EFFECTS OF ELABORATIVE MODIFICATION ON SECOND LANGUAGE READING COMPREHENSION AND INCIDENTAL VOCABULARY LEARNING

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This study investigated the effects of different types of elaboration on second language (L2) reading comprehension and incidental vocabulary learning. Five hundred and seven 9th grade students in Korea were randomly assigned to one of six condition groups: Control, Unmodified, Simplified, Lexically Elaborated, Structurally Elaborated, or Lexically & Structurally Elaborated. Both simplification and elaboration increased L2 comprehension, assessed by 20 multiple-choice test items. Although students reading the simplified versions scored highest, no statistically significant difference was found between the effects of simplification and elaboration. Among the different types of elaboration, structural elaboration appeared to be more effective than lexical elaboration, but not significantly so. The results of three vocabulary tests—form, meaning, and delayed meaning recognition—showed no significant effects of text modification on incidental vocabulary learning.

INTRODUCTION

Recent research into the nature of text modification emphasizes the role of elaboration. A large part of this research has come from the idea of foreigner talk, in other words, the way native speakers (NSs) adjust their speech when they address non-native speakers (NNSs). This adjustment makes input more comprehensible and facilitates NNSs’ comprehension. Many researchers have characterized the features of foreigner talk (for a review, see Larsen-Freeman & Long, 1991). On the basis of those characteristics, they have modified spoken lecturettes and written texts and investigated the effects of elaboration on L2 learners’ comprehension.

Although positive effects of elaboration have been found (Brown, 1985: Ross, Long, & Yano, 1991; Tsang, 1987), little is known about which types of elaborative modification are most beneficial. In addition, it is not yet known whether or not this improved comprehension results in improved acquisition. The present study begins to investigate which types of elaborative modification are more effective for L2 reading comprehension. The study also addresses one aspect of the relationship between modified input and second language acquisition (SLA) by examining the effects of modification types on incidental vocabulary learning.

Input and Its Comprehensibility in Second Language Acquisition

The linguistic environment that L2 learners are exposed to can be considered in many ways. Perhaps one of the basic issues regarding linguistic input is its comprehensibility. Many researchers have been interested in what properties of the input make it accessible and comprehensible to learners in the language learning process (Pica, 1994). This concern about input comprehensibility in SLA has motivated a number of studies of the adjustments made by NSs while addressing NNSs, the result of which is termed foreigner talk (Ferguson, 1975, 1981; for review, see Larsen-Freeman & Long, 1991; Long, 1983a) found in many languages (Latté, 1989; Long, Ghambar, Ghambar, & Nishimura, 1982; Meisel, 1980; Onaha, 1987) as well as in L2 classrooms (for review, see Chaudron, 1988).

These adjustments fall into two broad categories—linguistic and conversational (Larsen-Freeman & Long, 1991). Linguistic adjustments have been found to exist at all linguistic levels. As far as phonology is concerned, NSs speak more slowly, use more stress and pauses, articulate more carefully, exaggerate intonation, and use more full forms rather than contractions. In the domain of morphology and syntax, NSs tend to retain optional constituents, and use shorter and less complex sentences, more canonical word order, more overt marking of grammatical relations, more present tense, and more questions. In the semantic domain, NSs use more overt marking of semantic relations, a lower type-token ratio, fewer idiomatic expressions, a higher average lexical frequency of nouns and verbs, a higher proportion of copulas to total verbs, more marked meanings of lexical items, and show a preference for full NPs over pronouns and for concrete verbs over dummy verbs (e.g., do).

Conversational adjustments include adjustments to content and interactional structure. As far as content is concerned, NSs use more predictable topics, more here-and-now orientation, briefer treatment of topics by dealing with fewer information bits per topic, and a lower ratio of topic-initiating to topic-continuing moves. With regard to interactional structure, NSs tend to accept more abrupt topic-shifts by NNS interlocutors, use more self- and other-repetition, more comprehension checks, confirmation checks, clarification requests, expansion, question-and-answer strings and decomposition.

What all these findings from foreigner talk studies alone do not reveal is whether the adjustments made by NSs addressing NNSs have facilitating effects on NNS comprehension. Additional research has confirmed an adjustment-comprehension relationship, however, and also shown that conversational adjustments are more

**Input Modification and Second Language Comprehension**

In the area of SLA, the primary concern of L2 researchers has been to look for ways to improve learners’ L2 comprehension. Language modification is an important means of creating comprehensible input in SLA (Diaz-Rico & Weed, 1995). The most popular and dominant way of modification has been simplification of the text. It is believed that an authentic text written for native speakers may be syntactically so complex and contain so many unfamiliar lexical items that decoding it for L2 readers would be excessively laborious and cognitively demanding (Lucas, 1991). Hence, it is assumed that supplying simplified texts by reducing surface structure eases the process of decoding by a reader. This type of modification is based on readability formulas and results in shorter and less complex sentences, use of high frequency vocabulary and usually loss of some semantic content.

However, a good deal of research has proven that simplification does not necessarily result in improvement of L1 comprehension (Duffy & Kabance, 1982) or L2 comprehension (Blau, 1982; Johnson, 1981; Lotherington-Woloszyn, 1993). Some researchers have noted the unnaturalness of simplified texts (Goodman & Freeman, 1993; Long & Ross, 1993; Lotherington-Woloszyn, 1992; Tickoo, 1993). In other words, simplification can generate choppy and unnatural discourse models and remove unknown linguistic items. Consequently, it denies learners access to the language items they need to learn. As White (1987) pointed out, “where comprehensible input is interpreted as simplified input, one is in danger of providing less than adequate input to the acquirer” (p. 108). Yano, Long, & Ross (1994) also pointed out the negative impact of linguistic simplification on learners’ output. They argued that the simplified languages which offer linguistic models below a learner’s developmental stage may lead the learner to use spoken language below his or her capacity.

An alternative way to improve comprehension without removing unfamiliar grammatical constructions and lexis is elaboration of input. This approach derives from research findings on the adjustments made by NSs to facilitate their NNS interlocutors’ comprehension. As we have seen before, a number of studies characterized the features of these adjustments, named foreigner talk. Elaboration
supplies redundant information through a variety of devices based on these research findings.

**Text Modification: Empirical Studies**

A great deal of research has been carried out on the effects of simplified and elaborated input on L2 comprehension. To date, there have been 15 studies on listening comprehension and 7 on reading comprehension (for review, see Chung, 1995). They fall into three categories. The first category includes studies that compared a NS text with a modified text (i.e., simplified, elaborated, or a mixture of both). The second comprises studies that investigated the effects of simplification and elaboration on L2 comprehension. Most studies are included in these two categories. A few studies fall into a third category which examines the effects of different types of elaborative modification (Chaudron & Richards, 1986; Kelch, 1985; Sawa, 1985). Unfortunately, no reading studies fall into this third category.

