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原　著

Effects of the Instruction in Headings on Japanese University Students

Fusako ARAKANE [1]　　Faculty of Health Sciences, Uekusa Gakuen University

The purpose of the present study is to investigate how Japanese university students recognize and use headings, and the effects of instructions on their ability to deal with headings. Two experiments were designed to analyze the effects of headings on text comprehension in terms of types of headings (statements or questions), three tasks (retrieval, cued recall, and instruction). Experiment 1 investigated the effects of different types of headings (statements or questions) on the retrieval task. The results of Experiment 1 indicated that no advantage accrued to students on the existence of headings (either statements or questions). Experiment 2 investigated whether instructions in the use of headings as processing aids facilitated either retrieval or recall, or both. All participants were randomly assigned to the following three groups: Instructions Plus-Headings, where students were given instructions on using headings to facilitate the processing of text; Headings Only, where students read text material containing headings but did not receive instructions; Control, where students read text material that did not contain headings. The results of Experiment 2 demonstrated that instructions in using headings facilitated retrieval tasks of Japanese university students.

Keywords：headings, signals, instruction

1. Background

Headings always precede the text content they signal and demarcate distinct subsections of a text. They label the dominant topic or theme of the subsequent text and thus help guide the reader to the most relevant information in the text (Lorch, 1989). Brooks et al. (1983) argue that headings influence cognitive processing by (1) acting as cues for prior knowledge relevant to a given topic, (2) accentuating the relationships among the concepts and facts in a given text, and (3) providing retrieval cues for subsequent recall.

In the field of L1, previous research in this area has examined headings, sometimes singularly and sometimes in combination with other types of signals. These studies have varied greatly in several respects, including several types of tasks, the length, familiarity and difficulty of the texts, and the subjects' ages. Arakane (2007) summarizes some issues concerning the effects of headings in previous L1 studies from three points, that is, tasks, texts, and learners. These issues are important, but unresolved. Current evidence either demonstrates unreliable effects or inconsistent effects with respect to all of these issues. In addition, few investigators, except for Hartley & Trueman and Lorch et al., have investigated the effects of headings systematically. Indeed, many of the studies may be characterized as "one-off ones.

Hartley et al. conducted several series of experiments

［1］ 著者連絡先：Fusako Arakane

on headings with secondary school students (1980, 1981, 1983, 1985).

In nine experiments with 14- and 15-year-old students , Hartley & Trueman (1983) focused on three main variables (1) the purpose of the task (recall, search or retrieval from familiar and unfamiliar text); (2) the position of the headings (marginal or embedded); and (3) the form of the headings (statements or questions). The results indicated that headings improved recall, search and retrieval from the text, but that the position of the headings (marginal or embedded) was ineffective. Moreover, in these experiments, the form of headings (questions or statements) had no differential effect with readers of different ability although Hartley et al. (1980, 1981) suggested that headings in the form of questions help less-able readers.

Further, Hartley & Trueman （1985） conducted another seventeen experiments on headings with different age group participants（11-12, 14-15） The first nine experiments focused on three main variables, (1) the position of headings (marginal or embedded); (2) the form of headings (statements or questions); and (3) the nature of the task (free recall, searching unfamiliar text, and retrieval from familiar text). The results indicated that the position of the headings (marginal or embedded) was ineffective, but that headings in either form enhanced the recall, search and retrieval with 14 - 15 year old participants. These experiments were then replicated using a different text in a further four experiments with 11-12 year old participants. These experiments indicated that headings improved 11-12 year old's search and retrieval but not their recall. Finally, in another three experiments with lower-ability readers, the results found no significant differences between different forms (statement or question) of headings.

Lorch et al. (1993） suggested that most studies address rather the effects of headings on the recall of information after reading the text than any other issue. Lorch & Lorch studied effects of headings on text memory focusing on the text factors: familiarity of a topic (Lorch & Lorch, 1996a) and the complexity of a text's topic structure (Lorch & Lorch, 1996b). As a result, Lorch & Lorch (1996) assumes that headings have little effect on recall if the topics of a text are easily distinguished, and their organization is relatively simple.

In the settings of L2, Chung (2000) conducted multiple signal study using both headings and logical connectives to Hong Kong secondary students. As a result, headings contributed to both macrostructure and microstructure understanding. Headings facilitated top-down processing in the first place and guided the processing of the information at a lower level.

