Hidi, S. & Baird, W. (1988). Strategies for increasing text-based interest and students' recall of expository passages. Reading Research Quarterly, 1-24

Gallery Proof from R R Q issue.

Suzanne Hidi
William Baird
*Ontario Institute for Studies in Education*

# Strategies for increasing text-based interest and students' recall of expository texts

RECENT RESEARCH has indicated that how interesting a text is will affect students' cognitive performance. This kind of "interestingness," or *text-based interest*, was the focus of the study. More specifically, the authors attempted to develop strategies to create text-based interest in expository text used in schools in order to improve children's recall. Three versions of a single text were constructed utilizing three interest-evoking strategies. All fourth- and sixth-grade students in one suburban school were randomly assigned to study and recall one of the versions. Although overall recall was relatively high across the three text versions as compared with recall of standard texts in an earlier study, the strategies did not result in any significant difference in recall. However, children's interest ratings indicated that two of the three strategies resulted in increased subjective interest. A content analysis performed on the recall protocols showed that the interest-evoking strategies were most effective in increasing children's recall of concrete, specific, or personally involving information, and did not enhance the acquisition of more abstract, general, or scientific information.

In a recent paper (Hidi & Baird, 1986a), we argued that most studies in the area of discourse processing have focused on structural models in order to explain why certain texts appear to be easier for students to comprehend and recall. Along with a handful of other researchers (e.g., Iran-Nejad, Clore, & Vondruska, 1984; Voss 1984; and Zajonc 1980), we have noted that affective variables in general, and interest in particular, have been neglected by investigators. Renninger and Wozniak (1985) have pointed out that although the effect of interest on memory has been common knowledge since at least the middle of the last century, the concept of interest disappeared for several decades and has only begun to reemerge as a legitimate area of research. Krapp and Schiefele (1986), in their review of basic educational psychology textbooks, found that interest was rarely considered an important concept in that area.

Since the above publications, however, "hot cognitions" (Zajonc, 1980) have become "hot issues." For example, at the 1988 annual meeting of the American Educational Research Association, one of the best-attended invited addresses was on the integration of motivation and cognition (Paris, 1988). In addition, for the first time in the history of these meetings (as far as we know), two international symposiums examined the role of interest in learning. One session dealt with content and interest as motivational factors that influence learning (Schiefele, 1988), and the other session ad-



1 of 24

dressed the effect of interest on school performance across subject areas (Krapp, 1988).

There are two distinct ways of investigating the role of interest in education. One is to focus on the impact of personal preferences, that is, how people's interests affect their cognitive performance. In this more common approach one compares, for example, how subjects focus on, comprehend, or learn material of varying personal interest. Not surprisingly, such studies have established that cognitive performance (as measured by many different indicators) improves with personal interest (e.g., Asher, 1979, 1980; Asher, Hymel, & Wigfield, 1978; Estes & Vaughan, 1973; Marton & Saljo, 1984; Renninger, 1988; Renninger & Wozniak, 1985). The second way to look at interest, and the focus of our study, is to investigate how the "interestingness" of stimulus materials influences cognitive performance across subjects (regardless of individual differences). This kind of interest, which we will call text-based interest, has been the focus of work reported by several researchers (e.g., Anderson, 1982; Anderson, Mason, & Shirey, 1984; Anderson, Shirey, Wilson, & Fielding, 1986; Garner, in press; Garner, Gillingham, & White, 1988; Hidi & Baird, 1983, 1986a, 1986b; Hidi, Baird, & Hildyard, 1982).

These and other studies indicate that text-based interest is an important variable in the comprehension and recall of narrative as well as expository text. In the following sections, we will first review the work on text-based interest. Next, we will report on our attempts to develop ways in which interest can be created in expository texts for use in schools. Finally, we will discuss the implications of our results for the effect that interest may have on memory.

## Text-based interest in narrative

Researchers were slow to recognize what good authors and playwrights have known all along—that in order to entertain, good stories must have interesting complications. De Beaugrande (1982) has succinctly argued that interest is one of the crucial variables affecting readers' reactions to stories: An entertaining story may be acceptable even without a message, whereas a dull one may lose its readers before any message can be delivered. Evidence has also been accumulating that interest may influence not only people's motivation to read a story, but also how well they comprehend and recall it (Brewer 1983; Stein 1983; Wilensky 1983).

Schank (1979), who may have been the first researcher in the last decade to address the issue of text-based interest in discourse processing, has identified three conditions that elicit interest in story processing. In two of these conditions, interest is related to readers' expectations, which are based on the event structure of a given story; expectations either (a) are violated through unusual, incongruent, or conflicting information, or (b) are unfulfilled because potentially relevant information is missing. In

the third condition, interest is inherent in certain concepts that are of "absolute interest" to most human beings, such as death, danger, power, and sex.

Kintsch (1980) also considered how interest is produced in stories. He distinguished *emotional interest*, which is created through events that tend to arouse the reader, from *cognitive interest*, which results from certain relations between incoming information and background knowledge.' Kintsch, like Schank, emphasized the importance of knowledge-based expectations in producing cognitive interest, but he developed two additional points. First, Kintsch argued that cognitive interest is related non-monotonically to the degree of novelty or uncertainty that a given text generates; that is, relatively small deviations from expectations are optimal in creating interest. On the one hand, if a situation or event in a story develops as one expects, interest will be lacking. On the other hand, if the new information is *too* unusual or unfamiliar, interest will again be stymied. Second, Kintsch explained the latter lack of interest (resulting from weird or unpredictable new information) as follows: The degree to which information is interesting is related to its postdictability—that is, how well the information can be related meaningfully to other sections of the text or to stored knowledge. Thus, if new information is excessively novel, or unexpected, it cannot be resolved within the reader's existing knowledge structure and thus will not create interest.

Iran-Nejad (1987) reported empirical evidence supporting Kintsch's position. He found that stories containing surprises elicited higher ratings of interestingness than stories with no surprises, but only if the surprising story contained a successful resolution. Thus, interest is seen as the outcome of a process whereby anomalous or surprising information is resolved within the context of a story. Iran-Nejad suggests that interest is a consequence rather than a cause of the intellectual activity involved in resolving an issue. He further argues that although missing, anomalous, or other thematically salient information may elicit an affective response (such as surprise) immediately, it does not create interest until the reader has resolved his incomplete or ambiguous understanding of the new information in relation to existing knowledge structures.

### Text-based interest in exposition

The role of interest in the processing and recall of expository text has only recently become a topic of concern. It is worth noting that words like interest, affect, and salience did not appear even in the indexes of such major works on text processing as Britton and Black's *Understanding of Expository Text* (1985); Mandl, Stein, and Trabasso's *Learning and Comprehension of Text* (1984); and Otto and White's *Reading Expository Material* (1982). Two factors may have contributed to this apparent lack of concern in the literature (Hidi & Baird, 1986a).

First, to date we know very little about which topics, themes, or types of information make part or all of an exposition interesting. Concepts that have previously been associated with interest, such as danger, power, sex, or mystery, are usually associated with the actions of a main character, and thus are most suitable for creating interest in stories. However, the importance of these and similar concepts for informative prose seems questionable, and it has not been established what types of information may create interest and spark intellectual activity in expository text.

