Effects of Expository-Text Structures on Text-Based Interest, Comprehension, and Memory

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ABSTRACT

The purpose of the study was to examine the effects of expository-text structures on text interest, comprehension, and memory. Two strategies of structuring expository texts were used: contextualizing and questioning strategies. Students in the sixth and seventh grades participated in two experiments. In the first experiment, a within-subject design was used to investigate the differences in text interest among the different forms of texts. In the second experiment, a between-group design was used to investigate the strategy effects on text comprehension and memory as well as interest. The results of the first experiment showed that expository texts constructed with the two strategies showed significantly higher levels of text interest than the base text. In contrast, the second experiment showed no such significant differences. However, scores on the memory tests and text comprehension were significantly higher in both of the base and questioning-strategy texts than the contextualizing text. The results of the study provided practical implications on how to compose expository texts that are commonly used in schools to enhance students' motivation and learning outcomes.

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I. Introduction

Despite the relative importance of expository texts in schools, research on expository texts has not been conducted as much as narrative ones (Gunn, 2007). Narrative texts are "stories written to entertain, whereas expository texts are "materials written to communicate information to help readers learn something new" (Saenz & Fuchs, 2002). Generally, for most students, reading expository texts is more challenging than reading narrative ones (McCormick, 2007; Berkeley, Mastropieri, & Scruggs, 2011) because the reading processes of expository- and narrative-texts differ in respect to the process of integration of text contents with students' prior knowledge (Wolfe & Mienko, 2007). Increasingly, recent research has focused on strategies for improving students' interest in and comprehension of expository texts, and it has shown that some strategies work effectively (Furtado & Johnson, 2010; Gaddy, Bakken, & Fulk, 2008; Gajria, Jitendra, Sood, & Sacks, 2007; Berkeley, Mastropieri, & Scruggs, 2011; Berkeley, Marshak, Mastropieri, & Scruggs, 2010; McCrudden, Schraw, & Lehman, 2009). The purpose of the study was to examine the effectiveness of strategies that can be used to improve text-based interest and students' comprehension of expository texts.

An individual's interest in text contents influences not only his or her motivation to read the text, but also how well he or she comprehends and remembers it (Hidi, 1990; Krapp, Hidi, & Renninger, 1992; Schiefele, 1992). Furthermore, interest brings about active learning by encouraging learners to be more actively engaged. At the same time, it affects learning outcomes by making learning processes more meaningful to the learner.

There have been two different approaches in investigating the roles of interest in learning (Hidi, 1990; Hidi & Anderson, 1992; Hidi & Baird, 1988; Krapp, 2002; Renninger, 2000). One approach regards the concept of individual interest as a relatively enduring predisposition to attend to and re-engages with objects or ideas. The other focuses on situational interest, which is elicited by external objects or environmental features.

It has been maintained, however, that these two types of interest are not dichotomous phenomena but rather, the both are expected to interact with each other and influence each other's development. Situational interest is reported to evolve into individual interest (Hidi, 2006; Hidi & Renninger, 2006; Krapp, 2002). Hidi and Renninger (2006) recently proposed the four-phase model of interest development, which shows interactive relations between individual and situational interests.

Although a number of studies reported that individual interest plays an important role in enhancing learning, it is difficult for teachers to manage it in an actual classroom setting. Because every student has his or her own unique interest, it is not easy to reflect upon the differences in all aspects of learning in the classroom (Hidi, 1990).

On the other hand, situational interest can be controlled more easily in educational settings. The interest that is elicited from text features or learning activities is less affected by individual differences. Therefore, it is possible to evoke students' interest by manipulating learning stimuli or activities (Hidi, 1990). Text-based interest is a type of situational interest that can be triggered by text features.

Several studies proved that situational interest contributes to increasing learning outcomes (Hidi, 1990; Hidi & Baird, 1988; Krapp, 2002; Renninger, 2000). It helps to improve the quality of learning by enabling readers to focus more on the text (McDaniel, Waddill, Finstad, & Bourg, 2000) and to integrate new information with learners' prior knowledge (Kintsch, 1980). In Schraw (1997)'s study, situational interest was related to not only the overall interpretation of text contents but also the elaboration of them. Thus, situational interest helps learners to engage more deeply in processing information while reading, which subsequently increases the level of learning.