**Modification to aural text.** Of the studies on listening comprehension, three are especially noteworthy because they investigated the effects of different types of elaborative modification on L2 comprehension. Kelch (1985) investigated the effects of two different types of modification separately and in combination: a reduced rate of delivery, and features of grammatical foreigner talk (FT). The results indicated a significant main effect for a reduced rate of delivery alone, and when combined with FT modification, on comprehension (as measured by dictation scores), but no significant main effect for FT modification alone. Kelch concluded that slower speech aided NNS comprehension by increasing perception of the stream of speech and allowing more processing time. Other studies also found a significant effect for rate of delivery on listening comprehension and confirmed Kelch’s findings (Blau, 1990; Griffiths, 1992).

Two other studies which investigated different types of elaborative modification were not related to rate of delivery. Sawa (1985) examined two types of modification: repetition and signaling. Overall, there was no significant effect for modification in any condition. However, when further propositional level (main idea, second, third, & fourth level) analysis indicated a significant effect for repetition on lower (third) level propositions. Although Sawa’s definition of propositional levels was unclear and interrater reliability was missing for distinguishing among propositional levels, this study was the first to investigate the effects of different types of elaborative modification other than rate of delivery.
Chaudron and Richards (1986) assumed that the structuring and organization of information within a lecture were an essential aspect of its comprehensibility. They identified two types of discourse markers: macro and micro-markers. Macro markers are signals or metastatements about the major propositions within a lecture, or the important transition points in a lecture (e.g., what I’m going to talk about today, one of the problems was, this is why, etc.), while micro markers are intersentential relations, framing of segments, and pause fillers (e.g., then, you see, well, because, etc.). They found a consistent result across groups that macro-markers were more conducive to successful recall of the lecture than micro-markers.

Modification to written text. Johnson (1981) investigated the effects of language complexity and cultural background of a text on the reading comprehension of Iranian ESL students in the United States. Half of the subjects read an unadapted English version of two stories, one from Iranian folklore and the other from American folklore; the other half read the same stories in adapted or simplified English. The results of comprehension test using a written story-recall task and multiple-choice questions showed that the cultural origin of the story had more effect on ESL students’ comprehension than did the level of syntactic and semantic complexity.

Blau (1982) challenged the usual sentence length criterion of readability formulas which supposes shorter sentences are easier to read. Two samples of Puerto Rican subjects—college students and 8th graders—read three different versions of a text: version 1 consisted of short, simple sentences; version 2 of complex sentences with clues to underlying relationships; and version 3 of complex sentences without clues. The twenty-four item multiple-choice comprehension test showed that the second version yielded the highest comprehension scores. Blau concluded lower readability materials did not facilitate comprehension for ESL learners, and might actually have impeded comprehension.

Brown (1985) compared the reading comprehension of ESL secondary school students in Taiwan on three separate versions of a text: a NS version written at the 10th grade level of difficulty; a Modified Input version (MI) adjusted both in sentence structure and vocabulary; and a Modified Interactional Structure version (MIS) which retained the NS level of difficulty, but elaborated information through redundancy and definition. The results of testing using 20 multiple-choice comprehension questions showed that the MI group obtained the highest score, followed by the MIS group, and then the NS version group. Brown found no significant difference between MI and MIS groups, and concluded that MIS might be the better option for advanced learners.
because it offers more native-like linguistic input.

Tsang (1987) investigated the effects of text version and form level on L2 reading comprehension. Cantonese-speaking students at five different form levels (three to seven) in Hong Kong read three different versions (as in Brown, 1985). Results revealed that the two modified versions (MI and MIS) were significantly more effective than the NS version, and that the MI version was significantly better than its MIS counterpart at the lowest levels, Forms Three and Four.

Parker and Chaudron (1987) considered the effect of modified target language input on L2 comprehension. Forty-three college students were asked to read two types of passages: an unmodified and an elaborated version. The results of reading comprehension scores measured via a cloze test showed that there was no statistically significant difference between group A (elaborated) and group B (non-elaborated). However, despite the fact that the non-elaborated version was linguistically more complex than the elaborated one in terms of words per sentence, words per T-unit, and S-nodes per T-unit, group B actually did slightly better than modified group A. The reason for this could be that the non-elaborated text was modified in the way that all redundancies were eliminated and all the thematic structure was reduced to canonical word order, which resulted in a shorter text than the elaborated one. This might have offset the effects of elaboration, so no significant difference was found between two groups.

Ulijin and Strother (1990) investigated the effects of syntactic simplification on reading comprehension of English for Science and Technology (EST) texts in L1 and L2. Using American and Dutch college students majoring in computer science and humanities, they found no significant effects for simplified syntax either on comprehension, measured by 10 True-False (T-F) questions, or on reading time across the four subgroups of subjects (NS/NNS with computer science major and NS/NNS with humanities major). Ulijin and Strother reported that in order to avoid artificial item descriptions in T-F statements, the sentences were used exactly as they appeared in the original computer science text. This might have favored the unsimplified version groups over the simplified version group.

Ross, Long, & Yano (1991; also, Yano, Long, & Ross, 1994) investigated whether elaborative modification of written texts could serve as an alternative approach to simplification. They had three different versions of 13 passages: unmodified, simplified, and elaborated. Overall elaborated texts were twice as complex by traditional measures as simplified ones, 50% longer, and 6.5 grade levels
more advanced in readability. The results of 483 Japanese undergraduate students’ comprehension scores assessed by 30 multiple-choice test items revealed that the simplified group did best, followed by the elaborated and unmodified groups. However, there was no statistically significant difference between simplified and elaborated text types on reading comprehension test scores. On their further analysis of the interaction between modification types (i.e., simplification or elaboration) and test item types (i.e., replication, synthesis or inference), Ross et al (or Yano et al) found out different kinds of modification facilitated different levels of comprehension.

**Input Modification and Second Language Acquisition**

One of the hotly debated issues among L2 researchers is whether improved comprehension achieved by text modification results in more L2 acquisition. Long (1983a, 1985) made an indirect argument for a causal relationship between modified input and SLA. That is, if it could be shown that modified input promotes comprehension, and that comprehensible input promotes acquisition, then it could be deduced that the modified input promotes acquisition.