Second, the limited nature of the expository texts used in most investigations may have led researchers to assume that structural importance alone can predict how well subjects process and recall these texts. Such texts tend to fall into two categories: college-level materials and artificial expository passages constructed explicitly for experimental purposes. Both of these types of exposition are intended primarily to be informative, and therefore rarely contain interesting or entertaining material written in any rhetorically purposeful way. As such, they are not truly representative of the kind of expository text often found in elementary school textbooks, which often contain entertaining material specifically aimed at catching the reader's interest (Anderson et al., 1984; Hidi & Baird, 1983; Hidi, Baird, & Hildyard, 1982; Pearson, Gallagher, Goudvis, & Johnston, 1981).

It seems to be important to identify the kind of information that can create a heightened sense of interest in school texts, yet not interfere with the learning process. Although few researchers have been directly concerned about how interestingness influences the comprehension and recall of expository text, several studies seem to support the hypothesis that text-based interest plays as important a role in the processing of exposition as it does for narrative. Alvoid (1983), Smith (1985), and Winograd, Hare, Garner, Alexander, and Haynes (1984) all reported that students were influenced by the interestingness of ideas while processing expository school texts. Anderson (1982) and associates (Anderson et al., 1984) reported that the interestingness of single sentences had a most powerful effect on how children recalled these materials.



For the past five years, our research has been concerned with how the content of exposition in elementary school textbooks affects learning (Baird & Hidi, 1984, 1988; Hidi & Baird 1983, 1986a). Using subjects in Grades 4 and 6, we found a weak relation between the rated importance of sentences and the frequency of students' sentence recall. These results suggest that students do not necessarily exhibit in their recall the kind of abstractive processing in which important information is selectively recalled and unimportant information is forgotten. Rather, subjects often recalled in a "chunking" pattern which combined the important and the interesting facts of a particular sub-

topic. We concluded that students, when reading textbook exposition, may not evaluate the relative importance of facts within the whole text, and may simply recall chunks of information associated with those subtopics that are most salient to them.

The texts we used as experimental materials were taken directly from actual science and social science textbooks used in Ontario schools. In these texts we could identify only one predominant strategy for creating interest: the insertion of interesting but unimportant information in the form of either narrative anecdotes or descriptive elaborations. The assumption behind such an insertion strategy is that if you grab a reader's interest with salient information, the reader will then pay increased attention to the more discursive and important information associated with it. Our data, as well as findings reported by Anderson et al. (1984), show that this assumption is unwarranted. Although more interesting sentences are more likely to be recalled, this greater likelihood does not extend to the information immediately preceding or following. We also found that when interesting narrative anecdotes are inserted into an exposition, they actually interfere with the recall of important information. In recent papers, Garner (in press) and Garner, Gillingham, and White (1988) reported that interesting but unimportant information ("seductive details") disrupts not only children's but also mature and expert adults' expository text processing.

### Present investigation

We have argued previously (Hidi & Baird, 1986a) that interest should be investigated across genres, rather than within a single genre as in earlier research. For example, research on narrative has highlighted the role of event structure in creating an affective response such as interest. Such structures, however, are often not present in expository text. We have further argued that, in order to be a more inclusive concept, interest should be considered in process terms: Interest is created when a person reacts to a situation or information of special significance. The kind of informational significance may vary, leading to different forms of interest. We distinguish here between *knowledge-triggered interest* and *value-triggered interest.* Knowledge-triggered interest springs from certain conceptual relations between new information and prior knowledge, such as novelty, anomaly, and unexpectedness. This type of interest has received the most attention. For example, both Kintsch's "cognitive interest" and Schank's (1980) concept of interest as resulting from "violated expectations" can be seen as knowledge-triggered. Value-triggered interest is concerned with the relation of incoming information to a person's values, desires, and preferences. Little research can be found on this type of interest, although Kintsch's "emotional interest" and Schank's "absolute interest" would appear to fit into this category.

Knowledge-triggered interest is more eas-

ily manipulated than value-triggered interest in producing text-based interest. For example, by carefully sequencing information in a story, the mystery writer controls what a reader knows and doesn't know, and thereby the degree of suspense and interest felt by the reader. By contrast, the wide range of individual differences in personal values and preferences generally prevents the writer from being able to manipulate value-triggered interest. However, some values and preferences can be assumed to be generalized across most readers, or within some particular readership. For example, we would expect most readers to be more interested in a character who is highly intense in his or her activities than in one who is lackadaisical. Similarly, for the particular readership of young readers, we would expect close identification with youthful characters and their activities. Thus, values and preferences that apply to most readers or to a particular readership can be manipulated to produce value-triggered interest in text-based.

The purpose of this study was to investigate three new strategies for creating text-based interest in expository texts. The first strategy is related to work by Anderson, Shirey, Wilson, and Fielding (1986), who suggested four attributes that may contribute to sentence interest:

1. *Character identification.* People are more interested in characters with whom they readily identify.
2. *Novelty.* Novel or unusual content will enhance interest.
3. *Life theme.* People are interested in what is important to them.
4. *Activity level.* Material that describes intense actions and feelings is more interesting than static scenes and less intense states.

don't line up

These attributes correspond to some of the factors that we (Hidi & Baird, 1983, 1986a) found contributed to children's recall of expository text. It should be pointed out that these attributes may help create either knowledge-triggered or value-triggered interest. For example, novelty adds to a person's knowledge and thus creates knowledge-triggered interest, whereas life themes are related to a person's value system and thus create value-triggered interest. Character identification and activity level are the two attributes most easily manipulated in producing text-based interest. In the texts developed for this study, we tried to use the four attributes as rhetorical goals that might produce content that is strong in text-based interest.

The second strategy used to create interest was an insertion strategy. We tried to improve on the somewhat unsystematic insertion strategy commonly found in previous studies by focusing on inserting information that elaborated the central ideas of the text, rather than randomly inserting interesting information.

For the third strategy, we borrowed from Kintsch (1980) and Iran-Nejad (1987) the concept that interest is related to the resolution of some novel information, and we attempted through text manipulation to induce a need on

the reader's part to resolve some incomplete understanding of new information.

## *Method*

### Subjects

Our subjects consisted of 44 students in Grade 4 and 66 students in Grade 6 from an upper-middle-class suburban school in Toronto. These children constituted all of the fourth- and sixth-grade students enrolled in regular classes in the school.

### Text materials

Initially, we constructed an outline for a single expository passage to which the different interest-producing strategies could be applied. We chose the topic of famous inventors in history and included general ideas about the factors that contributed to their success as inventors. (The book *Invention, Discovery, and Creativity* by A.D. Moore, 1969, was used as a factual source.) An introductory paragraph describing what inventors are generally like was followed by three episodes focusing on three specific inventors and their discoveries. We selected Edison, Morse, and Spenser and their most famous inventions: the light bulb, the telegraph, and the thermostat, respectively. As our interest-evoking strategies produced texts longer than typical Grade 4 texts (Baird & Hidi, 1984), the section on Morse was deleted from the fourth-grade versions. Thus, the fourth-grade text dealt only with Edison and Spenser. We stipulated four themes to be addressed in the discussion of each inventor:

1. "An inventor is a person who makes something new that is useful to people."
2. "To be successful, an inventor has to have a strong interest in what he or she is doing, and has to work hard at inventing."
3. "Inventors know that their inventions actually have to work, or nobody will use them."
4. "An inventor does not have to start out as an expert."

