's strategies or on the assistance of the teacher.

OBJECTIVES

In the following experiment we aim to obtain more information about the influence of various procedures to enhance the student's learning from a text on History. The central issue is how visual representations of different rhetorical organization can support learning from a text. The study had two objectives.

1. First, we aimed to analyse the extent to which the revision of a History text, focusing exclusively on the *rhetorical organization* of the ideas, could influence learning of readers. As we have seen, previous research has shown that when the causal structure of a historical accounts and the temporal order of events are made more specific, readers understand and recall better (Linderholm *et al.*, 2000). In principle, one would therefore expect that a textual version in which each causal state or event was explicitly linked with its consequence

(antecedent-consequent), would be more useful than an inverse organization (consequent-antecedent) or merely the collection of facts.

Previous research has also shown that allowing the high knowledge readers to make their own inferences could be the most effective aid for learning from a text (Chi, 2000). In this sense, we were also interested in analysing the effect of some graphic organizers in the inferential activity from the text studied.

2. The second objective was to analyse the extent to which *graphic support*, as an aid to making the rhetorical relation between ideas more explicit, would affect the level of understanding and recall by the reader. As we have already suggested, the elaboration or completing of diagrams which reflect selectively the relations between ideas could be a good mediator of inferential processes of implicit information. The results obtained from previous studies support the notion that network charts, which reflect explicitly the rhetorical relations of the text, could promote learning. A proper graphic representation of the rhetorical structure can provide valuable help in compensating for limitations of working memory and in involving the student in the production of elaborative inferences; it also provides a more selective retrieval of the required prior knowledge. Most research on learning with visual representations deals with presented representations. In this respect, our intention was to compare the effect produced by the representation of a *complete diagram*, consistent with the rhetorical organization of the ideas, to another *incomplete diagram*, which the students had to complete.

METHOD

Participants

A total of 338 undergraduate students (aged 19-20) participated in the study. The subjects had passed university entrance exam, for which a certain competence in reading is required, although they lacked specialized knowledge of History. The distribution of subjects by sex was balanced.

Variables

Two independent variables were considered: the rhetorical structure which organized the ideas of the text, and the type of graphic support (consistent with the structure). Following the classification by Meyer (1975, 1985), we compared the effect of different rhetorical structures of the same expository text: Causation, antecedent-consequent (AC); Causation, consequent-antecedent (CA); Collection (COLL); Problem-solution (PS); Comparison (COM).

The second independent variable, i.e. the type of graphic support, produced two conditions: complete graphic organizer; incomplete graphic organizer (the latter accompanied by a request to fill in the missing content).

The *dependent variables* were related to comprehension and recall of information, which were required from the subjects immediately after reading.

a) With regard to the *comprehension process*, we tested two kinds of inferences. Global inferences were elicited from questions on global meaning representation, which required the readers to extract the essential idea of the text.

b) *Delayed recall*, a week after studying the text, provided the distinctions between the evocation of macro propositions, details and rhetorical relations. In the experimental condition of the incomplete graphic organizer, the extent to which subjects correctly reflected the organization of the text ideas in the outline was quantified.

Finally, as a *control variable*, an analysis was made of subjects' prior knowledge of the content of the text immediately before they studied it.

Materials

Expository texts

Most of the previously cited studies on text revision used rather extensive texts as study material, with the result that there are excessive differences in length among the versions with the same content; it is therefore more difficult to know which components really produced improved comprehension. In our case, we chose a complex but relatively short text on "The Great Discoveries of the 15th Century", taken from a Secondary Education textbook of History and Geography. Three versions were made up from the original text, with very little variation in the number of words (around 200 each) or in the semantic content of the propositions. The revision did not include, therefore, an *expansion* of the text.

In the first version (Causation, AC), the ideas were organized by antecedent-consequent relations. Connectors, conjunctions, causal verbs or others signposting expressions were introduced to highlight the direct causal relations of the phenomenon ("this brought about...", "consequently...").

In the second version of Causation (CA), the ideas were organized inversely in the explanatory chain (by means of consequent-antecedent relations). Explicitly

marked through linguistic markers (such as “this came about as a result of...” and “this was due to...”) were inserted.