Two empirical studies have attempted to investigate the modification-acquisition relationship directly. Loschky (1994) examined the relationship between comprehensible input and the learning of Japanese as a L2. In his study, modified input produced through interaction led to higher comprehension, but no relationship was found between comprehension and gains in vocabulary recognition or grammar scores. Through the data from NS-NNS speaker conversations on a direction-giving task, Gass and Varonis (1994) found that both pre-modified input and interaction affected NNSs’ comprehension. However, when NNSs were asked to perform a task of giving directions to NSs, successful completion of the task depended on their opportunities for interacting with NSs during the previous task. Gass and Varonis argued that the interaction with NSs offered a chance for NNSs to detect discrepancies in structure between their language and the target language, and that this affected subsequent task performance.

A number of studies have shown that incidental vocabulary learning can occur during L2 reading (Day, Omura, & Hiramatsu, 1991; Hulstijn, 1992; Kim, 1995; Ko, 1995; Pitts, White, & Krashen, 1989; Watanabe, 1992). That is, although the primary focus of reading is to understand the content of a passage, a reader can learn unknown words from the context, as well. In fact, incidental learning through reading accounts for a great proportion of vocabulary growth (Nagy & Herman,
1985). If this is the case, it can be expected that higher text comprehension will lead to more vocabulary acquisition. In other words, if learners understand the context better, they are more likely to infer the meanings of unknown words from the comprehended context. Therefore, if learners’ comprehension of the context can be improved through elaboration, more vocabulary acquisition should occur.

Problems

In spite of the agreement about the more positive effects of elaboration than simplification on text comprehension, several issues remain unresolved. First, little has been discovered about which types of elaboration are most beneficial for comprehension. Some studies confounded modification categories, and some researchers were more concerned about comparing linguistic simplification with elaborative modification rather than the differential effects of different types of elaboration on comprehension. Only a few studies have been conducted on this issue in listening comprehension, and none in reading.

Second, with few exceptions, most studies have been conducted using university students. These subjects have already acquired a certain amount of L2 vocabulary and syntax. This may imply that the findings of these studies are generalizable to learners of relatively high proficiency. That is, the types of elaborative modification that were used for these subjects may not work with learners of lower proficiency.

Third, if the ultimate goal of providing comprehensible input to L2 learners through text modification is to help their acquisition of the L2 as well as their comprehension, whether modified input leads to more acquisition than unmodified input should also be investigated. Most of the studies reviewed so far have not dealt with this issue.

Purpose of the Study

The present study was an attempt to investigate the differential effects of various types of elaborative modification on L2 reading comprehension and on vocabulary acquisition. Elaboration was defined as adding redundancy to a text through modification. Two types of elaboration were examined: lexical and structural.

Lexical elaboration was chosen because knowledge of the vocabulary in a text is considered to be one of the main factors affecting reading comprehension. In his survey of the sources of reading problems for foreign language readers, Yorio (1971) found out that vocabulary was ranked as the most serious handicap in reading.
English. Other researchers show that readers need 95% lexical coverage of a text for adequate comprehension (Hirsh & Nation, 1992; Liu & Nation, 1985). In addition, Coady (1993) pointed to the dilemma regarding vocabulary simplification and authenticity of the text. That is, while a simplified text runs the risk of producing a distorted version of L2 lexical patterning in actual discourse, a realistic text with its authentic lexical cohesion and pragmatics may be so realistic that the learner can become lost. Thus, vocabulary elaboration without losing any original vocabulary items is a better option than simplification to facilitate L2 learners’ decoding of unknown vocabulary.

Chaudron (1982) offers some insight into vocabulary elaboration. He identified characteristics of vocabulary elaboration in teachers’ speech to L2 learners, and categorized them into two types according to the structural features of the explanation: implicit and explicit. Implicit explanation includes apposition, parallelism, and paraphrasing. Explicit explanation contains definition, questioning, naming, and description. The effect of these devices for vocabulary elaboration on reading comprehension was examined in this study.

Text structure is another factor affecting L2 comprehension. Text structure was operationalized as the logical relationship between sentences, or larger discourse segments, including overall passage organization. Structural elaboration was motivated by several factors. First, not all intersentential relations are marked by explicit signals in authentic texts. This lack of links between sentences may require learners to process more in order to decode a message. Second, several studies emphasized the importance of text structure for comprehension by showing that improved textual coherence through modification facilitated comprehension (Beck, Mckeown, Omanson, & Pople, 1984; Chaudron & Richards, 1986), or by showing that awareness of text structure improved reading comprehension (Carrell, 1994).

**Research Questions**

1. Is L2 comprehension higher when reading a modified text than when reading unmodified one?
2. Is there any difference between the effects of simplification and elaboration on L2 reading comprehension?
3. Are there differences in L2 comprehension of structurally and lexically elaborated texts?
4. How does text modification affect incidental L2 vocabulary learning?
Hypotheses

1a. Comprehension scores of subjects reading simplified texts will be higher than those of subjects reading unmodified texts.

1b. Comprehension scores of subjects reading lexically elaborated texts will be higher than those of subjects reading unmodified texts.

1c. Comprehension scores of subjects reading structurally elaborated texts will be higher than those of subjects reading unmodified texts.

1d. Comprehension scores of subjects reading lexically and structurally elaborated texts will be higher than those of subjects reading unmodified texts.

2a. There will be no statistically significant difference in the comprehension scores of subjects reading simplified texts and those of subjects reading lexically elaborated texts.

2b. There will be no statistically significant difference in the comprehension scores of subjects reading simplified texts and those of subjects reading structurally elaborated texts.

2c. There will be no statistically significant difference in the comprehension scores of subjects reading simplified texts and those of subjects reading lexically and structurally elaborated texts.

3a. There will be no statistically significant difference in the comprehension scores of subjects reading lexically elaborated texts and those of subjects reading structurally elaborated texts.

3b. There will be no statistically significant difference in the comprehension scores of subjects reading lexically elaborated texts and those of subjects reading lexically and structurally elaborated texts.

3c. There will be no statistically significant difference in the comprehension scores of subjects reading structurally elaborated texts and those of subjects reading lexically and structurally elaborated texts.

4a. There will be no statistically significant difference in vocabulary test scores of subjects reading unmodified texts and those of subjects reading simplified texts.

4b. Vocabulary test scores of subjects reading lexically elaborated texts will be higher than those of subjects reading unmodified texts.

4c. There will be no statistically significant difference in vocabulary test scores of subjects reading unmodified texts and those of subjects reading structurally elaborated texts.

4d. Vocabulary test scores of subjects reading lexically and structurally elaborated
texts will be higher than those of subjects reading unmodified texts.

4e. There will be no statistically significant difference in vocabulary test scores of subjects reading simplified texts and those of subjects reading lexically elaborated texts.