On the basis of this outline we composed the following three versions:

*Base text.* The base text was constructed to be coherent and interesting. In this version, we attempted to create interest by including interesting content, as described by Anderson et al. (1986) and Hidi and Baird (1983). We could best manipulate the text attributes of character identification and activity level, followed by novelty. To elicit character identification, we included facts such as the ones in these sentences: "Thomas Edison became the most famous inventor of all time even though he left school when he was very young," and "John Spenser began to experiment making inventions even though he was only a teenager." We tried to increase the activity level by describing the invention process as a series of highly motivated actions initiated by the inventor in which he or she recognizes a social need, expresses an abid-

ing interest in the invention, and works very hard to produce something useful. The base text was 58 sentences long for Grade 6 students, and 44 sentences for Grade 4 students.

*Salient text.* The salient text was produced by starting with the base text and adding salient descriptive elaborations after several of the important facts in the essay. The insertions were, however, more systematic than were those we had found in actual school texts. We did not insert any independent narrative anecdotes, and all our insertions were elaborations on the main themes. For example, after stating that an inventor has to have a strong interest in what he is doing, we added, "Sometimes they became so interested they would forget to go home to eat dinner." Nineteen sentences were added in this way. The salient text was 77 sentences long for Grade 6 students and 58 sentences for Grade 4 students.

*Resolution text.* The resolution text was produced by further modifying the salient text to present the reader with a need for resolution. For this version, we used the salient text as a starting point and introduced a manipulation in the presentation order, which was intended to activate speculative thought on the part of the reader. This manipulation tested the hypothesis that interest is a by-product of the reader's need to resolve some incomplete or uncertain understanding of an event or text. In his research, Iran-Nejad (1987) used unexpected events in stories to induce surprise *(need for resolution).* A technique more suited to expository text was used in order to induce such a need for resolution in our readers. Each episode was interrupted at some point in describing the respective invention, and the reader was asked a question, the answer to which would complete the account. For example, after stating how inventors before Edison had failed to make a light bulb that actually worked, we asked, "How did Edison make a better light bulb?" The resolution that answered this question was given after an intervening paragraph. The resolution text was 84 sentences long for Grade 6 students and 63 sentences for Grade 4 students.

**Procedure**

Each student was randomly assigned to read one of the three versions of the text. All subjects were given 25 minutes to read and reread the text. They were instructed to read the text carefully because they would be asked to remember what they had read, both immediately after the reading session and sometime later. After 15 minutes, subjects were again told to continue to reread the text. Written free recalls were obtained immediately after the reading phase and exactly 1 week later. The only cue given to the children for both recalls was the title of the text they had read. They were encouraged to write down as much as they could remember, without concern for the original order of the ideas in the text.

We were also interested in finding out whether the three versions differed in their subjective interest to the readers. Therefore, we presented a forced-choice task to another, comparable group of 36 fourth- and sixth-grade students. These subjects were given two of the versions and were instructed to read them carefully. They were then asked to decide which of the two texts was the most interesting.

### Scoring

Typed protocols of the subjects' recalls were presented to judges who were asked to identify, for each sentence in a protocol, the sentence in the original text with the same gist, or core idea. Thus, if a subject only partially recalled a sentence, then that fragment had to contain enough of the core idea to be recognizable in order to be scored as a recall of that sentence. If no such correspondence could be determined, then the recall sentence was coded as an intrusion. There were generally very few intrusions, and they did not seem to provide enough data on which to base an analysis. On a subset of protocols, the agreement between raters was 80.3%.

In addition, each version of the "Inventors" text was rated for content importance on a sentence-by-sentence basis. Three adult raters were used for each version. Raters were given the following instructions: "Underline the most important sentences. By the most important sentences, we mean those that are essential to the meaning of the text. We would expect that these sentences represent the main ideas that the writer intended to communicate." The sentences underlined by at least two out of three raters were scored as important.

In order to compare the recalls across the three text versions, we computed recall scores using only those sentences which all versions had in common. Because no deletions were made, the common sentences consisted of all the sentences of the base text (44 sentences for the Grade 4 text and 58 sentences for the Grade 6 text). We calculated three recall scores: *Total proportion recalled* was calculated by dividing the number of sentences recalled for each subject by the total number of common sentences in the original text. *Proportion recalled of important information* was calculated by dividing the number of important sentences recalled by the total number of important sentences in the original text (13 sentences for the Grade 4 text, and 18 sentences for the Grade 6 text). *Proportion recalled of unimportant information* was calculated by dividing the number of unimportant sentences recalled by the total number of unimportant sentences in the original text (31 sentences for the Grade 4 text, and 40 sentences for the Grade 6 text).



## *Results and discussion*

### Overall recall

A three-way analysis of variance (ANOVA)

was carried out with grade, text, and time (immediate vs. delayed recall) as variables, and repeated measures on the third variable. Table 1 shows the mean proportion recalled overall for the common sentences of the three text versions. There were significant main effects of grade, $F(1, 104) = 26.07$, $p < .001$; and time of recall, $F(1, 104) = 85.32$, $p < .001$. Although there was no significant difference between the three texts, there was a noticeable trend toward equivalent total recall for the base and salient texts, and less recall for the resolution text. Also, it should be noted that the average proportion recalled immediately, ranging from 18% to 25% for Grade 4, and from 30% to 35% for Grade 6, was substantially higher than the typical level of recall from textbooks found in previous research. For example, Schallert (1984) reported that the secondary school children she tested recalled, on average, 12% to 20% of an expository text.

*Comparison with earlier findings.* One of the important questions this study raises is how texts constructed with interest-creating strategies affect learning as compared with actual school texts. This question is especially important given that our design did not allow a comparison of performances between the three "Inventors" texts and a standard control text. We found it impossible to construct such a control text, because reducing the base text by eliminating all of its interesting content would yield merely a generalized summary. In contrast, school textbooks provide extended texts for children. Reading and studying from such texts requires students to select and distill information. This process is not comparable to studying the already selected and distilled information that would be found in any good summary.

In a previous study, however, we collected recall data on 8 comparable texts, 4 each at Grade 4 and Grade 6 levels (Baird & Hidi, 1984; Hidi & Baird, 1986a). These texts were selected from a random sample of 25 representative science and social science texts (taken from current textbooks used in the Ontario school system), which were evaluated by adult raters (Hidi & Baird, 1986b). The texts of this study are comparable to those of the present study, and the reading and recall instructions were identical. Moreover, the subjects in this earlier investigation are comparable to the children of the present study, as they were from the same schools and were in Grades 4 and 6 at the time of each study. The texts used earlier included a high-quality, a low-quality, and two middle-range texts, of which one included narrative intrusions and the other did not. For the purpose of comparing those data with the data from the present study, we eliminated the two texts (one at each grade level) with the narrative intrusions, as these could not be characterized as truly expository, and compared the remaining three texts for each grade with the three "Inventors" texts. The three Grade 4 texts were entitled "About the Arctic," "What Is Light," and "Let's Look at Insects." The average length of

these was 55 sentences. The Grade 6 texts were "The Far North," "What Is Culture," and "Getting to Know the Gorilla," and the average length was 81 sentences.

Table 1 includes the mean proportion recalled overall for the three standard and three "Inventors" texts for each grade. A three-way ANOVA of grade, text, and time (immediate vs. delayed recall), with repeated measures on the third variable, was performed on the two sets of recall scores. Significant main effects were found for grade, $F(1, 190) = 16.7$, $p < .001$; text, $F(1, 190) = 20.0$, $p < .001$; and time of recall, $F(1, 189) = 166.7$, $p < .001$. The significant main effect of text indicated that our constructed texts were effective in producing more general recall than a sample of ecologically valid texts.