Regarding situational interest, it has been suggested by researchers there are different types of text-based interest (Harp & Mayer, 1997; Hidi, 2006). The well-known classification of text-based interest is cognitive and emotional interest. Cognitive interest refers to readers' interest caused by having a more cohesive, structural understanding of the text, whereas emotional interest refers to the interest caused by increased emotional arousal from stimulating illustrations, incidents, or cases (Kintsch, 1980). Hidi (2006) suggested that a separation of emotional interest from cognitive interest may be too artificial since it is more likely that both surely interact continuously during the development of interest.

However, through a series of studies on the effects of cognitive and emotional interest on text comprehension and memory, Mayer and his colleagues showed that the two types of text-based interests could indeed result in qualitatively different text processings (Mayer, 2001). In their studies, texts that were aimed at increasing cognitive interest through enhancing coherence promoted positive outcomes in text comprehension. On the other hand, texts aimed at increasing emotional interest through "seduction" failed to improve understanding. Thus, Mayer and his colleagues have shown that although text-based interest could have positive effects on text memory and comprehension, it could also induce the deterioration of learning if the interest was elicited by inserting "seductive details," which are not directly linked to important information of the text (Lehman, Schraw, McCrudden, & Hartley, 2007).

The factors affecting text-based interest were also extensively examined in several studies. According to Kintsch (1980), text-based interest is determined by readers' background knowledge, uncertainty of the story, and postdictability. That is, interest can be triggered when readers have appropriate background knowledge (readers' background knowledge), the story has a proper level of uncertainty or surprises (uncertainty of the

story), and new information is meaningfully integrated into the other parts of the text so that the uncertainty can be solved by reading the text (postdictability). Any of these interest-inducing factors can act as a more important cause than others depending on the text type.

Anderson, Shirey, Wilson, and Fielding (1987) also suggested four text characteristics that increase the degree of text-based interest. According to these researchers, students tend to be more interested in novel or extraordinary contents (novelty), characters they can easily identify with (character identification), what is important to them (life theme), and intense actions and feelings (activity level). Schraw, Bruning, and Svoboda (1995) also developed the multi-component model of situational interest, and they identified coherence, ease of comprehension, engagement, vividness, background knowledge, and emotiveness as factors that increase text-based interest.

The factors suggested by previous studies can be classified into two types: structural and content-bound factors (Hidi, 1990). Structural factors are related to organization or sequencing of text contents to increase text-based interest, which includes such factors as unexpected events, novelty, and surprises. On the other hand, content-bound factors indicate those directly associated with text contents themselves. These factors include life themes, activity level, and universally interesting concepts (e.g., violence, sex, entertainment, etc.).

In this study, the effects of differently structured expository texts on text-based interest, comprehension, and memory were examined. Based on the previous research on text-based interest, two text-structuring strategies were developed for an expository text, which were intended to evoke text-based interest and enhance readers' comprehension and memory of the contents. They were contextualizing and pre-questioning strategies.

Contextualizing strategy elicits emotional interest by providing a situation that readers can relate to or identify with before the main text is presented. Such a strategy can be expected to induce readers' interest by making the text more relevant to them. Increased relevance can also be expected to help readers have a better understanding of the text. Relevance is reported to affect the allocation of learners' cognitive resources and strategy use, and allow readers to access relevant background knowledge more easily (McCrudden & Schraw, 2007). Thus, readers would have better memory and understanding of the text when they consider the contents more relevant.

Pre-questioning strategy, on the other hand, evokes cognitive interest by presenting a multiple-choice question that is related to the text before the main text is given, and apply the use of structural factors. This type of strategy can be used to trigger readers' interest by arousing curiosity. This is closely related to the "Elaborative Interrogation," which has been extensively studied in reading research. Elaborative interrogation is reported to make new information more meaningful to readers by allowing readers to create more

connections to their background knowledge, thus improving their memory and understanding (Ozgungor & Guthrie, 2004; Smith, 2002). According to the previous studies that examined the effects of elaborative interrogation on text learning, the process of answering "why" helps readers remember the information of the texts which relates to the questions better by facilitating active reading (Seifert, 1994; Wood, Pressely, & Winne, 1990).