4f. There will be no statistically significant difference in vocabulary test scores of subjects reading simplified texts and those of subjects reading structurally elaborated texts.

4g. There will be no statistically significant difference in vocabulary test scores of subjects reading simplified texts and those of subjects reading lexically and structurally elaborated texts.

4h. There will be no statistically significant difference in vocabulary test scores of subjects reading lexically elaborated texts and those of subjects reading structurally elaborated texts.

4i. There will be no statistically significant difference in vocabulary test scores of subjects reading lexically elaborated texts and those of subjects reading lexically and structurally elaborated texts.

4j. There will be no statistically significant difference in vocabulary test scores of subjects reading structurally elaborated texts and those of subjects reading lexically and structurally elaborated texts.

Hypothesis 1a-d were motivated by findings in similar research (e.g., Beck et al, 1984; Brown, 1985; Chaudron & Richards, 1986; Johnson, 1981; Ross et al, 1991; Tsang, 1987). 2a and 2b were formulated as null hypotheses, due to the fact that there has been no research to motivate directional versions. 2c was formulated as a null hypothesis motivated by the findings of previous research (Brown, 1985; Ross et al, 1991). 3a-c were null hypotheses since no research has been conducted to investigate the differential effects of lexical and structural elaboration on L2 learners’ reading comprehension. 4b and 4d were motivated by the results of previous studies of vocabulary learning (Kim, 1995; Toya, 1992; Watanabe, 1992). It was found that lexically elaborated texts had positive effects on vocabulary learning. Except for the above two hypotheses, all hypotheses from 4a to 4j were null because there was no research to motivate directional versions.
METHOD

Subjects

Five hundred and seven 9th grade students in five secondary schools in Korea participated in the study. There were 161 female and 346 male students. One student was eliminated from the analyses because he had lived in the United States for five years (it was assumed that this might have had some influence on his performance on the tests). Another case was also excluded from the analyses because the student did not specify her test booklet type. In addition, data from 21 students were removed since they did not attend either the first or the second session of the study. Therefore, the data from 484 students were used for the analyses. The students' ages were homogeneous, ranging from 15 to 16. All of them had finished eight years of education. Their learning of English was mostly restricted to two years of English classes at school, starting from 7th grade.

Materials

Passages for the treatment groups. In order to minimize the potential effects of content schemata on the reading task, nine passages of various lengths were selected from different sources. The genres and topics of the passages varied—a personal letter, history, natural science, world civilization, biology, and sociology. Five different versions of each passage were prepared: unmodified, simplified, lexically elaborated, structurally elaborated, and lexically and structurally elaborated.

Simplified version. Simplified texts were produced by rewriting compound sentences as several simple declarative sentences which expressed a single main idea per sentence; by using the active voice where possible; by substituting low-frequency words with high-frequency ones.

Lexically elaborated version. Lexical elaboration was achieved primarily by adding redundancy to the language items anticipated to be unknown to the subjects. Unknown language items were identified by checking the students' textbooks and by a pilot study which had been conducted with comparable subjects in spring, 1995. Their definition, synonyms, antonyms, hyperonyms, and exemplification, and prepositional phrases for clarifying their meanings were added through apposition, explicit signaling, and coordination.

Structurally elaborated version. Structural elaboration was achieved through adding redundancy to text structure in order to clarify message content and organization through signaling of intersentential relationships, retention of full NPs,
repetition, supplying omitted elements, using anaphoric rather than cataphoric reference, and paraphrasing for summary statements which make already existing logical relations explicit without adding new information.

**Lexically and structurally elaborated.** This version was generated by combining lexical and structural elaboration. By way of illustration, the five versions of *Ice*, one of the shortest passages used in the study, are shown in Appendix. Descriptive statistics for the readability, complexity, and total length in words of the nine passages are shown in Table 1.

Table 1
*Characteristics of Text Versions*

<table>
<thead>
<tr>
<th>Text Versions</th>
<th>Readability (Flesch-Kincaid grade level)</th>
<th>Complexity (words per sentence)</th>
<th>Length (total words)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmodified</td>
<td>6.5</td>
<td>14</td>
<td>1058</td>
</tr>
<tr>
<td>Simplified</td>
<td>4.0</td>
<td>8</td>
<td>933</td>
</tr>
<tr>
<td>Lexically Elaborated</td>
<td>7.6</td>
<td>18</td>
<td>1388</td>
</tr>
<tr>
<td>Structurally Elaborated</td>
<td>7.7</td>
<td>18</td>
<td>1445</td>
</tr>
<tr>
<td>Lexically &amp; Structurally Elaborated</td>
<td>8.5</td>
<td>20</td>
<td>1749</td>
</tr>
</tbody>
</table>

As shown in Table 1, the three elaborated versions—Lexically, Structurally, and Lexically & Structurally Elaborated Versions—were longer, more complex and more advanced in readability level than the Unmodified and the Simplified Versions. In particular, the Lexically & Structurally Elaborated Version was twice as long as, and 2.5 times more complex than the Simplified Version, as well as 4.5 grade levels more advanced in readability.
Target words. Twenty target words for the vocabulary tests were selected from the reading passages. There were two chief criteria for selecting the target words. First, the words were most likely unknown to the subjects, which was determined by examining their textbooks and by the pilot study. Second, the words could be inferred from the context. Table 2 shows these target words in alphabetical order.

Table 2
Target Words

<table>
<thead>
<tr>
<th>advantage</th>
<th>employment</th>
<th>location</th>
<th>prevent</th>
</tr>
</thead>
<tbody>
<tr>
<td>bite</td>
<td>entertainment</td>
<td>mourn</td>
<td>reputation</td>
</tr>
<tr>
<td>blink</td>
<td>float</td>
<td>occur</td>
<td>shade</td>
</tr>
<tr>
<td>consume</td>
<td>freeze</td>
<td>painful</td>
<td>transportation</td>
</tr>
<tr>
<td>distance</td>
<td>invent</td>
<td>prefer</td>
<td>wheel</td>
</tr>
</tbody>
</table>

Passage for the control group. A short article about the life of Pablo Picasso and his art was used for the control group. It contained 928 words and its readability in terms of Flesch-Kincaid grade level was 7.4. There were 14 words per sentence. There were two purposes in having a control group. First, although the unfamiliarity of the target words was verified by checking the textbooks and through the pilot study, it was impossible to control the subjects’ exposure to them outside school. Thus, by having a control group who read different passages from the treatment groups, it was possible to ascertain whether or not the subjects’ vocabulary test scores came from the treatment. The second purpose was to measure the test effects from posttest to delayed posttest. Since the same vocabulary meaning recognition tests were administered twice (for immediate and delayed posttests), it was assumed that there could be a practice effect from taking the same test twice.