To investigate further the effectiveness of the two sets of texts, we compiled a score for the relative amount of "forgetting" between immediate and delayed recall for each subject by dividing the numbers of sentences recalled after the 1-week delay by the number recalled immediately. A two-way ANOVA of grade and text was performed. The results showed a significant main effect only for text, $F(1, 190) = 11.34$, $p < .001$. In other words, there was significantly less forgetting for the "Inventors" than standard texts. This is particularly noteworthy given that students had recalled proportionally more of the "Inventors" texts to start with.

**Recall of unimportant and important information.**

Table 2 shows the mean proportion recalled of unimportant information. Significant main effects were found for grade, $F(1, 104) = 22.69$, $p < .001$, and for time of recall, $F(1, 104) = 66.14$, $p < .001$. No significant difference was found for text. These significant main effects showed, as expected, that sixth-grade students' recall is higher than that of fourth-grade students, and that immediate recall is superior to delayed recall. These two main effects were found in each of the following analyses, and they will not be further discussed.

Table 3 shows the mean proportion recalled of important information. Main effects were found for grade, $F(1, 104) = 13.35$, $p < .01$, and for time of recall, $F(1, 104) = 39.06$, $p < .01$. However, a significant three-way interaction was found for Grade × Text × Time of Recall, $F(2, 104) = 3.44$, $p < .05$. Inspecting Table 3, we see that the salient text resulted in higher recall of important information than the other two versions, but only at immediate recall for the Grade 4 subjects, and only at delayed recall for the Grade 6 subjects. It is impossible to determine the meaning of this three-way interaction, in terms of how the manipulations in the salient text specifically affected the recall of important information. Is the effect restricted to intermediate levels of recall, or does salience affect recall differently for the subjects at different grade levels?

Interestingly, when we look at children's ratings of the three texts for subjective interest, we find that the forced-choice task produces different results for the two grades. On the basis of results of a binomial probability test ($p = .5$, $n = 6$ for each of three forced-choice comparisons per grade), Grade 4 readers had no clear preference for any of the versions, whereas the Grade 6 readers judged the salient and the resolution texts to be more interesting than the base text. Why these subjective ratings do not translate into clear-cut quantitative differences in recall is difficult to explain. However, we have found in the past that quantitative analysis of recall data can give us only a limited insight into how interesting content affects the recall process. Recently, both Hidi and McLaren (1988) and Schiefele and Krapp (1988) have argued that high interest does not simply increase the quantity of learning, but tends to change recall patterns and results in more qualitative differences.

In order to gain a clearer picture of how text interest affects recall of expository information, we felt that a content analysis was necessary to examine specific text manipulations and their specific effects on recall. Such an analysis may also indicate how well the additional ideas present in the salient and resolution texts were recalled, and what precise effect the manipulations had on learning.

Content analysis

We are now going to examine the recall patterns for each of the three text versions. Our discussion focuses on how the specific content and the interest-producing strategies affected recall of each version. Even though fourth graders were given shorter texts than the sixth graders, the patterns of their recall were less clear. Consequently, the following presentation concentrates on the older children's recall patterns, but for interested readers, the data for both grades are presented in Tables 4 and 5. In addition, in Appendix A we present the entire salient text version, which also includes the base text.

*Base text.* The introductory segment of 21 sentences, which dealt with inventors in general, what they are like, and what they have to do to be successful, was generally recalled poorly; the average sentence recall for the Grade 6 children was 23% immediately after the study period, and 17% after a week's delay.

If we look at the 21 sentences individually, only four ideas were relatively well recalled across grades and conditions. These were as follows: Sentence 1, which gives the definition of an inventor; Sentence 7, which expresses the high activity level of inventors; Sentences 15 and 16, which state what is essentially novel information for children—that to be an inventor one may not have to be an expert or a scientist to begin with—and Sentence 21, which introduces the information about the three famous inventors. Our strategies to produce interest through high activity level, character identification, and novelty did not result generally in high recall of the introductory segment.

The situation is quite different, however, when we look at the average recall of the three inventor episodes. The 11 propositions of the first episode, on Edison, were recalled on average by 47% of the sixth graders immediately after the study session, and by 39% after a week's delay. Details of Edison's life, such as his hard work, his many inventions, and his success in making a light bulb, a task at which many other people failed, were recalled exceptionally well. However, the high recall of these strongly motivated actions and details about his character did not generalize to the important sentences explaining the more scientific characteristics of Edison's invention. Whereas 62% of Grade 6 children recalled that Edison's success was due to having made a good filament (Sentence 31), only 29% of the children recalled what a filament was ("the little wire at the center of a light bulb that glows when it is turned on," Sentence 30). The corresponding figures for the delayed recall were 52% and 29%.

The second episode, on Morse and his invention of the telegraph, was recalled less well than the Edison episode. The 14 sentences were recalled on average by 33% of the sixth graders immediately and by 24% at delayed recall. Because of primacy and recency effects, one would expect the ideas of the middle episode to be recalled by fewer students than those of the first and last episodes. It may be of interest,

however, that overall recall of the Morse episode averaged 40% higher than overall recall of the introductory segment. As for recall of individual ideas, children focused on facts such as that "Morse invented the telegraph because he did not like how long it took to send people messages through the mail" (Sentence 40) and that his invention meant that "Instead of taking weeks to send a message across the country, now it could be done in minutes" (Sentence 46). We again found, however, that the high recall of these highly active, personally involving sentences did not generalize to the recall of other important and more scientific information, such as in the sentence "Morse knew that the only way to have a faster type of communication was to use electricity" (Sentence 43). Even though there were three sentences (43–45) that dealt with this aspect of Morse's invention, most of the Grade 6 children simply omitted any reference to the role of electricity in the creation of the telegraph.

The third and final episode, on John Spenser's invention of the thermostat, was recalled as well as the first segment dealing with Edison (on average, the propositions were recalled by 48% of the subjects at immediate and by 38% at delayed recall). Here we find the same pattern as in the first two episodes. The personally involving sentence "John Spenser invented something called a thermostat because of something that happened to him when he was 15 years old" (Sentence 51) was recalled by every one of the sixth graders immediately, and by 71% of them a week later. Compare this with the recall of the two sentences describing the more scientific aspects of the invention. The more abstract statement "A thermostat measures the temperature in your house" (Sentence 57) was recalled by 24% sixth graders on both the immediate and delayed measures, whereas the more concrete proposition "When the furnace is getting colder, the thermostat makes sure the furnace gets more fuel" (Sentence 58) was recalled by 67% of children on the immediate and 52% on the delayed measures. It is interesting to note that although both of these sentences were recalled by fewer students than the sentence about Spenser's personal experience, there is also a large difference between the recall of the two sentences. Again, the more generalized sentence dealing with the scientific function of the thermostat is recalled poorly, and the more specific, concrete proposition is recalled much better.

To sum up, our interest-producing strategies were successful in producing good recall only of base-text sentences that dealt with active, personally involving experiences of the inventors. More abstract sentences, which described, for example, the general characteristics of inventors and the scientific aspects of inventions, were poorly recalled in spite of our strategies.

*Salient text.* Recall that the salient version was a modification of the base text in which salient descriptive elaborations were inserted after many of the main points. What we will consider

here is how well these elaborations were recalled and their effect on the recall of the rest of the text, and especially on the recall of the main points they elaborated on.