Recently, Gunn (2007) showed that providing explicit directions for students to generate critical questions helped them to process expository texts more actively. Also, Berkeley, Marshak, Mastropieri, and Scruggs (2010) showed that the use of monitoring sheet on self-questioning strategy was helpful for learners with learning disabilities to comprehend expository texts.

While many studies confirmed the effectiveness of elaboration on memory, some studies reported that elaboration could be ineffectual or even detrimental to learning in certain conditions such as when elaborations are author-provided and readers do not have proper background knowledge (Reder, Charney, & Morgan, 1986; Willoughby, Wood, & Khan, 1994; Woloshyn, Pressley, & Schneider, 1992). And when readers have a limited amount of study time to learn facts, they might learn better without elaborations because details can interfere with the extraction of the main ideas by taking away studying time for main points (Reder & Anderson, 1980). Therefore, if provided details are not relevant to the main ideas, they can have negative effects on learning.

In this study, two experiments were conducted to investigate the effectiveness of these two strategies. The first experiment was designed to investigate the effects of the two strategies on text-based interest using the within-subject research design. The subjects were given three different types of texts on the same topic and were asked to rate their perceived interest after reading the materials.

When variations of the same construct or object are to be compared, researchers in the field of imagery effects recommend the within-subject rather than the between-group research design in order to sensitively detect actual differences among variations (Anderson, 2000). In studies on the effects of imagery on memory, when students were presented with both bizarre and plain images of objects (i.e., within-subject design), they remembered objects presented with bizarre images more than those with plain images. On the other hand, when bizarre images of objects were presented to one group and plain images to another group (i.e., between-group design), the bizarreness effect of images on memory disappeared (McDaniel & Einstein, 1986).

However, it is hard to tell the effects of different text structures of the same content on comprehension and memory using the within-subject research design. The second experiment was, therefore, carried out by using the between-group design to examine the effects of the strategies on text comprehension and memory. Each student read one of the

same strategy applied texts on different topics and was asked to respond to the questions on comprehension and memory.

Considering the fact that expository texts make up a large proportion of learning materials used in schools, research on the expository-text structuring strategies aimed at increasing text-based interest as well as improving learning outcomes is expected to provide practical implications for how to improve our instructional practices in school.

II. Experiment 1

A. Method

1. Participants

The participants were 88 students in grade 6 from an elementary school located in a metropolitan area in South Korea. Forty-three (48.8%) of the participants were male and 45 (51.2%) were female. Most students came from families with middle-class socio-economic status. The overall academic achievement level of the participating school was around the national average as compared with other elementary schools.

2. Materials

The within-subject research design was used to examine the differences in text-based interest among the three types of texts used in the study: base, contextualized, and pre-questioned texts. Three topics used to construct the texts in the experiment were "What make people's faces flushed after they drink?" "Why does forgetting occur?" and "What happens if you jump inside a falling elevator?" The topics were selected from science books because they were good representatives of expository texts. For each topic, three different types of texts were constructed.

The base texts of the three topics were obtained by modifying original texts from children's science magazine articles to have cohesive structures for a clear explanation of each topic. Pilot tests were conducted with another group of sixth graders to check readability; the results showed that the students had no difficulties comprehending the base texts. The number of words included in the base texts was 104 for a "flushed face" text, 125 for a "forgetting" text, and 129 for a "falling elevator" text.

Two strategies were applied to the base texts: contextualizing and pre-questioning strategies. By applying these strategies, two additional versions of each text were subsequently constructed: contextualized- and pre-questioned texts (see Appendixes for

examples of the different versions of the text).

Using the contextualizing strategy, an everyday life situation was presented preceding the base text. For instance, before the flushed-face text, a situation was introduced where a child gets curious about the reason why wine made only his father's face flushed when his father was having dinner with his friends. The number of words included in the base texts was 167 for a "flushed face" text, 193 for a "forgetting" text, and 183 for a "falling elevator" text.