Reading comprehension test for the treatment groups. A 20-item multiple-choice reading comprehension test was developed for the study. The number of questions following each passage ranged from one to four according to the length of the passage and the information it contained. Each question item was followed by three distractors and one correct answer. Care was taken not to make the correct answer the longest among the stems. Each passage was followed by comprehension
questions, so subjects could refer to the passage while they were answering the questions.

The comprehension questions were written in Korean. By using the students’ L1, two potential problems in the reading comprehension test could be avoided. First, the effects of using specific cue vocabulary items in the questions could be eliminated. Since five different versions were used in this study, questions written in English might have included some vocabulary items or sentences from the passages and consequently favored the subjects who read those particular versions. Second, students’ misunderstanding of the test items could be avoided. It is not uncommon that, although readers understand the content of a text, they fail to answer comprehension questions because of the difficulty of understanding the test items.

In order to check the passage dependency of the comprehension questions, two native speakers of Korean were asked to answer the questions without the reading passages. They reported that two of the original questions could be answered without reading the passages. Therefore, minor changes were made to those two items.

The order of reading passages followed by comprehension questions was different across groups. The reason for this was to remove any possibility of copying the answers from other students.

Reading comprehension tests for the control group. Ten open-ended comprehension questions were developed for the control passage to have the students in the Control Group engage in normal reading behaviors (to understand the content of the passages) and spend the same amount of time on the task as the students in the treatment groups. Since the reading comprehension level of the control group was not the focus of this study, their comprehension scores were not included in the analysis.

Form and meaning recognition vocabulary tests. The vocabulary tests consisted of two recognition tests: Form and Meaning. There were several reasons for using the recognition tests. First, the first stage of language acquisition is considered to be recognition of target form (Chaudron, 1985; Long, ESL 750 class, Fall 1994). Second, since the subjects were exposed to the target items for the first time, it would be hard to expect a great amount of learning from only one exposure (Chung, 1994). So, a recognition test was a more sensitive measure to detect this initial learning (Jenkins, Stein, & Wysocki, 1984; Shanks & St. John, 1994).

For the Form Recognition Test, subjects were given 40 words, including the 20 target words, and asked to circle the words they thought they had seen in the text. In order to prevent subjects from choosing all the words, including distractors, they were
told that some of the words were in the previous passages, but some were not. For the Meaning Recognition Test, 20 target items were presented with a list of 40 meanings in Korean including 20 correct meanings and 20 distractors. This, therefore, was a multiple-choice test. Subjects were asked to choose only one correct meaning for each target word. All directions and the meanings of the target words and distractors were given in Korean.

**Delayed meaning recognition vocabulary test.** To test long-term retention of initial learning, a delayed vocabulary test was given one week later. The test was the same as the Meaning Recognition Test, but the target words and their meanings were ordered differently.

**Procedures**

The study, which consisted of two sessions, was conducted at five secondary schools in Korea in the summer of 1995. In the first session, students took the three-section tests which contained a reading comprehension test and two vocabulary tests. The test booklets which contained either one of the five versions of nine passages or the control passage were randomly distributed within each intact class. The students were told that the order of reading passages followed by comprehension questions was different across each test booklet type. However, since incidental vocabulary learning was investigated in this study, students were not told they would have vocabulary tests later. Subjects were given 70 minutes to finish the Reading Comprehension Tests. The reading booklets were then collected. The two vocabulary tests were administered: after the subjects took the Form Recognition Test first, the tests were again collected, and then the Meaning Recognition Tests were given. All students took the same vocabulary tests. Five minutes were allowed for the Form Recognition Test, and ten minutes for the Meaning Recognition Test. The appropriateness of the time limits was ascertained from the pilot study. After students finished all the tests, they were given the bio-data questionnaire to fill out. In the second session, the Delayed Vocabulary Meaning Recognition Tests were given to the same subjects for ten minutes. The average time interval between the first and second sessions was 7.4 days, ranging from seven to nine days.

**Scoring.** The reading comprehension test consisted of 20 multiple-choice questions, and each correct answer received one point, resulting in a maximum score of 20. For the Form Recognition Test, correct responses were calculated. For the two Meaning Recognition Tests a multiple-choice format was adopted, so each correct
answer received one point. The maximum score on each vocabulary test was also 20.

**Analyses**

As mentioned earlier, the data from 484 students were used in the analyses. Two primary comparisons were conducted. First, a one-way multivariate analysis (MANOVA) for the three vocabulary test scores of all groups was conducted. If there was a significant difference in the overall MANOVA result, a follow-up univariate analysis (ANOVA) and post hoc Scheffé tests were to be conducted to locate source(s) of the specific mean differences. The purpose of this first analysis was to make sure that the subjects in the treatment groups improved their vocabulary scores on the basis of the treatment alone. Since no pretests were given, this was a necessary step to check subjects’ previous knowledge of the target words. Second, mean comparisons were also performed using MANOVA for the reading comprehension test and the three vocabulary tests. The scores from the control group were excluded from this analysis since the students in that group had taken different reading comprehension tests. Again, ANOVAs and post hoc Scheffé tests were used to determine the source of all significant differences. The analyses were conducted using the SuperANOVA (Abacus Concepts, 1989) software package. Since two overall comparisons were conducted, the alpha level for all analyses was adjusted to .025 ($\alpha/2 = 0.05/2 = 0.025$) in order to maintain an approximate experiment alpha level of .05.

**RESULTS**

**Main Analyses**

In order to ensure that the students in the treatment groups improved their vocabulary scores due to the treatment alone, mean comparisons including the Control Group were first conducted for the vocabulary tests ($N = 484$). Table 3 shows the descriptive statistics for the three vocabulary tests and their internal consistency reliability calculated using the Kuder-Richardson 21 formula (K-R21). The maximum possible score for each test was 20 (1 point x 20 items).
Table 3
Descriptive Statistics for the Vocabulary Tests