Six elaborative sentences were added to the introductory segment. There were no observable differences in the recall of the 21 sentences common to both versions. That is, the 6 elaborative sentences did not significantly improve the recall of the important propositions, nor the overall recall of the segment. It may be noteworthy, however, that the 6 salient elaborations were recalled on average by 38% of the subjects (see Table 5), and 2 of these propositions, again having very concrete and specific details (about inventions such as refrigerators, stoves, chairs, and television), were recalled especially well: by 70% and 74% of the sixth graders in the immediate and by 57% and 43% in the delayed condition.

The recall pattern for the first episode also showed that most of our elaborations did not significantly affect the recall of important information. For example, we added 4 sentences that elaborated on Edison's attempts to make a better filament with different wires and ways of twisting them, in the hope that we could increase students' recall of the scientific definition of a filament. However, the recall of the definitional sentence ("The filament is the little wire at the center of a light bulb that glows when it is turned on," Sentence 30) was virtually the same for the salient text as for the base text.

One type of elaboration that did make a difference in the recall of important information was the direct addition of concrete, numerical details to important ideas. For example, when we changed Sentence 22 of the base text, "Thomas Edison became the most famous inventor of all time even though he left school when he was very young" to "Thomas Edison became the most famous inventor of all time even though he left school when he was only 6 years old" in our salient version, recall increased from 57% to 87% at immediate recall. This difference disappeared on the delayed measure. And when we changed Sentence 24, "He [Edison] built more inventions than anyone in history" was changed to "He built a total of 1,093 inventions, more than anyone in history," the facilitative effect of the concrete numerical detail was apparent in scores at both immediate and delayed recall. The average recall of the sentence increased dramatically, from 48% to 78% of subjects at immediate and from 38% to 61% at delayed recall. Thus, when the important sentence itself was elaborated by adding concrete numerical details, recall improved significantly.

In the Morse episode, the elaborative sentences, which were recalled highly—on average by 45% of the children—again failed to improve the recall of the important information. For example, the sentence "Morse knew the only way to have a faster type of communication was to use electricity" (Sentence 43), which was supported by three sentences in the base text, was

further elaborated in the salient version. However, recall was very poor: Only 9% of the children in this condition referred to electricity, a decrease from the base text.

When we look at the Spenser episode of the salient version, we find that again propositions of this episode were well recalled (by 43% of sixth graders in the immediate and by 40% in the delayed condition). Our salient elaborations were similarly well recalled overall. However, whereas recall of the concrete, personal activity of Spenser described in Sentence 56, "When Spenser grew up and became an engineer he built a small device made out of metal called a thermostat," increased by 80% at delayed recall (from 38% to 65%), we could not increase the recall of the scientific explanation of the thermostat. Recall of Sentence 57, "A thermostat measures the temperature in the furnace in your house," remained virtually unchanged (24% vs. 22%).

In summary, the salient elaborations tended to be well recalled. However, although they may increase the recall of some important sentences, these improvements are likely to be related to concrete, personal activities and unfortunately do not seem to carry over to more general, more abstract, and more scientific information.

*Resolution text.* In our third text version we manipulated the presentation order of the salient text version in order to induce a need for resolution on the part of the reader. In this analysis, we look only at the three manipulations made (one for each episode) and their effect on the recall of the corresponding important propositions. In Episode 1, concerning Edison's invention of a working light bulb, we began by asking "How did Edison make a better light bulb?" The corresponding questions in Episodes 2 and 3 concerned how the telegraph and the thermostat work. In none of the three episodes did the resolution strategy improve recall of information.

It should be noted that, as we reported above, Grade 6 children judged both the salient and the resolution texts to be more interesting than the base text. However, at least in the case of the resolution text, the increased subjective interest of sixth graders did not translate into any observable quantitative or qualitative differences in recall. These results suggest that although the resolution of some anomalous or surprising information in exposition may increase subjective interest ratings, at least with the method we used to implement it, the need for resolution did not result in increased learning of the text.

## *Conclusions*

Elementary school textbooks are written to interest and entertain their young readers as well as to inform them. However, as yet we know little about the effects of different types of interest-evoking rhetorical strategies on children's learning from and recall of expository prose.

Earlier we identified one predominant strategy used to produce interest: the insertion of attention-getting content in the form of narrative anecdotes or descriptive elaborations. It was found that the insertion of salient elaborations, when unsystematic (elaborating minor points as frequently as main ideas), is a strategy that may not facilitate recall at all and that may even interfere with the learning of important information. We concluded that there had to be other interest-producing strategies which were not apparent in the textbook materials we have reviewed.

The present study investigated the effect on students' recall of three interest-producing strategies. These strategies were inspired by current research on the influence of affective factors on discourse processing. It should be emphasized that although we feel this study is a novel attempt to develop strategies to evoke interest in young readers of exposition, there must be other strategies as yet not considered, or other ways of applying the strategies we selected here.

Our first strategy consisted of incorporating the four text attributes of high activity level, character identification, novelty, and life themes in composing an expository base text. The effect of this strategy was generally to increase recall above levels typically found for grade-school children's recall of science and social science expository text. We found that this strategy also produced less forgetting from immediate to delayed recall. These are welcome results, given the persistent difficulty children exhibit recalling exposition, and they allow us to be optimistic that school exposition constructed utilizing these attributes may facilitate learning. However, we must also caution that the learning of more abstract and scientific information is unlikely to be affected by such text attributes.

The second strategy, inserting salient elaborations after the main points of the base text, improved recall of the important information for the Grade 4 students at immediate recall and the Grade 6 students at delayed recall. A sentence-by-sentence analysis of the recall patterns showed, however, that the readers recalled much of the concrete and personally involving content associated with these insertions, but not the more general, scientific content. Together with the finding that there were no differences between the texts in recall of unimportant information, these results argue against a selective recall process through which inserted salient elaborations improve learning of significant information.

The third strategy, which consisted of manipulating the reader's "need-for-resolution," did not improve recall in any way. More research is needed concerning the implementation of this strategy with exposition; previous research has concentrated exclusively on story resolution.

These last two strategies were found to increase readers' subjective interest. It is obvious, however, that this heightened subjective interest

did not generally translate into improved recall for the important content. The lack of a connection between subjective interest ratings and learning of text alerts us to the need to consider in the future the precise nature of the cognitive operations involved.

Previous research showed that the current rhetorical method of producing interest does not necessarily facilitate, and may even inhibit, the recall of important information in exposition. The results of the present study suggest that there are more effective strategies for eliciting interest in young readers, and for improving overall recall of exposition. However, much research remains to be done in order to clarify how subjective interest can be used to make young readers attend to, recall, and learn the important content of exposition. The process of how facts become significant, and therefore of interest, to a reader is a process which may transcend particular texts. We are now looking at the role of global factors such as theme and topic in mediating text-based interest.

## REFERENCES


ALVOID, K.L. (1983). *A study of the relationship between signaling of organizational patterns in selected chapter-length American history text and recall of information by ninth graders.* Unpublished doctoral dissertation, Texas Woman's University, Denton, TX.

ANDERSON, R.C. (1982). Allocation of attention during reading. In A. Flammer & W. Kintsch (Eds.), *Discourse processing* (pp. 292-305). Amsterdam: North Holland.

ANDERSON, R.C., MASON, J., & SHIREY, L. (1984). The reading group: An experimental investigation of a labyrinth. *Reading Research Quarterly, 20,* 6-37.

ANDERSON, R.C., SHIREY, L., WILSON, P.T., & FIELDING, L.G. (1986). Interestingness of children's reading material. In R.E. Snow & M.J. Farr (Eds.), *Aptitude, learning and instruction: Vol. 3. Cognitive and affective process analyses* (pp. 287-299). Hillsdale, NJ: Erlbaum.