Arakane (2007a) investigated the effects of headings (statements or questions) on text comprehension of Japanese senior high school students. However, the results showed that neither form of the headings (statements or questions) had an effect on text comprehension of Japanese EFL students. And, headings also had no positive effect when an experiment was conducted in combination with other types of signals (Arakane, 2007b). Analyses of the immediate tests failed to find significant effects among the groups. Some methodological shortcomings seem to have been apparent in those studies: (a) the small number of the participants (b) lack of instructions on headings use (c) the use of an immediate testing paradigm. However, the biggest shortcomings seem to be that few headings, except for titles, are seen in English textbooks in Japan. So Japanese students may not be aware of the significance of headings and may not know how to use headings effectively. That is probably also concerned with the reason that there have been few studies of headings in Japan. However, in the field of L1, headings are prevalent in most high school and college textbooks (Holley et al., 1981) and very useful for reading and writing. However, several researchers have also assessed instructions on headings use for L1 learners (e.g., Meyer et al., 1989; Holley et al., 1981). We, therefore, explore ways how Japanese students can use headings for processing aids effectively.

Holley et al. (1981) investigated the effect of headings and training on the use of headings (both as input and output processing aids) [1] under conditions of immediate

and delayed recall. The result indicated that headings enhanced immediate recall slightly and delayed recall greatly. The results also showed that input and output training on the use of headings failed to find positive effects, compared to students that used their normal studying techniques with the headings. Holley et al. (1981) suggested this failure to find a facilitative effect of training may have been due to the limited amount of time the students had to integrate the new strategies with their existing techniques and due to the inappropriate training methods. Moreover, Brooks et al. (1983) suggested that the study has directly compared the effects of headings and outlines used separately and in combination. In addition, Brooks et al. (1983) summarized a number of limitations of the past research; (a) the use of short, artificial prose passages; (b) the use of only cued tests such as multiple-choice or cloze as the dependent measures; (c) the use of only an immediate testing paradigm.

On the basis of the Holley et al. (1981) experiment, Brooks et al.(1983) conducted two experiments with university students to examine the influence of intact outlines2 and embedded headings used both separately and in combination in a complex scientific text. Results of the first experiment showed that embedded headings within the text improved delayed test performance. However, results of the immediate tests failed to find positive effects among the four groups. The second experiment examined whether or not instructing students in the use of embedded headings would further improve performance in comparison with presenting students headings without instruction. Results of the experiment indicated a significant effect for instructions on headings use. However, headings without instruction were ineffective in improving delayed test performance, contrary to the result of the first experiment.

So far we have reviewed the investigations of headings in L1 and L2 settings. From these reviews, headings are indicated to be effective for reading comprehension, but there are still a lot of unsolved variables. As to Japanese EFL settings, two important points seemed to be concerned with the effects of headings; the low frequency of headings in English texts and Japanese EFL students' inaccurate mastery of headings. Following the observations, the author explores the effects of headings on Japanese university students in two experiments compared to the previous research conducted by Arakane (2007a,b).

2. Experimental Study

2.1 Purpose of the present study

The specific objectives of this study were to examine the influence of headings as processing aids and instructions for headings use.

First, Hartley & Truemann (1985) argue that it is easier to retrieve from text that has headings, and previous research had suggested that headings in the form of questions help less-able readers (e.g., Hartley et al., 1980, 198l). However, the results of the experiments by Arakane (2007) showed that headings, neither in the statement nor question form, had no positive effect on text comprehension by Japanese senior high school students. We, therefore, planned our first experiment to focus on the form of headings used (questions versus statements), in order to confirm if headings, in each form, affect Japanese university students, compared to the previous research conducted to senior high school students (see Arakane, 2007a). So, the purpose of Experiment 1 was to determine whether headings, written in the form of statements or questions, would help participants to retrieve information from a text which they had just previously read and were thus, to some extent, familiar with.

Second, Brooks et al. (1983) showed a positive effect for instructions on headings use. Experiment 2 was designed to investigate whether or not instructing students in the use of headings as processing aids would further enhance performance, compared to merely presenting the headings without instruction. In addition, Hartley et al. (1985) suggests the headings can be used to aid recall (in memory tasks) and to aid retrieval (in

search tasks) but no-one to our knowledge has examined the effects of headings on both recall and retrieval from the same text. So, in Experiment 2, the investigation of the effect for instructions on headings use on both recall and retrieval[3] (from unfamiliar and familiar text) was also conducted.