<table>
<thead>
<tr>
<th>Text version</th>
<th>N</th>
<th>Form Recognition</th>
<th>Meaning Recognition 1</th>
<th>Meaning Recognition 2 (Delayed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>79 $M$</td>
<td>5.165</td>
<td>1.190</td>
<td>1.241</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>3.429</td>
<td>1.433</td>
<td>1.434</td>
</tr>
<tr>
<td>Unmodified</td>
<td>77 $M$</td>
<td>10.182</td>
<td>5.429</td>
<td>5.558</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>4.297</td>
<td>5.521</td>
<td>4.854</td>
</tr>
<tr>
<td>Simplified</td>
<td>82 $M$</td>
<td>12.146</td>
<td>6.122</td>
<td>5.793</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>4.563</td>
<td>5.238</td>
<td>5.506</td>
</tr>
<tr>
<td>Lex. Elaborated</td>
<td>82 $M$</td>
<td>10.963</td>
<td>6.366</td>
<td>5.561</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>4.882</td>
<td>5.323</td>
<td>5.677</td>
</tr>
<tr>
<td>Struc. Elaborated</td>
<td>85 $M$</td>
<td>10.600</td>
<td>5.859</td>
<td>5.376</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>3.995</td>
<td>5.069</td>
<td>5.102</td>
</tr>
<tr>
<td>Lex. &amp; Struc. Elaborated</td>
<td>79 $M$</td>
<td>10.595</td>
<td>5.911</td>
<td>5.367</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>4.046</td>
<td>5.405</td>
<td>5.440</td>
</tr>
<tr>
<td>Total</td>
<td>484 $M$</td>
<td>9.969</td>
<td>5.167</td>
<td>4.831</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>4.745</td>
<td>5.181</td>
<td>5.120</td>
</tr>
<tr>
<td>K-R21</td>
<td>.820</td>
<td>.902</td>
<td>.906</td>
<td></td>
</tr>
</tbody>
</table>

It should be noted here that the students in the Control Group read a different passage from the other groups, which did not contain the target words. Table 3 indicates that the means of the other five groups on the three vocabulary posttests were higher than those of the Control Group. Regardless of the text versions, all groups obtained higher scores on the Form Recognition Test than on the two Meaning Recognition Tests. The internal consistency reliability of the two Meaning Recognition Tests was somewhat higher than that of the Form Recognition Test.

A multivariate analysis was performed on the data with the three vocabulary tests
used as the dependent variables and Text Version as the independent variable. All analyses (Wilks' Lambda, Hotelling-Lawley Trace, and Pilai Trace) indicated multivariate significance below $p < .001$. Therefore, a univariate analysis of variance (ANOVA) procedures were conducted for each of the tests.

Table 4

ANOVA on Form Recognition Test Scores (with Control Group)

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text Version</td>
<td>5</td>
<td>2361.648</td>
<td>472.330</td>
<td>26.391</td>
<td>.0001</td>
</tr>
<tr>
<td>Residual</td>
<td>478</td>
<td>8554.887</td>
<td>17.897</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5

ANOVA on Meaning Recognition Test 1 Scores (with Control Group)

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text Version</td>
<td>5</td>
<td>1531.945</td>
<td>306.389</td>
<td>12.811</td>
<td>.0001</td>
</tr>
<tr>
<td>Residual</td>
<td>478</td>
<td>11431.500</td>
<td>23.915</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6

ANOVA on Meaning Recognition Test 2 Scores (with Control Group)

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text Version</td>
<td>5</td>
<td>1226.712</td>
<td>245.342</td>
<td>10.255</td>
<td>.0001</td>
</tr>
<tr>
<td>Residual</td>
<td>478</td>
<td>11435.395</td>
<td>23.923</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
All the univariate analyses indicated that there was a significant effect for Text Version. Thus, Scheffé multiple comparisons were performed to locate the source of the significant effect for each test. The results of the post hoc analyses for each vocabulary test indicated that there were significant differences between the scores of the Control Group and those of the other groups on the three vocabulary tests ($p < .001$). Thus, the scores of the five treatment groups on the vocabulary tests appeared to be due to the treatment, not to the students' previous knowledge of the target words.

A second comparison was performed for the reading comprehension and vocabulary test scores. Since students in the Control Group had read different passages from those in the treatment groups, their scores were removed from all further analyses ($N = 405$). Descriptive statistics for the scores on the four tests and internal consistency reliability (K-R 21) are shown in Table 7. The maximum possible score for each test was 20 (1 point x 20 items). Table 7 indicates that on average the students in each group scored only between 36.1 percent (7.221) and 50.3 percent (10.049) of the maximum possible score on the Reading Comprehension Test. The means of all modified version groups (the Simplified and three elaborated groups) were higher than those of the Unmodified Group, and that the Simplified Version Group scored the highest. The internal consistency reliability of the Reading Comprehension Test was lower than those of the other vocabulary tests. On the Form Recognition Test, all groups scored more than 50 percent of the maximum score. Again, the Simplified Version Group scored the highest (12.146). On the Meaning Recognition Test 1, each group scored only 27.2 percent (5.429) to 31.8 percent (6.366) of the maximum score. The Lexically Elaborated Version Group scored the highest. On the Delayed Meaning Recognition Test, the scores of all groups except the Unmodified Version Group decreased compared to the Meaning Recognition Test 1. In particular, the scores of the Lexically Elaborated Version group decreased the most.

In order to control for Type I errors, a MANOVA was performed on the data with the Reading Comprehension Test and the three vocabulary tests used as the dependent variables and Text Version as the independent variable. All analyses (Wilks' Lambda, Hotelling-Lawley Trace, and Pillai Trace) indicated multivariate significance below $p < .0031$. Thus, univariate ANOVAs were conducted for each test.
Table 7  
*Descriptive Statistics for Reading Comprehension and Vocabulary Test scores*

<table>
<thead>
<tr>
<th>Text version</th>
<th>N</th>
<th>Reading Compreh.</th>
<th>Form Recognition</th>
<th>Test Meaning Recognition 1 (Delayed)</th>
<th>Test Meaning Recognition 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmodified</td>
<td>77</td>
<td>7.221</td>
<td>10.182</td>
<td>5.429</td>
<td>5.558</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>2.923</td>
<td>4.297</td>
<td>5.521</td>
<td>4.854</td>
</tr>
<tr>
<td>Simplified</td>
<td>82</td>
<td>10.049</td>
<td>12.146</td>
<td>6.122</td>
<td>5.793</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>4.422</td>
<td>4.563</td>
<td>5.238</td>
<td>5.506</td>
</tr>
<tr>
<td>Lex. Elaborated</td>
<td>82</td>
<td>8.671</td>
<td>10.963</td>
<td>6.366</td>
<td>5.561</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>3.381</td>
<td>4.882</td>
<td>5.323</td>
<td>5.677</td>
</tr>
<tr>
<td>Struc. Elaborated</td>
<td>85</td>
<td>9.047</td>
<td>10.600</td>
<td>5.859</td>
<td>5.376</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>3.641</td>
<td>3.995</td>
<td>5.069</td>
<td>5.102</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>3.943</td>
<td>4.046</td>
<td>5.405</td>
<td>5.440</td>
</tr>
<tr>
<td>Total</td>
<td>405</td>
<td>8.849</td>
<td>10.906</td>
<td>5.943</td>
<td>5.531</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>3.796</td>
<td>4.400</td>
<td>5.291</td>
<td>5.285</td>
</tr>
<tr>
<td>K-R21</td>
<td></td>
<td>.692</td>
<td>.783</td>
<td>.896</td>
<td>.902</td>
</tr>
</tbody>
</table>
Table 8
ANOVA on Reading Comprehension Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text Version</td>
<td>4</td>
<td>335.978</td>
<td>83.995</td>
<td>6.124</td>
<td>.0001</td>
</tr>
<tr>
<td>Residual</td>
<td>400</td>
<td>5485.834</td>
<td>13.715</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 9
ANOVA on Form Recognition Test Scores (without Control Group)