In the third version (PS) the ideas were organized by problem-solutions relations. Connectors were similar to the causal ones (“through”, “the solution reached was...”, etc.), but the ideas were presented as a ways or means to face social and economic problems.

The comparison relation (COM) had two ideas (Portuguese and Spanish explorations) which were linked by an element of comparison, using markers, such as “on the contrary”.

In the last version (COLL), a collection of ideas were enumerated. This text highlighted a “time sequence”, recounting events in chronological order, without marking any causal explanation. In this sense, we use other connectors such as “in the first place”, “in the second place”, etc.

Graphic Organizer

Each text was accompanied by a complete or incomplete graphic, showing the rhetorical structure of the ideas. The completion of the half-empty graphic organizer in one of the experimental conditions was evaluated. The subjects involved in this experimental condition were asked to complete the graphic organizer or synoptic chart corresponding to the text version they had read with codes relating to a list of ideas from the text. The students had the text available when filling the blanks. The task was presented to them as follows: “Before answering the questions on the text, write the letters which correspond to the following ideas in the empty squares”. The task was scored with a maximum of six points: one point for each of the ideas correctly situated in the empty squares of the graphic.

Test of Prior Knowledge

In order to evaluate the readers’ knowledge of the subject-matter before studying a text, an objective multiple choice test was made up containing 10 questions on historical concepts and information related to the content of the text to be studied.

Comprehension Test

As we have already mentioned, assessment of comprehension was made by evaluating the global and causal inferences immediately following the reading of the text. For this purpose the students were also required to do an objective multiple choice (8 items, without access to the text).

a) In order to evaluate the *global inferences* which intervene during the construction of the macrostructure of the text-base (van Dijk and Kintsch, 1983), we considered four main points for the assessment of overall meaning and the distinctions between hierarchically different ideas. Thematic comprehension, as the most global meaning of text, was evaluated through questions on a hypothetical title that could be assigned to the text. Distractors reflected wrong answers of four types: titles that were inaccurate, too general, too particular or too distant from the real subject-matter. The second point required the students to select the specific detail (at the lowest hierarchical level of the macrostructure) which was least relevant to comprehension of the text, from several ideas of varying generality. The third point aimed to determine whether the student had managed to integrate certain text propositions related semantically within a more synthetic meaning. The fourth point required the student to say what the main idea of the text was.

b) In order to evaluate the *causal inferences*, two questions were intended to find out whether the student was able to infer implicit information to account for the causal relations between some of the ideas in the text (e.g. “Why the Constantinople’s Conquest made the price of the coveted spices rise?”). The last two questions require causal reasoning on the situational representation of the historical phenomenon (e.g. “Is there a connection between the Constantinople’s Conquest and the Discovery of America?”).

Delayed Recall Test

For the evaluation of written recall, an analysis model was devised for each of the text versions, based on Meyer’s method of propositional analysis (1985). The resultant protocols varied regarding the type of rhetorical relation, although they had an almost identical number of main ideas, details and rhetorical relations. The quantification of these ideas in the recall protocols was made by two judges. One point was given for each expression whose meaning approximately reflected the content of a proposition or relation contained in the analysis model. The coincidence percentage of the judges was 95%, any discrepancies found having been resolved by consensus.

Procedure

The study was done at the University of Extremadura (Spain). Subjects were distributed in 10 groups, each of which was assigned, randomly, to one of the experimental conditions derived from the combination of the two independent variables (5x2). Each evaluation session lasted around 50 minutes, and was divided into three phases: 5 minutes to answer the prior knowledge objective test; 15 for reading and studying the text; and a maximum of 30 minutes to

answer the global and causal questions (without consulting the text). One week later the delayed recall test was carried out.

RESULTS

The following tables show the means and standard deviations of the scores obtained by the subjects, according to the two independent variables of the study, i.e. the type of rhetorical structure that organizes the ideas of the text version, and the type of graphic support provided.