The pre-questioning strategy was to present a question with multiple choices incompatible with each other and to make readers think about which would be a correct answer before reading the base text in order to trigger readers' cognitive conflict. For example, before giving the flushed-face text, the following question was asked, "Why do you think some people's faces get flushed after drinking alcohol?" Then the following four choices were provided to readers: (a) "Because people are in a bad mood when they drink alcohol," (b) "Because alcoholic beverages promote blood circulation," (c) "Because the toxic substance in alcoholic beverages spreads throughout the body," and (d) "Because alcoholic beverages heat up our bodies and then our faces, too." The choices were constructed based on most common responses of the students who did not participate in the experiment. Each choice was selected to be attractive by choosing the choices incompatible with each other and possibly causing cognitive conflicts to readers. The number of words included in the base texts was 149 for a "flushed face" text, 182 for a "forgetting" text, and 201 for a "falling elevator" text.

3. Procedure

The participants were randomly divided into three groups. Each group was given three versions of texts on one of the three topics. That is, 30 students (34.9%) read three different versions of "flushed-face" texts, 29 students (33.7%) were given three versions of "forgetting" texts, and 27 students (31.4%) read the three different types of "falling elevator" texts.

After reading each version of the texts, they were asked to rate the degree of their perceived interest in each text version (i.e., base, contextualized, and pre-questioned texts) on the 5-point Likert scale.

To control for the effect of text-presentation order, a completely counterbalanced design was used in the study. The students were randomly divided into six groups, and each group were assigned one of six different orders of the three texts, which were "base, contextualized, and pre-questioned texts," "base, pre-questioned, and contextualized texts," "contextualized, pre-questioned, and base texts," "contextualized, base, and pre-

questioned texts," "pre-questioned, base, and contextualized texts," and "pre-questioned, contextualized, and base texts,".

B. Results

The means and standard deviations of the text-interest ratings are provided in Table 1. To examine the differences in text-based interest among the texts, one-way ANOVA with repeated measures was conducted. The assumptions of the repeated measures ANOVA (i.e., equality of variances, normality of data distribution, and sphericity of repeated measures) (Hair, Black, Babin, & Anderson, 2010) were checked and met in the current data analysis.

<Table 1> Means and Standard Deviations of Text-Based Interest in the Within-Subject Design

	BT		CT		QT		
	M	*SD*	*M*	*SD*	*M*	*SD*	*N*
Interest	3.05	1.07	3.59	1.17	3.52	1.09	86

Note. BT = base text; CT = contextualized text; QT = pre-questioned text.

There was a statistically significant overall main effect of the strategies on text-based interest (Wilks' λ (2, 84) = .89, p < .01, η^2 = .14). The results showed that the contextualized text was rated the highest, the pre-questioned text was rated the second, and the base text was rated the lowest. For further analyses, the Bonferroni method was used as a post-hoc technique. The differences were statistically significant between the contextualized and base texts and between the pre-questioned and base texts at the significant level of .01. There, however, was no statistically significant difference between the contextualized and pre-questioned texts. In sum, the results suggested that both the contextualizing and pre-questioning strategies could enhance students' text-based interest in expository texts.

III. Experiment 2

A. Method

1. Participants

The participants in the second experiment were also 87 sixth graders from another

middle-class suburban elementary school located in a metropolitan area in South Korea. Among the participants, 43 (49.4%) were male and 44 (50.6%) were female. The overall academic achievement level of the participating school was around the national average as compared with other elementary schools, almost identical to the students of the school participating in the first experiment.

2. Materials

The same texts used in the first experiment were also used in the second experiment. The three different types of texts on the three different topics were used as well.

3. Procedure

In the second experiment, the between-group research design was applied, and the participants were randomly given one of the three text versions: base, contextualized, and pre-questioned texts. The number of students assigned to each text version group was 33 (37.9%) for the base text, 26 (29.9%) for the contextualized text, and 28 (32.2%) for the pre-questioned text.

Before the participants read the texts, their prior knowledge of the texts and working memory capacities were assessed. A working memory test used in this study was developed for elementary school students based on the reading span test developed by Daneman and Carpenter (1980). Students were required to read a series of sentences and recall the last word of each sentence. The working memory test consisted of 15 items which contained three sets of two sentences, seven sets of three sentences, and five sets of four sentences. Students were required to answer a true or false question for each of the sentences in order to make sure that they read all the sentences. The number of correctly recalled words was counted for their working memory scores only when they answered each of the true or false questions correctly as suggested by Daneman and Carpenter (1980).