2.2 Experiment 1

2.2.1 Method

2.2.1.1 Materials

An expository text A, extracted from *STEP Practice Test*, was used as an experimental material. All the subjects had no prior exposure to this text. For analyzing the level of the text of the present study, we used the Flesch-Kincaid Readability formula and v8an - revised web edition of JACET 8000. Table 1 presents the text and its readability level by using the Flesch-Kincaid Readability formula and v8an - revised web edition of JACET 8000.

2.2.1.2 Participants

Fifty seven university freshmen participated in this study. All participants were native speakers of Japanese. The participants were randomly assigned to one of three groups. One-way analysis of variance (ANOVA) of the English proficiency test, consisting of three sections, vocabulary, grammar, and reading taken from STEP tests (combination of pre-second and third level), showed no significant difference between the three groups, F (2, 60) = . 132.

2.2.1.3 Procedure

Sessions were conducted by the author in an approximately 20-min period for all the three groups. The material was divided into three versions: (1) without headings, (2) with headings in statement form, (3) with headings in question form. Each of the three groups is assigned each version of the material and these were distributed systematically to the participants.

In the retrieval tasks[4], the participants were asked to read their passage for ten minutes. And then, they were asked to write a summary of each paragraph in Japanese and to answer the short answer questions while reading their passage.

2.2.1.4 Results

SPSS（Statistical Package for Social Science）was used to conduct data analysis. A one-way factorial analysis of variance (ANOVA) was carried out to see if there was a statistically significant difference in the results. On all analyses, the criterion for significant was .05. The results revealed that there was no positive differences among the three groups, F (2, 55) = .073, p =.929 > .05.（See Table2,3）

2.2.1.5 Discussion

This study primarily aimed to examine whether or not Japanese university students provided with headings (either in question form or in statement form) could better understand an explanatory text written in English than those without the headings. With regard to this research question, the experimental results revealed no significant differences between each group. In the previous study of Arakane (2007a,b), headings, either in question form or in statement form, did not affect the reading comprehension of the Japanese senior high school students. These results suggest that headings are not probably useful for the reading comprehension of Japanese EFL learners. We assume these failures to find a facilitative effect of headings may have been due to the low frequency of headings in English textbooks in Japan and therefore Japanese EFL students' little opportunity to encounter and learn headings. We argue that the

Table 1. The experimental materials and the results of the Flesch-Kincaid Readability and the results of analysis using v8an - revised web edition of JACET 8000（v8an.pl）

Experiment	Text	Word	Flesch Reading Ease	Flesch-Kincaid Grade Level	i/t（JACET）
1	A	283	57.5	8.8	45.098 %

Table 2. Summary of Descriptive Statistics for the Retrieval Task

Group	*N*	*M*	*SD*	*Minimum*	*Maximum*
1.00	18	3.6667	1.4552	1.00	5.00
2.00	18	3.5556	1.2935	.00	5.00
3.00	22	3.7273	1.4859	.00	5.00
Total	58	3.6552	1.3961	.00	5.00

Table 3. Results of a one-way ANOVA for the Retrieval Task

	SS	*df*	*MS*	*F*	*Sig.*
Between Groups	.295	2	.148	.073	.929
Within Groups	110.808	55	2.015		
Total	111.103	57			

$p < .05$.

infrequency of headings in Japanese English textbooks is a grave issue in the field of English reading.We assume these failures to find a facilitative effect of headings may have been due to the low frequency of headings in English textbooks in Japan and therefore Japanese EFL students' little opportunity to encounter and learn headings. We argue that the infrequency of headings in Japanese English textbooks is a grave issue in the field of English reading. However, the significance of headings is not to be underestimated nor denied because they are definitely helpful to readers. Consequently, we explore instruction as a way in which students can understand the function of headings and how to use them appropriately at the text level. The second experiment, therefore, attempts to instruct Japanese university students how to use text headings.

2.3 Experiment 2

2.3.1 Method

2.3.1.1 Materials

An expository text B, extracted from STEP Practice Test, was used as an experimental material. All the subjects had no prior exposure to this text. For analyzing the level of the text of the present study, we used the Flesch-Kincaid Readability formula and v8an - revised web edition of JACET 8000. Table 2 presents the text and its readability level by using the Flesch-Kincaid Readability formula and v8an - revised web edition of JACET 8000.

2.3.1.2 Participants

All participants of Experiment 2 were the same as Experiment 1 although some participants were absent. The participants were also randomly assigned to one of three groups. One-way analysis of variance (ANOVA) of the English proficiency test, using the same data of Experiment 1, consisting of three sections, vocabulary, grammar, and reading taken from STEP tests (combination of pre-second and third level), showed no significant difference between the three groups, F (2,49) = 1.156.