Table 1: Means and standard deviations of the results in the different experimental conditions

Variable	Version	<i>Half-empty graphic organizer</i>			<i>Complete graphic organizer</i>		
		N	M	SD	N	M	SD
Prior knowledge	AC	46	5,74	1,53	27	4,59	1,80
	CA	34	5,79	2,48	26	5,35	2,02
	PS	42	5,83	1,64	28	5,46	1,79
	COM	39	5,51	1,75	32	5,25	1,87
	COLL	37	5,81	2,36	27	5,41	1,85
	Total	198	5,74	1,93	140	5,21	1,87
Global inferences	AC	46	2,32	0,92	27	2,29	0,91
	CA	34	2,26	0,75	26	2,30	1,25
	PS	42	2,23	0,85	28	1,78	0,99
	COM	39	2,58	0,99	32	2,31	1,06
	COLL	37	2,27	0,83	27	2,07	0,87
	Total	198	2,33	0,87	140	2,15	1,03
Causal inferences	AC	46	2,06	1,32	27	2,00	1,46
	CA	34	2,29	1,08	26	2,00	1,26
	PS	42	2,16	1,03	28	1,85	1,11
	COM	39	1,56	1,07	32	2,03	1,06
	COLL	37	1,78	1,00	27	2,07	1,10
	Total	198	1,97	1,13	140	1,99	1,19
Recall of details	AC	25	3,20	2,02	18	3,11	2,19
	CA	21	3,05	2,09	16	2,88	2,45
	PS	25	2,68	1,91	12	1,83	1,03
	COM	21	1,76	1,61	18	1,56	1,15
	COLL	23	2,87	2,01	15	2,33	1,88
	Total	115	2,73	1,97	79	2,37	1,91
Macropropositions recall	AC	25	4,64	2,00	18	4,50	2,33
	CA	21	3,76	2,26	16	3,13	1,71
	PS	25	3,76	2,18	12	2,83	1,03
	COM	21	5,05	2,27	18	3,72	1,78
	COLL	23	4,35	2,42	15	3,13	1,13
	Total	115	4,30	2,24	79	3,53	1,78
	AC	25	1,96	1,93	18	2,56	2,06

Rhetorical relations recall	CA	19	0,84	1,07	16	0,56	1,15
	PS	25	1,40	1,35	12	0,83	0,94
	COM	21	1,24	1,04	18	0,61	0,78
	COLL	22	2,00	2,16	15	0,60	0,91
	Total	112	1,52	1,63	79	1,08	1,50

Prior knowledge

As can be seen in Table I, the prior knowledge scores were slightly superiors for the half-empty graphic organizer condition, despite the random assignation of subjects. Even though the differences were not statistically significant, we decided to monitor their effect, introducing them as a co-variable in the following analyses.