The prior knowledge test was composed of six true-or-false questions for each text topic. The questions assessed the students' knowledge of the basic concepts of each text. Example items for each topic are as follows: 1) "If our blood vessels are extended, our face will turn red." (for the text of *"What makes people's faces flushed after they drink?"*), 2) "A cell is the smallest part of a human body that is able to function." (for the text of *"Why does forgetting occur?"*), 3) "If one's speed is 80km/h, that means it can move 80,000m in an hour." (for the text of *"What happens if you jump inside a falling elevator?"*). Students were asked to respond to each item by choosing one of three choices – "true," "false," or "don't know." Before the test, they were told that they would

get +1 point for each correct answer, -1 for each wrong answer, and 0 point if they chose "don't know" to minimize the possibility of random guessing.

After the prior knowledge test, the participants were instructed to read the texts carefully and were informed that they would be asked to remember what they had read. In the present study, we informed the participants of only the memory test administered right after reading the texts because it was closer to a setting of learning in school. The comprehension test on the texts they read was composed of eight true-false items that assessed the readers' literal and inferential understanding of the texts. Example items for each topic are as follows: 1) "The alcohol which is absorbed in our body is dissolved in our stomachs." (for the text of *"What makes people's faces flushed after they drink?"*), 2) "The number of neurons is decreased as people get older." (for the text of *"Why does forgetting occur?"*), 3) "If you were up in the air when the elevator hits the ground, you would not be hurt." (for the text of *"What happens if you jump inside a falling elevator?"*). The way of answering the comprehension test was the same as that of the prior knowledge test.

Finally, a week after their initial reading of the texts, without prior notification, the students were required to take two delayed memory tests: a free recall test and a cloze test in order. In the free recall test, the students were asked to write down all the concepts in the texts they could remember. Among all the concepts they recalled, only the main concepts included in the base text were counted and the proportions of the recalled concepts out of all the main concepts provided were calculated for data analyses.

A cloze test was administered as a recognition test in the study. In the cloze test, main sentences in the texts were provided with some blanks. Students were asked to select one of four choices that could fill in the blank. For example, for the blank in the sentence, "The alcohol that is absorbed in our bodies moves to the (   ) and gets dissolved," the students were asked to select one of the following choices: 1) stomach, 2) intestines, 3) liver, and 4) gallbladder. The cloze test consisted of 8 to 9 items for each text, and the number of correct choices was counted for analysis.

B. Results

The measures of working memory and prior knowledge were considered covariates in the study because they could influence the outcomes of text comprehension and memory. The statistical tests, by using the Analysis of Variance (ANOVA) method, were conducted to examine whether there were group differences in the measures. The results showed that there were no statistically significant score differences among the three groups in the working memory ($F_{(2, 1)} = 2.37$, $p > .05$) and prior knowledge ($F_{(2, 1)} = .35$, $p > .05$) measures. Therefore, subsequent analyses to examine the group

differences in the comprehension and memory of the texts the students read were conducted without these covariates in the equations.

The means and standard deviations of text comprehension and memory tests are provided in Table 2. To examine the differences in the comprehension and memory measures among the different types of texts, the Multivariate Analysis of Variance (MANOVA) method was used because there was inter-dependency among the dependent measures. The assumptions of MANOVA (i.e., equality of variance and covariances, multivariate normality, and linearity of the dependent variables) (Hair, Black, Babin, & Anderson, 2010) were checked and met in the current analysis of the data.

<Table 2> Means and Standard Deviations of Text Comprehension and Memory

Measures	BT ($n = 33$)		CT ($n = 26$)		QT ($n = 28$)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Comprehension	5.96	.96	5.44	.91	5.95	.76
Recognition	7.66	.94	6.82	1.15	7.36	.86
Recall	.43	.07	.33	.11	.44	.12

Note. BT = base text; CT = contextualized text; QT = pre-questioned text.