2.3.1.3 Procedure

The procedures of instruction tasks in Experiment 2 followed Brooks (1983). First, all participants were randomly assigned to the following three groups: Instructions-Plus-Headings, where students were given instructions on using headings to facilitate the input and output processing of text; Headings Only, where students read text material containing headings but did not receive instructions: Control (no instruction on heading use), where students read text material that did not contain headings, and where subjects were told to use their normal studying techniques. The Instructions-Plus-Headings and Headings Only groups read passages containing embedded headings, while the Control group read identical passages that did not contain headings. The Headings Only and Control groups received oral and written instructions to use their typical study methods. On the other hand, the Instructions-Plus- Headings group had received oral and written instructions on using headings in other texts prior to studying. These instructions consisted of a checklist of cognitive activities the student should engage in while studying text material. In part, students were asked to (a) develop expectations (based on the headings) about the

material in the passage, (b) understand why each heading was appropriate for its section of text, (c) memorize the headings, and (d) practice using the headings as recall aids.

Both recall and retrieval tasks from the same text were conducted with the three groups (Instructions Plus-Headings, Headings Only, Control). Firstly, in the recall tasks4, the participants were asked to read their passage at their own speed, and then turn over and write a summary of each paragraph in Japanese and to answer the short answer questions without looking at the passage. The participants, who completed the recall task, submitted the answer sheets of recall tasks. Then they were given another and the same question sheets as the recall tasks, and retrieval tasks[5)] were conducted; the participants were asked to search for the answers, with reading the same passage as the recall tasks, and to write a summary of each paragraph in Japanese. The session lasted about 20 minutes.

2.3.1.4 Results

Experiment 2 was designed to investigate whether or not instructing students in the use of headings as processing aids would further enhance performance, compared to merely presenting the headings without instruction as was done in the initial experiment.

A one-way ANOVA was carried out to see if there was a statistically significant difference in the scores of the groups on the instruction and recall task, but no significant differences were found among the three groups, F (2, 49) = 2.312, p.=110. （See Table 4,5）

Table 4. Summary of Descriptive Statistics for the Instruction and Recall Task

Group	*N*	*M*	*SD*	*Minimum*	*Maximum*
1	16	1.06	1.57	0	5
2	13	1.69	1.18	0	4
3	23	2.22	1.91	0	7
Total	52	1.73	1.69	0	7

On the other hand, a one-way ANOVA, carried out in the scores on the instruction and the retrieval task, yielded significant differences among the three groups, F (2, 49) = 7.043, p =.002< .05. （See Table 6,7）

Results of retrieval tasks showed a significant and positive effect for Instructions Plus-Headings group; however, presentation of headings without instruction failed to enhance test performance, as was the case in the first experiment.

Table 5. Results of a one-way ANOVA for the instruction and recall task

	SS	*df*	*MS*	*F*	*Sig.*
Between Groups	12.611	2	6.305	2.312	.110
Within Groups	133.620	49	2.727		
Total	146.231	51			

$p < .05$

Table 6. Summary of Descriptive Statistics for the Instruction and the Retrieval Task

	N	*M*	*SD*	*Minimum*	*Maximum*
1.00	15	2.6000	2.1647	.00	8.00
2.00	14	3.1429	2.9835	.00	9.00
3.00	23	5.5652	2.6298	1.00	10.00
Total	52	4.0577	2.9014	.00	10.00

Table 7. Results of a one-way ANOVA for the instruction and theretrieval task

	SS	*df*	*MS*	*F*	*Sig.*
Between Groups	95.860	2	47.930	7.043	.002*
Within Groups	333.466	49	6.805		
Total	429.327	51			

$p < .05$

2.3.1.5 Discussion

Experiment 2 investigated the effects of instructing students directly in the use of author-provided headings as processing aids with either retrieval tasks or recall tasks. The results of Experiment 2 indicated a significant effect of heading use on instructions for

retrieval tasks. Moreover, the comparison of results on retrieval task between Experiment 1 and 2 strongly support the importance of instruction on headings use for Japanese students.