ASHER, S.R. (1979). Influence of topic interest on black children's and white children's reading comprehension. *Child Development, 50,* 686-690.

ASHER, S.R. (1980). Topic interest and children's reading comprehension. In R.J. Spiro, B.C. Bruce, & W.F. Brewer (Eds.), *Theoretical issues in reading comprehension* (pp. 525-534). Hillsdale, NJ: Erlbaum.

ASHER, S.R., HYMEL, S., & WIGFIELD, A. (1978). Influence of topic interest on children's reading comprehension. *Journal of Reading Behavior, 10,* 35-47.

BAIRD, W., & HIDI, S. (1984, April). *The effect of factual importance and interestingness on recall from naturally-occurring school texts.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

BAIRD, W., & HIDI, S. (1988). *The effect of informational saliency on the recall of important information contained in actual textbook expositions.* Manuscript under revision.

BREWER, W.F. (1983). Form, content, and affect in the theory of stories. *The Behavioral and Brain Sciences, 6,* 595-596.

BRITTON, B.K., & BLACK, J.B. (Eds.). (1985). *Understanding expository text.* Hillsdale, NJ: Erlbaum.

DE BEAUGRANDE, R. (1982). The story of grammars and the grammar of stories. *Journal of Pragmatics, 6,* 383-422.

ESTES, T.H., & VAUGHAN, J.L., JR. (1973). Reading interest and comprehension: Implications. *The Reading Teacher, 27,* 149-153.

GARNER, R. (in press). Skilled and less skilled readers' ability to distinguish important and unimportant information in expository text. In S.R. Yussen & M.C. Smith (Eds.), *Reading across the life span.* New York:

Springer-Verlag.

GARNER, R., GILLINGHAM, M.G., & WHITE, J. (1988). *Effects of 'seductive details' on macroprocessing and microprocessing in adults and children.* Manuscript in preparation.

HIDI, S., & BAIRD, W. (1983, November). *Types of information saliency in school texts and their effect on children's recall.* Paper presented at the National Reading Conference, Austin, TX.

HIDI, S., & BAIRD, W. (1986a). Interestingness—a neglected variable in discourse processing. *Cognitive Science, 10,* 179-194.

HIDI, S., & BAIRD, W. (1986b). What children remember: A study of school textbooks. *Orbit, 17,* 10-11.

HIDI, S., BAIRD, W., & HILDYARD, A. (1982). That's important, but is it interesting? Two factors in text processing. In A. Flammer & W. Kintsch (Eds.), *Discourse processing* (pp. 63-75). Amsterdam: North Holland.

HIDI, S., & MCLAREN, J. (1988). *The effect of topic and theme interestingness on children's school performance.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

IRAN-NEJAD, A. (1987). Cognitive and affective causes of interest and liking. *Journal of Educational Psychology, 79,* 120-130.

IRAN-NEJAD, A., CLORE, G.L., & VONDRUSKA, R.J. (1984). Affect: A functional perspective. *The Journal of Mind and Behavior, 5,* 173-210.

KINTSCH, W. (1980). Learning from text, levels of comprehension, or: Why anyone would read a story anyway. *Poetics, 9,* 87-98.

KRAPP, A., & SCHIEFELE, U. (1986). *The development of interests: Research programs in the Federal Republic of Germany.* Paper presented at the annual meeting of the American Educational Research Association, San Francisco.

KRAPP, A. (Chair). (1988, April). *Differences in student performance across subject areas as a function of interest.* Symposium conducted at the annual meeting of the American Educational Research Association, New Orleans.

MANDL, H., STEIN, N.L., & TRABASSO, T. (Eds.). (1984). *Learning and comprehension of text.* Hillsdale, NJ: Erlbaum.

MARTON, F., & SALJO, R. (1984). Approaches to learning. In F. Marton, D.J. Hounsell, & N.J. Entwistle (Eds.), *The experience of learning* (pp. 36-55). Edinburgh: Scottish Academic Press.

MOORE, A.D. (1969). *Inventions, discovery and creativity.* Garden City, NJ: Doubleday.

OTTO, W., & WHITE, S. (Eds.). (1982). *Reading expository material.* New York: Academic Press.

PARIS, S. (1988, April). *Fusing skill and will: The integration of cognitive and motivational psychology.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

PEARSON, P.D., GALLAGHER, M., GOUDVIS, A., & JOHNSTON, P. (1981). *What kinds of expository materials occur in elementary school children's textbooks?* Paper presented at the National Reading Conference, Dallas.

RENNINGER, K.A. (1988). *Effects of interest and noninterest on student performance with tasks of mathematical word problems and reading comprehension.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

RENNINGER, K.A., & WOZNIAK, R.H. (1985). Effect of interest on attentional shift, recognition, and recall in young children. *Developmental Psychology, 21,* 624-632.

SCHALLERT, D.L. (1984, April). *The demands of informative text.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

SCHANK, R.C. (1979). Interestingness: Controlling inferences. *Artificial Intelligence, 12,* 273-297.

SCHIEFELE, U. (Chair). (1988, April). *Content and interest as motivational factors in learning.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

SCHIEFELE, U., & KRAPP, A. (1988, April). *The impact of interest on qualitative and structural indicators of knowledge.* Paper presented at the annual meeting of the American Educational Research Association, New Or-

leans.

SMITH, L.C. (1985, April). *Recall of superordinate and subordinate concepts from science and social studies texts.* Paper presented at the annual meeting of the American Educational Research Association, Chicago.

STEIN, W. (1983). What's the point? *The Behavioral and Brain Sciences, 6,* 611.

VOSS, J.F. (1984). Learning and learning from text. In H. Mandl, N. Stein, & T. Trabasso (Eds.), *Learning and comprehension of text* (pp. 193-212). Hillsdale, NJ: Erlbaum.

WILENSKY, R. (1983). Story grammars versus story points. *The Behavioral and Brain Sciences, 6,* 579-623.

WINOGRAD, P., HARE, V.C., GARNER, R., ALEXANDER, P.A., & HAYNES, F. (1984, April). *When lookbacks fail.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

ZAJONC, R.B. (1980). Feeling and thinking: Preferences need no inferences. *American Psychologist, 35,* 151-175.

Footnote

This research was supported by the Ontario Ministry of Education, through a transfer grant to the Ontario Institute for Studies in Education. We gratefully acknowledge the assistance of Valerie Anderson, Jud Burtis, John McLaren, and Mary Ann Potter. We also thank David Moscoe, the Principal of Denlow Elementary School, and his staff and students for their participation.

[1]In our opinion Schank's "absolute interest" and Kintsch's "emotional interest" are very similar concepts.

Received July 15, 1986
Final revision received May 20, 1988
Accepted May 31, 1988



Heidi

20 0

# APPENDIX

*Salient text*

[1]An inventor is someone who makes something useful for people. Just think of all the useful things you have in your home. There is a refrigerator to keep your food cold, and a stove to cook it on. There are chairs to sit on, and a television to entertain you. And there are many more things in your home that are useful to you. [2]You are surrounded by machines and appliances that make your life comfortable and interesting. [3]At some time in the past each of these things did not exist. [4]Somebody had to discover them. [5]Somebody had to use their imagination to think of something that society would find useful. [6]We call this person an inventor.