The results of the analysis are presented in Table 3. The results showed that there was a statistically significant overall difference among the groups in the text comprehension and memory (Wilks' λ= .70, $p < .01$). The follow-up results, which were obtained by using the univariate tests, showed that significant differences were found in the measures of comprehension ($F (2, 82) = 3.20$, $p < .05$, $\eta^2 = .07$), recognition ($F (2, 82) = 5.77$, $p < .01$, $\eta^2 = .12$), and recall ($F (2, 82) = 9.03$, $p < .01$, $\eta^2 = .18$). The results of post-hoc analyses by the Tukey's HSD showed that the base text showed significantly higher scores in all the measures of comprehension, recognition, and recall than did the contextualized text. An additional significant difference was found between the pre-questioned and contextualized texts where the pre-questioned text showed higher recall on the text contents. The outcomes of the pre-questioned text, however, did not differ from those of the base text in the study.

<Table 3> Multivariate Analysis of Variance on the Text Comprehension and Memory Measures

Measures	Wilks' Λ	Univariate F	*df*	η^2
Comprehension		3.20*	2, 82	.07
Recognition	.70**	5.77**	2, 82	.12
Recall		9.03**	2, 82	.18

* $p < .05$. ** $p < .01$.

IV. Discussion

The effects of the text-structuring strategies on text-based interest, comprehension, and memory were examined in the study by using the within-subject and between-group research designs. The strategies to increase text-based interest, comprehension, and memory in the study were the contextualizing and pre-questioning methods.

Regarding text-based interest, the base text was rated significantly lower than the other two texts that the contextualizing and pre-questioning strategies were applied to. The contextualized text was rated as the most interesting among the three text versions in the study.

Regarding text comprehension and memory, the results of the study were different from what were expected. The base-text condition showed significantly higher outcomes in the measures of comprehension, recognition, and recall than the contextualized-text condition. The pre-questioned-text condition did not show significant differences in the measures of comprehension and recognition when compared to other two conditions but showed significantly higher outcomes in the recall measure than the contextualized-text condition.

These results suggest that although the text-structuring strategies can be effective in increasing readers' interest in expository texts, the increased interest might not necessarily be linked to increased comprehension or memory of the text contents. The results might be attributed to two factors: (1) the length of the texts used in the study and (2) the effects of seductive details on text comprehension and memory (Lehman, Schraw, McCrudden, & Hartley, 2007).

First, the texts used in the study were relatively short with less than 200 words on average, and they explained the phenomena in a very cohesive way. Therefore, the base text allowed readers to focus more on the main contents of the text, which led to higher levels of performances in the comprehension and memory tasks (Fletcher & Bloom, 1988).

Second, the contextualized text showed the worst performance in the study. Because the contextualized text provided familiar situations for the readers, it was expected that the readers would consider the contents more relevant to themselves and process the text more deeply; which would eventually lead to better outcomes in comprehension and memory (McCrudden & Schraw, 2007). Contrary to our expectations, the provided contextualized text seemed to function as seductive details to the readers as found in previous studies on text comprehension (Harp & Mayer, 1997; Lehman, Schraw, McCrudden, & Hartley, 2007; Wade, Schraw, Buxton, & Hayes, 1993).

In fact, when the recall responses were analyzed, the students of contextualized text group recalled more contents from the contextualized situations instead of the main concepts in the text. Although the familiar situations that were used in the present study were related to each of the topics, they were not so strongly related to the main points of the passages which may not have been helpful for the readers to understand the cause and effect relations in the main texts.

Also, McDaniel, Waddill, Finstad, and Bourg (2000) suggested that more interesting texts helped readers to focus more on an overall structure of a text (i.e., organizing text elements), whereas less interesting texts made readers pay attention to more detailed contents of a text. According to the McDaniel et al. (2000)'s suggestion, the base text, a less interesting text, would require readers to focus more on detailed information than the contextualized text, a more interesting text, in the study. This would lead to higher memory outcomes in the base text than the contextualized one.

One interesting finding in the study is that the pre-questioned text, unlike the contextualized text, did not deteriorate readers' achievement in comprehension and memory of text contents as compared with the base text. This may be due to the fact that the questions provided before reading texts, at least, did not destroy the cohesive processing of the given text contents. Previous research showed that the questions would help readers to focus more on the main points of text contents (Seifert, 1994; Wood, Pressely, & Winne, 1990) which increases cohesive understanding and memory of text contents. In addition, the questions seemed to bring about cognitive conflicts to readers so that they became more interested in searching-for-the-answer activities while reading.