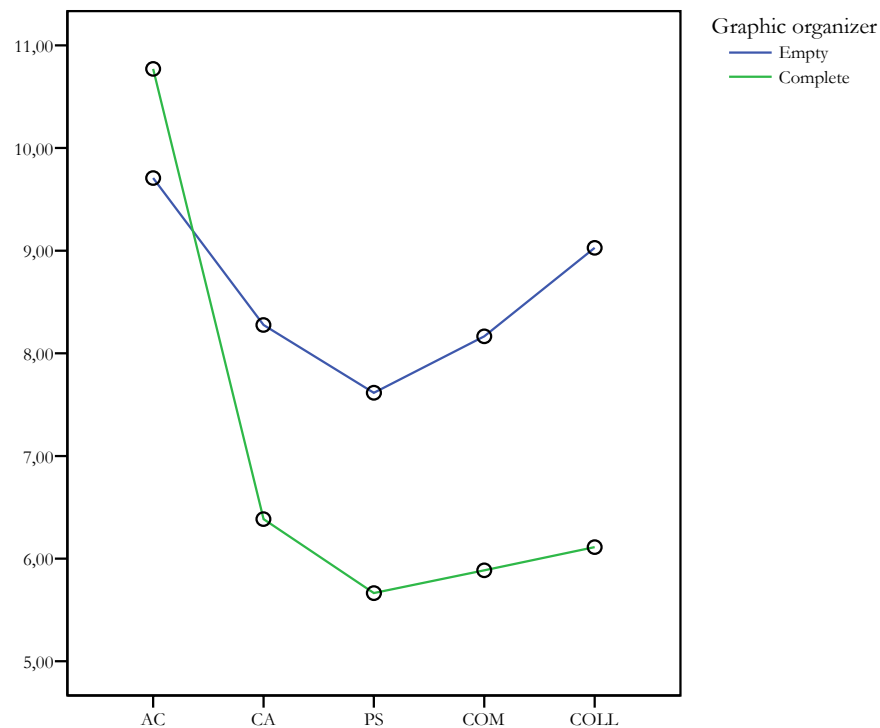
Comprehension

Subjects belonging to the incomplete graphic organizer condition obtained higher scores in the global inferences questions. The covariance analysis with two independent variables, however, did not give significant differences in rhetorical structure or graphic type. We did not find any correlation between accuracy in the filling of the graphic organizer and comprehension test.

Delayed recall

Text structure had a significant influence on overall recall ($F=4.148$; $p<0.05$). Subjects belonging to AC condition obtained higher scores in details, macro propositions and rhetorical relations recall. The task of completing the half-empty graphic organizer was also clearly positive ($F=5.92$; $p<0.05$). Those undergraduates who were asked to fill in a semi-empty graphic organizer can be seen to be more likely to obtain better results for recall, except in the case of AC texts (figure 1). The effect is also the same even with those subjects making mistakes when filling in the graphic organizer. We did not find a significant correlation between accuracy when filling the graphic and recall.

Figure 1: Means of the scores for delayed recall



DISCUSSION

Researchers on reading comprehension have made great efforts to study the efficiency of the different methods focussed on facilitating or generating inferences about a specific text: linguistic revision procedures and activities to enhance inferential processes at the moment of understanding and learning. The present research has compared the efficiency of a text revision procedure (*from the text*) and inferential activity engagement (*toward the text*) in the comprehension and recall of a History text.

As already mentioned in the introduction, several studies have shown that causal text revision with the aim of clarifying the causes and effects chain in its temporal order has positive effects on the learning from historical texts. In these studies, subjects read an *expanded* text (with additional information bearing on intentional and causal explanations). In our study, the results suggest that a

revision of a short text, focusing only on the rhetorical organization of ideas, can be also relevant for recall. The rhetorical versions were exclusively elaborated to clarify linguistically and graphically a certain organization of the ideas in the text, without lengthening the original passage. Antecedent-consequent version had significant benefits over the inverse organization (consequent-antecedent) and over the rest of the rhetorical structures. Consequently, the clarification of the *causal organization* of the historical text seems to be a sufficient help to improve the recall of the text.

The AC Causal version produced better recall scores than the rest of the texts. However, we have not demonstrated that AC causal markers, without any further semantic information, produce a significant advantage in the global and causal inferences (comprehension test). This result is in line with previous research: clarifying the rhetorical structure of causal content, in its temporal order (CA), produce a more articulated representation of the ideas expressed in the text. In the CA version the events were organized inversely in the causal chain through linguistic markers, such as “this was due to...” The Collection structure reflects a historical listing of events in chronological order (time sequence). The Comparison version is shown on a different scale as it is organized by differences (between Portuguese and Spanish explorations), rather than on time or causality. On the contrary, the AC causation structure provides some coherence, mainly based on the comprehension of the causal chain and the protagonists’ motivations (Carretero, Jacott & López-Manjón, 1997; Coffin, 2004). The act of remembering an event (cause) helps the students to recall the next one (effect). However, increasing cohesion between sentences in a text is not so positive for causal comprehension, because it reduces the need for the reader to make inferences during reading.

The low score for problem-solution (PS) structure was an unexpected result. This pattern consisted of two elements: historical situation, within which there is a problem, and alternative responses or solutions to the problem. According to Meyer and Freedle (1984), all the characteristics of cause-effect are present in the problem/solution type, with the additional feature of at least one part of the solution being able to neutralize an antecedent of the problem. However, our results suggest that the cause-effect organization facilitates more the recall of a History text than the problem-solution structure.