[7]To be successful, an inventor has to have a strong interest in what he is doing, and he has to work hard. [8]History shows that many different kinds of people were inventors. [9]Each inventor has his own obstacle to overcome. [10]But they all had two important characteristics in common. [11]First, they became very interested in their invention. Sometimes they became so interested they would forget to go home to eat dinner. [12]They knew that they were making something important, something everyone could use. [13]Second, they worked very hard to improve their invention. Inventors work like busy bees, sometimes working all night long. [14]They knew they had to make machines that actually worked, or else nobody would use their invention.

[15]An inventor does not have to be an expert. [16]Many inventors were not scientists. [17]But they all had a lot of curiosity about the world. [18]They learned about science on their own. [19]And they were willing to experiment with machines and things. [20]If you experiment a lot, you may discover something important.

[21]Here are some facts about three famous inventors:

[22]Thomas Edison became the most famous inventor of all time even though he left school when he was only six years old. [23]He was always experimenting in his laboratory. [24]He built a total of 1,093 inventions, more than anyone in history.

[25]Edison was the first person to make a light bulb that actually worked. [26]At that time, people could only use candles and oil lamps to get light. [27]Edison knew that we needed a better source of light. [28]Other people had tried to make light bulbs but they didn't work very well. The light bulbs would either burn or blow up. [29]Edison knew that the problem was that these people had not made very good filaments. [30]A filament is the little wire at the centre of a light bulb that glows when it is turned on. Edison spent months and months trying to make a good filament. First he tried one type of wire and then another. He tried different ways of twisting the wire into a loop. He made hundreds of different types of filament. [31]One day he made a filament that wouldn't burn or blow up — it worked! [32]We use the same filament today in our light bulbs.

[33]Samuel Morse invented the telegraph even though he wasn't an expert in electricity. [34]Morse was not a scientist; he was a painter. [35]At first he didn't know anything about electricity. He spent years reading all the books he could find on electricity. [36]This way he learned as much as he could on his own. [37]Also, he asked many experts to help him. [38]Finally, Morse was successful. [39]He was the first person to send a message over a telegraph.

[40]Morse invented the telegraph because he didn't like how long it took to send people messages through the mail. [41]At that time people could communicate only by mail. Letters could only be carried on trains or by men riding on horses. [42]It took weeks for a letter to get to its destination. [43]Morse knew that the only way to have a faster type of communication was to use electricity. [44]He spent many years building a machine that would send messages over wires using electricity. [45]He finally made a machine that would work, and he called it a telegraph. A telegraph works by tapping a metal needle against a small metal plate. The tapping sounds travel through an electrical wire. A person at the other end of the wire can hear the tapping sounds. [46]Instead of taking weeks to send a message from Washington to Baltimore, now it could be done in a few minutes.

[47]John Spenser began to experiment making inventions even though he was only a teenager. [48]So even young people, who don't have enough experience to be experts, can invent something important. [49]When Spenser was young he had a lot of curiosity and imagination and often made little machines that worked. [50]When he grew up and became an engineer, he improved some of these machines so that everyone could use them.

[51]John Spenser invented something called a thermostat because of something that happened to him when he was 15 years old. [52]He was working summers in a lumber camp. [53]He had to put wood on the fire in a furnace whenever it was getting colder. [54]He listened to the sounds the furnace made when it was getting colder. But he didn't want to keep opening the furnace door to see if the fire was going out. He wondered whether there was a way of knowing when the fire inside was getting colder without having to open the door. [55]He noticed that the door made a loud "popping" sound when it was getting colder. So he knew that he could just sit around until he heard the door "pop." Then he would open the furnace door and put more fuel on the fire to make it hotter. [56]When Spenser grew up and became an engineer he built a small device made out of metal called a thermostat. [57]A thermostat measures the temperature in your home. [58]When the furnace is getting colder, the thermostat makes sure the furnace gets more fuel.

---

*Note.* The numbers refer to only the common sentences in each version. Sentences without numbers were additions to the salient text.

Table 1 Mean proportion recalled of all common information

| Text | Immediate recall | Delayed recall |
|---|---|---|
| **Grade 4** | | |
| "Inventors" | | |
| Base text | .25 | .19 |
| Salient text | .25 | .17 |
| Resolution text | .20 | .16 |
| Overall | .23 | .17 |
| Standard texts | | |
| Overall | .18 | .10 |
| **Grade 6** | | |
| "Inventors" | | |
| Base text | .35 | .27 |
| Salient text | .33 | .27 |
| Resolution text | .30 | .24 |
| Overall | .33 | .26 |
| Standard texts | | |
| Overall | .24 | .15 |

Table 2 Mean proportion recalled of common information rated as unimportant

| Text | Immediate recall | Delayed recall |
|---|---|---|
| **Grade 4** | | |
| Base text | .21 | .15 |
| Salient text | .18 | .12 |
| Resolution text | .16 | .11 |
| **Grade 6** | | |
| Base text | .31 | .24 |
| Salient text | .29 | .21 |
| Resolution text | .25 | .20 |

Table 3 Mean proportion recalled of common information rated as important

| Text | Immediate recall | Delayed recall |
|---|---|---|
| **Grade 4** | | |
| Base text | .33 | .28 |
| Salient text | .40 | .28 |
| Resolution text | .31 | .27 |
| **Grade 6** | | |
| Base text | .44 | .34 |
| Salient text | .44 | .39 |
| Resolution text | .41 | .31 |



Hidi/Bo...