In conclusion, the contextualizing strategy did not seem to ensure comprehension and memory of text contents in the study, even though it might be able to increase the level of interest in text contents. It would be important in the follow-up research to investigate how the contextualizing strategy would be used effectively to increase text comprehension and memory as much as interest.

In contrast, the pre-questioning strategy seems to have some potential for making reading materials more interesting and still be processed in more cohesive ways (Gunn, 2007; Berkeley et al., 2010). In the study, students were asked to select one of the choices

as an answer to a question. Different ways to construct choices would affect the degree to which students feel interested in text, understand, and remember text contents later. This would be worthwhile to be investigated in future follow-up research.

Further research is also necessary with longer passages to find more about the effects of the expository structure strategies used in the study on text-based interest, comprehension, and memory. Students usually read long expository texts. As the length of texts is increased, there may be a tendency for readers to feel bored and become distracted from reading tightly-structured and abstract texts. In that case, the contextualizing strategy might have some positive effects on text processing, consequently resulting in increased outcomes of text comprehension and memory.

Follow-up research with expository texts from social science or history can be considered because science texts have different characteristics from social science texts. Social science texts are more context-bound; therefore, the effects of the expository structure strategies would be different depending on the subjects of expository texts.

Finally, the effects of the two strategies, contextualizing and pre-questioning strategies, on text interest, comprehension, and memory were investigated with science texts in the study. Further research would be necessary to examine the effects on social-science texts. The strategies might work more effectively for social-science texts because providing contexts could allow for more relevance to the main contents of text in social science compared to science, and because providing questions would create cognitive dissonance more easily in social science.

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Appendix A

Example of base text on ″What makes people' faces flushed after they drink?″

There are people whose faces become flushed and red when they drink. Once we start drinking, the alcohol in the drink gets absorbed into our body. The alcohol that is absorbed in our body moves to the liver and gets dissolved. At this time, while some people's livers dissolve alcohol well, others' have troubles in dissolving alcohol. If the body cannot dissolve alcohol well, the undissolved alcohol will be accumulated in our body. The alcohol that hasn't been dissolved and remains in our body turns into toxin. This toxin spreads throughout our body through blood vessels, and makes our face turn red. After all, a flushed face after drinking can be a sign of danger that indicates toxin is spreading throughout our body.

Appendix B

Example of contextualized text on "What makes people' faces flushed after they drink?"

One day when my father's friends visited our house, my father started drinking with his friends after having dinner. After eating cookies in the room with my brother, I went out to the living room, and noticed that only my father's face had turned red. When I asked my father if he drank the most, he insisted that he drank just a little. I wonder why his face turns red when he drinks and why some people's faces do not at all.

There are people whose faces become flushed and red when they drink. Once we start drinking, the alcohol in the drink gets absorbed into our body. The alcohol that is absorbed in our body moves to the liver and gets dissolved. At this time, while some people's livers dissolve alcohol well, others' have troubles in dissolving alcohol. If the body cannot dissolve alcohol well, the undissolved alcohol will be accumulated in our body. The alcohol that hasn't been dissolved and remains in our body turns into toxin. This toxin spreads throughout our body through blood vessels, and makes our face turn red. After all, a flushed face after drinking can be a sign of danger that indicates toxin is spreading throughout our body.

Appendix C

Example of pre-questioned text on "What makes people' faces flushed after they drink?"

Why do you think some people's faces get flushed after drinking?
(a) because people are in a bad mood at the time when they drink
(b) because alcoholic beverages promote blood circulation
(c) because the toxic substance in alcoholic beverages spreads throughout the body
(d) because alcoholic beverages heat up our body and then our face, too
Have you chosen your answer? Then shall we find out the right answer?

There are people whose faces become flushed and red when they drink. Once we start drinking, the alcohol in the drink gets absorbed into our body. The alcohol that is absorbed in our body moves to the liver and gets dissolved. At this time, while some people's livers dissolve alcohol well, others' have troubles in dissolving alcohol. If the body cannot dissolve alcohol well, the undissolved alcohol will be accumulated in our body. The alcohol that hasn't been dissolved and remains in our body turns into toxin. This toxin spreads throughout our body through blood vessels, and makes our face turn red. After all, a flushed face after drinking can be a sign of danger that indicates toxin is spreading throughout our body.