This conclusion is also based on the assumption that causality is central to historical explanation as the vehicle for representation of historical knowledge. Historical causality is a complex and controversial concept. The majority of historians agree that historical facts can be narrated sequentially and, to a great extent, be explained both in intentional and causal terms. Together with its

context and its chronological sequence, a good narration should posit plausible causal relationships. Narrative forms not only increased the intelligibility and the appeal to studying history, but are basic to the culture of history as a discipline (Levstik, 1995). The last conclusion applies to histories and history teaching that is framed within those assumptions. However, some postmodernist historians have assessed critically, not only narrative and causal conceptions of history, but also all lineal construction of events and their periodization. For these authors simplification of history as a chain of events and actions is a naïve abstraction and is frequently biased towards certain ideological positions (Evans, 2000). In this paper, we will not go deeper into this epistemological debate (see Roberts, 2001, for review). The role of causation and narration, as a part of historical thought, is hotly disputed by historians, but there is no doubt that they are elements frequently related to history teaching. Causality can be understood at different *levels*. Historical accounts are usually presented as succession of events and human actions, based on individual decision making factors (knowledge, motive, need, etc.). From other point of view, causal explanations are made up of contexts or conditions: cultural frameworks and contexts, or changes in social, economic and political structures, affecting human actions. Maybe, the texts that the paper examines might not apply to this last level. There is agreement that learning history entails, to a great extent, understanding historical events and the time and causal links between them (Barton & Levstik, 2004; Hertzberg, 1985; Perfetti, Britt & Georgi 1995). But textbooks also organize learning contents around historical stages or relevant phenomena taking into account the influence they might have had on peoples and civilizations up to the present moment.

As regards *inferential* strategy (“toward the text”), filling in a causal graphic organizer was an activity to show significant effects. Those readers who filled in the graphic organizers remembered more information than those who studied the graphic representation already elaborated for them. Therefore, a task which actively involves the reader in the causal representation of the events could be more useful than providing a previously elaborated graphic representation. The effect is also the same even with those subjects making mistakes when filling in the graphic organizer. This would explain why significant correlations were not found between accuracy when filling in the graphic organizer and comprehension or recall.

We do not know if the benefit is related to the amount of time subjects could devote to task. A more acceptable explanation is that the diagram filling could help subjects to develop a reconstruction effort, focus on the connections between the events. Complete graphic organizer would not be productive to supply the inferences missing from the text, because these inferences may not

necessarily correspond to gaps in students' mental representation. It has been shown in reading research that making causal connections too explicit can actually decrease memory. Complete graphics might have made short texts too easy and thus promoting less active processing (Duffy, Shinjo, & Myers, 1990). On the contrary, the semi-empty diagram could serve a guide to retrieving the previous knowledge for the inferences which were required afterwards. The reconstruction effort involved in the graphic filling could help subjects to read the text grasping the relationships justifying the connections between the ideas. This conclusion is consistent with the one made by Gilabert *et al.* (2005): "a very explicit text causes high prior background readers to process the text passively because it does not leave enough room for the reader's mental activity". An issue that was not addressed in this study was the nature of the different processes involved in the students' mental representation: how students represent to themselves the text ideas during reading; how they represent it graphically; and how they respond to completing someone else's graphic representation. More research is needed to better understand this distinction.

The integration of this type of activities in a collaborative learning context may help teachers and students to spend a greater share of their time carrying out tasks specially designed to *think over* the text. When readers are aware of the rhetorical structure, they are able to organize information and make predictions about what will happen next based on that knowledge (Richgels, McGee, Lomax & Sheard, 1987). Sánchez and García (2009) showed that rhetoric competence ("the capacity to detect, understand and use the rhetorical devices from texts") plays an important role in the process of reading comprehension. It has a specific weight in relation to other variables: previous knowledge, word recognition and working memory. The *engagement activity* considered in this research (the completion of the half-empty graphic organizer) was designed to generate inferences focused on the rhetoric structure. In future studies, it would be necessary to examine this task in a collaborative group setting. Group *discussion could help* students to identify their own inconsistent situational representations and to build their own causal self-explanations (Chi, 2000) about historical phenomena.

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