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text Version</td>
<td>4</td>
<td>182.408</td>
<td>45.602</td>
<td>2.388</td>
<td>.0505</td>
</tr>
<tr>
<td>Residual</td>
<td>400</td>
<td>7638.027</td>
<td>19.095</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 10
ANOVA on Meaning Recognition Test 1 Scores (without Control Group)

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual</td>
<td>400</td>
<td>11271.348</td>
<td>28.178</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 11. ANOVA on Meaning Recognition Test 2 Scores (without Control Group)

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text Version</td>
<td>4</td>
<td>9.899</td>
<td>2.475</td>
<td>.088</td>
<td>.9862</td>
</tr>
<tr>
<td>Residual</td>
<td>400</td>
<td>11274.965</td>
<td>28.187</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Only the Reading Comprehension scores showed a significant main effect for text version at \( p < .025 \) (Table 8). The post-hoc analysis using Scheffé showed that only the difference between the Unmodified Version Group and the Simplified Version Group was significant at \( p < .025 \). The differences between the other two pairs of groups, the Unmodified vs. the Structurally Elaborated Version Groups and the Unmodified vs. the Lexically & Structurally Elaborated Version Groups showed a non-significant trend in the same direction \( (p < .0452 \) and \( p < .0311 \), respectively).

**Additional Analyses**

Additional analyses were performed to investigate the relationship between reading comprehension and vocabulary test scores. A correlation coefficient between reading comprehension scores and each of the vocabulary test scores was calculated. Subjects in the Control Group were excluded from this analysis (therefore, \( N = 405 \)).

**Table 12**

*Correlation Coefficients (and \( R^2 \) in Parentheses) between Reading Comprehension Scores and Three Vocabulary Test Scores*

<table>
<thead>
<tr>
<th>Text Version</th>
<th>N</th>
<th>Form Recognition</th>
<th>Meaning Recognition</th>
<th>Meaning Recognition 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmodified</td>
<td>77</td>
<td>.249 (.062)</td>
<td>.351* (.123)</td>
<td>.311* (.097)</td>
</tr>
<tr>
<td>Simplified</td>
<td>82</td>
<td>.472* (.223)</td>
<td>.567* (.321)</td>
<td>.477* (.227)</td>
</tr>
<tr>
<td>Lex. Elaborated</td>
<td>82</td>
<td>.413* (.170)</td>
<td>.454* (.206)</td>
<td>.439* (.193)</td>
</tr>
<tr>
<td>Struc. Elaborated</td>
<td>85</td>
<td>.397* (.157)</td>
<td>.389* (.152)</td>
<td>.356* (.127)</td>
</tr>
<tr>
<td>Lex. &amp; Struc. Elaborated</td>
<td>79</td>
<td>.400* (.160)</td>
<td>.529* (.280)</td>
<td>.478* (.228)</td>
</tr>
<tr>
<td>Total</td>
<td>405</td>
<td>.406* (.165)</td>
<td>.458* (.209)</td>
<td>.409* (.168)</td>
</tr>
</tbody>
</table>

\( * p < .01 \)
As shown in Table 12, the correlations of reading comprehension with all vocabulary test scores were significant (except for Form Recognition in the Unmodified Version Group). However, the low overlapping variances expressed by R-Squared suggest that there were intervening variables unique to each test. Therefore, it is not possible to claim any strong relationships between the students’ comprehension of the reading passages and their vocabulary learning. As for the correlation between students’ reading comprehension and vocabulary learning for the different types of text modification, except for the Structurally Elaborated Version Group, all groups showed a similar pattern; that is, Meaning Recognition Test I had a higher correlation with the Reading Comprehension scores than the other two vocabulary tests did. For the Structurally Elaborated Group, Form Recognition Test scores correlated with the Reading Comprehension scores more than the two Meaning Recognition Tests did. For the Simplified and Lexically & Structurally Elaborated Groups, the vocabulary test scores showed a higher correlation with the Reading Comprehension scores compared to the other groups.

DISCUSSION

Effects of Text Modification on Reading Comprehension

Results of the study indicated a significant effect for text modification type on foreign language reading comprehension. Students who read the Simplified Versions comprehended the texts significantly better than those who read the Unmodified Versions, so hypothesis 1a was supported. Hypotheses 1b, 1c, and 1d were rejected: students who read the three elaborated versions (Lexically Elaborated, Structurally Elaborated, and Lexically & Structurally Elaborated) scored higher than those who read the Unmodified versions, but not statistically significant so. However, the difference between the two pairs of groups, Unmodified vs. Structurally Elaborated and Unmodified vs. Lexically & Structurally Elaborated, showed a tendency towards significance ($p < .0452$ and $p < .0311$) that might have occurred if the study had been more powerfully designed.

Hypotheses 2a, 2b, and 2c were supported since there was no significant difference between the Simplified Version Group and the three elaborated version groups on reading comprehension: Lexically, Structurally and Lexically & Structurally Elaborated. These results are consistent with the findings of previous studies. Both simplification and elaboration were shown to improve L2 reading
comprehension, and simplification was more effective than elaboration. However, the difference between the effects of simplification and elaboration was not statistically significant no matter which elaborative devices were used. This is especially noteworthy because students in the elaborated version groups read much longer and more complex texts than those in the Simplified and Unmodified Version Groups (Table 1). Thus, subjects who read the elaborated texts had a heavier processing burden than those who read the simplified texts. This might have offset the effects of text elaboration on reading comprehension since the same amount of time was allowed all groups.

Hypotheses 3a, 3b, and 3c were supported: no statistically significant difference was found among the elaborated text version groups. However, note that students who read the Structurally Elaborated Versions scored higher than those who read the Lexically Elaborated Versions, and they almost achieved as well the Lexically & Structurally Elaborated Group. Although no statistically significant difference was found, structural elaboration might have been more effective than lexical elaboration for reading comprehension, especially for these subjects. It might be possible that some of the devices used for lexical elaboration were not explicit enough for students to recognize the redundant information. As Chaudron (1982) pointed out, the subjects in this study might not have discerned whether the same information had been provided redundantly or whether new information had been supplied. As a result, some of the elaborated vocabulary items may have added to the processing burden for subjects rather than helped them to understand the passages.