On the other hand, the results for instructions on headings use on recall tasks were not positive. The main reason of the negative results of recall tasks can be attributed to the ages or levels of the participants. There seems to be important relationship between recall task and the age of the participants. Recall tasks are not probably appropriate for lower level students. Kirby & Cantwell (1985) argue free recall seems to be difficult for lower level students. Hartley & Truemann (1985) indicated that headings aided 11-12 year old's search and retrieval but not their recall. Moreover, most of the participants of L1 researchers of headings, including Lorch et al. who investigated the effect of headings mainly by memory measures, were university students. Chung (2000) also argues that recall is obviously not a reliable way of measuring reading comprehension although recall and reading comprehension are closely related.

3. Conclusion & Further Implication

This study is significant in that it empirically demonstrates that a lot of Japanese students do not know how to use headings and that instruction in use of headings is effective in improving reading skills. Experiment 1 investigated the effects of different types of headings (statements or questions) to university students on the retrieval task. The results showed that the form of the headings had no effect on retrieval task. Experiment 2 aimed to examine whether instructions in the use of headings as processing aids facilitated recall or retrieval tasks from the same text. The experimental results clearly revealed the advantages of instructions in the use of headings on retrieval tasks. But on recall tasks, there were no positive effect among groups. The results of these experiments show that Japanese students seem not to know how to use headings and should be taught how to use them.

Additional studies investigating the effects of instructions in the use of headings are suggested to further explore these issues. The replication of the study with other EFL students within the same level of this study is recommended to see if results are similar to those in this study. In addition, many participants will be needed because prose research can be full of many naturally occurring variables that will be eliminated only by the use of many participants. Future studies will also need to identify delay testing as well as immediate testing. Delay testing is of great value with signal research (Brooks et al., 1983).

Furthermore, there are several areas that should be investigated in Japanese settings. Especially, the study with upper level students will be needed because a lot of L1 studies were conducted with upper level students (e.g., Lorch & Lorch, 1996). Upper level students can recognize and use headings without instructions. Even free recall tasks can show the positive effects of headings on upper level students. Future studies will also need to identify the effect of more revised and sophisticated instruction tasks. For example, Dee-Lucas and DiVesta (1980) investigated the effects of having students generate their own headings for text. This type of instruction task may lead readers to concentrate more on the texts. On the base of research in Japanese settings, we can examine the other variables of headings in detail, for example, the selective effect, that is, whether headings facilitate selective access to specific information within a text[6].

In concluding this paper, the author also proposes important educational implications for textbook writers. As shown in the studies, the lack of positive effect of headings on reading of Japanese EFL students is attributed to the low frequency of headings in English textbooks in Japan. So it will be effective if headings are introduced to English textbooks in Japan and students are taught how to use them for successful reading comprehension as shown in this study.

Notes

1. In the study, participants were assigned to the following three groups: (a) input training, where students were told to use embedded headings during input processing; (b) output training, where students were instructed to use an outline as a retrieval device; (c) no training with headings, where students were told to use their normal study methods.

2. Brooks et al.(1983) claim as follows; intact outlines may provide the student with information about the superordinate topics and their interrelationships but would not necessarily provide ties between the superordinate information in the outline and the subordinate information presented in the text. On the other hand, headings (embedded outlines), by their presence in the text, should provide clear ties between the superordinate and subordinate information but probably do not effectively indicate the interrelationships between superordinate topics (Carver, 1970)

3. As to the retrieval and recall tasks, in this study, we copied from the procedure of Hartley & Trueman (1985) and improved them to some extent for Japanese settings. On retrieval tasks, we examined the scores of answers although Hartley & Trueman (1985) examined the time that participants completed the retrieval tasks. In this study, we did not use free recall but cued recall.

4. The procedure of the recall tasks by Hartley & Trueman (1985) is as follows: The participants were asked to read through the passages once carefully, and then, when they had completed their reading, to turn over the booklet and answer the test questions on the back.

5. Hartley & Trueman (1983) describe retrieval studies as follows; The aim of the retrieval studies was to see if headings affected the time taken to retrieve information from text which the participants had already read (and were thus, to some extent, familiar with). Participants read the passage first before answering the questions about it. The participants read the experimental passages (for a period of six minutes) before starting the retrieval task. The procedure was explained to the participants after they had read the main passage. In the present study, we arranged this retrieval task in part. Moreover, there are some subtle differences as to the retrieval tasks between Experiment 1 and 2 because the retrieval task of Experiment 2 was after recall tasks. However, in this study, the author defined retrieval task such as to retrieve information from text the participants had already read (and were thus, to some extent, familiar with).

6. Lorch (1989) indicates that little research has been done regarding this function of headings although the available evidence clearly indicates readers use headings to guide text-search processes.

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