20 of 24

Table 4 Proportion of subjects recalling each sentence

| Sentence | Immediate recall | | | Delayed recall | | |
|---|---|---|---|---|---|---|
| | Base | Salient | Resol. | Base | Salient | Resol. |
| **Grade 4** | | | | | | |
| **Introduction** | | | | | | |
| 1* | .47 | .43 | .33 | .33 | .43 | .33 |
| 2 | .27 | .21 | .13 | .20 | .07 | .07 |
| 3 | .27 | .14 | .07 | .20 | .00 | .13 |
| 4 | .13 | .07 | .20 | .13 | .00 | .13 |
| 5 | .13 | .00 | .13 | .07 | .00 | .00 |
| 6 | .07 | .00 | .07 | .00 | .00 | .13 |
| 7* | .00 | .07 | .13 | .00 | .14 | .00 |
| 8 | .07 | .00 | .00 | .00 | .07 | .00 |
| 9 | .00 | .07 | .00 | .00 | .07 | .07 |
| 10 | .00 | .07 | .07 | .00 | .07 | .00 |
| 11 | .20 | .07 | .07 | .00 | .00 | .07 |
| 12 | .13 | .00 | .13 | .00 | .07 | .07 |
| 13 | .20 | .14 | .20 | .07 | .07 | .00 |
| 14* | .00 | .07 | .00 | .00 | .00 | .13 |
| 15* | .80 | .43 | .27 | .53 | .14 | .27 |
| 16 | .33 | .14 | .47 | .20 | .14 | .13 |
| 17 | .13 | .00 | .13 | .07 | .00 | .00 |
| 18 | .07 | .07 | .00 | .07 | .00 | .00 |
| 19 | .07 | .00 | .00 | .00 | .00 | .00 |
| 20* | .07 | .14 | .00 | .07 | .00 | .07 |
| 21 | .33 | .21 | .27 | .33 | .14 | .13 |
| *M* | .18 | .11 | .13 | .11 | .07 | .08 |
| **Edison** | | | | | | |
| 22* | .27 | .71 | .40 | .33 | .57 | .40 |
| 23 | .00 | .14 | .00 | .07 | .14 | .07 |
| 24* | .47 | .57 | .40 | .27 | .43 | .40 |
| 25* | .80 | .86 | .73 | .80 | .57 | .80 |
| 26 | .27 | .07 | .13 | .13 | .14 | .13 |
| 27 | .13 | .14 | .00 | .07 | .14 | .07 |
| 28 | .60 | .57 | .33 | .47 | .36 | .33 |
| 29 | .33 | .29 | .13 | .33 | .07 | .13 |
| 30 | .33 | .14 | .27 | .27 | .07 | .20 |
| 31* | .27 | .50 | .40 | .20 | .29 | .33 |
| 32 | .00 | .29 | .13 | .00 | .14 | .07 |
| *M* | .32 | .39 | .27 | .27 | .27 | .27 |
| **Spenser** | | | | | | |
| 33* | .20 | .50 | .13 | .00 | .36 | .07 |
| 34* | .20 | .07 | .27 | .20 | .14 | .20 |
| 35 | .00 | .14 | .00 | .13 | .14 | .00 |
| 36 | .13 | .21 | .07 | .00 | .14 | .00 |
| 37* | .80 | .86 | .80 | .73 | .50 | .60 |
| 38 | .60 | .43 | .47 | .33 | .29 | .40 |
| 39 | .40 | .29 | .47 | .53 | .29 | .40 |
| 40 | .53 | .43 | .40 | .27 | .57 | .27 |
| 41 | .40 | .29 | .20 | .13 | .21 | .20 |
| 42 | .20 | .36 | .20 | .40 | .29 | .20 |
| 43* | .00 | .14 | .13 | .20 | .00 | .07 |
| 44 | .20 | .21 | .20 | .13 | .14 | .07 |
| *M* | .31 | .33 | .28 | .26 | .26 | .21 |
| **Grade 6** | | | | | | |
| **Introduction** | | | | | | |
| 1* | .62 | .57 | .50 | .38 | .43 | .36 |
| 2 | .33 | .17 | .32 | .29 | .13 | .14 |
| 3 | .29 | .48 | .27 | .29 | .30 | .09 |
| 4 | .33 | .52 | .18 | .24 | .35 | .27 |
| 5 | .14 | .17 | .09 | .05 | .00 | .00 |
| 6 | .10 | .26 | .14 | .05 | .09 | .09 |
| 7* | .48 | .43 | .27 | .29 | .35 | .14 |
| 8 | .05 | .04 | .09 | .00 | .00 | .05 |
| 9 | .10 | .04 | .09 | .10 | .00 | .00 |
| 10 | .24 | .30 | .27 | .10 | .09 | .18 |
| 11 | .19 | .17 | .32 | .14 | .04 | .09 |
| 12 | .10 | .13 | .00 | .14 | .00 | .00 |
| 13 | .24 | .22 | .45 | .19 | .13 | .23 |
| 14* | .24 | .04 | .23 | .10 | .04 | .00 |
| 15* | .33 | .26 | .27 | .24 | .30 | .14 |
| 16 | .48 | .70 | .45 | .38 | .52 | .23 |
| 17 | .14 | .22 | .32 | .14 | .13 | .05 |
| 18 | .00 | .13 | .05 | .05 | .04 | .00 |

Heidi/Edward

23 of 24

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 19 | .10 | .00 | .05 | .00 | .00 | .00 |
| | 20* | .00 | .04 | .05 | .10 | .04 | .05 |
| | 21 | .38 | .39 | .59 | .33 | .30 | .41 |
| | *M* | .23 | .25 | .24 | .17 | .16 | .12 |
| Edison | | | | | | | |
| | 22* | .57 | .87 | .45 | .48 | .48 | .32 |
| | 23 | .14 | .09 | .05 | .05 | .09 | .05 |
| | 24* | .48 | .78 | .68 | .38 | .61 | .45 |
| | 25* | .71 | .70 | .73 | .86 | .70 | .91 |
| | 26 | .48 | .35 | .18 | .29 | .04 | .00 |
| | 27 | .14 | .17 | .09 | .05 | .04 | .05 |
| | 28 | .67 | .39 | .45 | .62 | .52 | .82 |
| | 29 | .76 | .52 | .36 | .71 | .35 | .50 |
| | 30 | .29 | .26 | .41 | .29 | .13 | .23 |
| | 31* | .62 | .70 | .73 | .52 | .70 | .77 |
| | 32 | .24 | .39 | .32 | .05 | .35 | .36 |
| | *M* | .47 | .47 | .41 | .39 | .36 | .41 |
| Morse | | | | | | | |
| | 33* | .53 | .48 | .32 | .48 | .61 | .18 |
| | 34 | .52 | .61 | .45 | .33 | .43 | .32 |
| | 35 | .20 | .09 | .23 | .24 | .04 | .14 |
| | 36 | .33 | .09 | .00 | .19 | .00 | .05 |
| | 37 | .33 | .26 | .36 | .24 | .13 | .18 |
| | 38 | .19 | .04 | .09 | .00 | .04 | .00 |
| | 39* | .05 | .04 | .09 | .05 | .04 | .00 |
| | 40* | .86 | .70 | .82 | .76 | .57 | .91 |
| | 41 | .14 | .13 | .05 | .05 | .17 | .05 |
| | 42 | .19 | .17 | .23 | .24 | .22 | .18 |
| | 43* | .19 | .09 | .27 | .10 | .26 | .14 |
| | 44 | .29 | .04 | .05 | .10 | .04 | .14 |
| | 45 | .14 | .22 | .09 | .29 | .22 | .00 |
| | 46* | .57 | .57 | .36 | .38 | .61 | .27 |
| | *M* | .33 | .25 | .24 | .24 | .24 | .18 |
| Spenser | | | | | | | |
| | 47* | .19 | .35 | .05 | .14 | .17 | .09 |
| | 48* | .19 | .22 | .09 | .05 | .09 | .09 |
| | 49 | .24 | .17 | .05 | .19 | .17 | .00 |
| | 50 | .05 | .13 | .14 | .10 | .04 | .41 |
| | 51* | 1.00 | .74 | .91 | .71 | .83 | .68 |
| | 52 | .67 | .57 | .55 | .62 | .61 | .50 |
| | 53 | .67 | .61 | .45 | .52 | .65 | .59 |
| | 54 | .67 | .70 | .77 | .62 | .70 | .68 |
| | 55 | .57 | .35 | .27 | .43 | .39 | .36 |
| | 56 | .67 | .65 | .45 | .38 | .61 | .18 |
| | 57* | .24 | .26 | .55 | .24 | .22 | .27 |
| | 58 | .67 | .48 | .32 | .52 | .35 | .36 |
| | *M* | .48 | .43 | .38 | .38 | .40 | .35 |

*Sentences rated as important.

Table 5 Mean proportion recalled of sentences added to the salient and resolution texts

| | Salient text | | Resolution text | |
|---|---|---|---|---|
| Paragraph | Immediate | Delayed | Immediate | Delayed |
| | | Grade 4 | | |
| Introduction | .26 | .19 | .22 | .13 |
| Edison | .20 | .14 | .18 | .14 |
| Spenser | .36 | .26 | .10 | .13 |
| | | Grade 6 | | |
| Introduction | .38 | .22 | .38 | .17 |
| Edison | .27 | .28 | .18 | .18 |
| Morse | .45 | .32 | .43 | .32 |
| Spenser | .42 | .36 | .30 | .28 |

Heidi Eaud

24 of 24