Effects of Text Modification on Vocabulary Acquisition

Although text modification had significant effects on reading comprehension, no significant effect for text modification type was found on either vocabulary form or meaning recognition tests. Therefore, hypotheses 4b and 4d were not supported: there was no significant difference between the Unmodified Version Group and the two elaborated version groups (Lexically and Lexically & Structurally Elaborated) on any of the vocabulary recognition tests. In addition, all hypotheses 4a through 4j except the above two hypotheses were supported: no significant difference between any pairs of groups was found on the three vocabulary tests.

These results were contrary to the findings of previous research. That research had shown the positive effects of vocabulary elaboration on vocabulary learning (Kim, 1995; Toya, 1992; Watanabe, 1992). One reason for this could be that the subjects
who participated in this study were younger than those in the previous studies: 9th grade students participated in this study, whereas college students participated in the previous ones. It is assumed that the students in this study had relatively lower English proficiency than those in earlier studies. Therefore, the effects of the elaboration devices used in this study might not be strong enough for these subjects to produce any significant difference between text version groups.

However, incidental vocabulary learning did occur while reading: all treatment groups scored significantly higher than the control group on the three vocabulary tests. On the Form Recognition Test, the subjects in the treatment groups recognized more than half of the target words. The subjects reading the Unmodified Versions scored the lowest although they read shorter texts than the elaborated ones. Since no redundant information or structural signaling was provided to the Unmodified Versions, it might have been difficult for students in this group to comprehend the content of the texts. Thus, they may hardly have had enough processing capacity to attend to the form of each target word, as well. This is consistent with VanPatten’s (1989) argument that learners’ conscious attention to form in the input competes with conscious attention to meaning, and that only when input is easily understood can learners attend to form as part of the intake process. All other groups scored higher than the Unmodified Group, but the difference between them was not statistically significant. The scores of subjects who read the Simplified Versions were higher than those of subjects in the other groups (Table 7). This can be interpreted in two ways. First, simplification might have been more effective than other modification types in helping the students to comprehend the texts, so they could also pay attention to the forms of the words. Alternatively, the students in this group read the shortest texts, so they might have had more time to look at the passages.

The results of Meaning Recognition Test 1 show that students could recognize only the meanings of a few target words (5 or 6 out of 20). As Chung (1994) pointed out in an earlier study of incidental vocabulary learning, students must have had a hard time remembering the meaning of a word after only one exposure. According to Coady (1993), research on learning words in context found only a 5%-15% probability that a given word would be learned at first exposure. The number of repetitions required for learning varied across studies. In Crothers and Suppes (1967, cited in Nation, 1982), almost all learners had mastered 108 Russian-English word pairs after seven repetitions. Saragi, Nation, and Meister (1978) found that most learners needed sixteen encounters to recognize the meaning of a word. The
incidental acquisition research suggests gradual but steady incremental growth of vocabulary knowledge through meaningful interaction with text.

On the Delayed Meaning Recognition Test, the scores of all groups except the Unmodified Group decreased a little compared to the Meaning Recognition Test. The scores of the Lexically Elaborated Group dropped especially dramatically. There seemed to be not much difference between groups any more. Overall, students still retained their initial vocabulary learning after one week.

Relationship between Second Language Comprehension and Acquisition

There seemed to be a correlation between reading comprehension and incidental vocabulary learning. As shown in Table 12, the correlation between reading comprehension and vocabulary test scores was statistically significant. In particular, the Simplified and Lexically & Structurally Elaborated Version Groups, which scored highest on the Reading Comprehension Test, showed a higher correlation between reading comprehension and vocabulary learning than the other three groups. However, it is not possible to claim any strong relationship between reading comprehension and vocabulary learning since the overlapping variances were low.

Improved comprehension appears to result in more acquisition according to the results of this study: subjects who read modified texts (either simplified or elaborated) scored higher both on reading comprehension and vocabulary tests than those who read unmodified ones. However, since no significant difference was found between their vocabulary test scores, it is not possible to claim that improved comprehension necessarily caused more acquisition. Besides, it is not yet clear which types of modification are more beneficial for vocabulary learning. Although the Simplified Version Group scored higher than the other modified version groups on almost all vocabulary tests, there was still no statistically significant difference between them.

CONCLUSION

In this study, the effects of different types of elaboration on L2 reading comprehension and vocabulary acquisition were investigated. Both simplification and elaboration increased L2 comprehension. Although simplification seemed to be slightly more effective than elaboration, there was no significant difference between the effects of simplification and elaboration. Thus, it is suggested that elaboration of texts is a better option for foreign language reading comprehension than simplification, since elaboration offers more native-like language models. Put another
way, given the fact that the long-range goal of a reading lesson is not the understanding of a particular text, but the learning of language which is applicable to the real world, elaboration is more conducive to this goal. Among the different types of elaboration, structural elaboration appeared to be more effective than lexical elaboration. However, it would be hasty to conclude that structural elaboration is more effective than lexical elaboration since no significant difference was found. The relationship between types of modification and acquisition was not clear in this study. Although modification seemed to improve vocabulary acquisition, it is hard to determine whether certain types of modification are more effective for L2 vocabulary acquisition than other types.

Although significant effects for text modification on reading comprehension were found, there were several limitations to this study. First, as a by-product of the elaboration process, the elaborated versions were much longer and more complex than the other text versions. This might have worked against the effects of elaboration on both reading comprehension and vocabulary learning. This might be why some of the studies on text elaboration (Parker & Chaudron, 1987; Ross et al., 1991; Tsang, 1987), including this one, could not find a significant difference in L2 comprehension between elaborated versions and unmodified versions.

Second, overall low mean reading comprehension scores suggest that the reading passages were difficult for these subjects. Since subjects were assumed to have low English proficiency, it must have been hard for them to read authentic materials (i.e. written for native speakers). However, this was an essential component of the study because its purpose was to investigate the effects of text modification on reading comprehension and vocabulary learning. If the premodified texts written for the nonnative speakers had been adopted, it would have been impossible to expect any difference between the text types.

Third, there is an issue which this study did not address. Several studies (including this one) have pointed out that an elaborated text is more natural than a simplified one (Brown, 1985; Parker & Chaudron, 1987; Ross et al., 1991). Although intuitively appealing, this is based on researchers' impressionistic judgments. If too much redundant information is provided through elaboration, it is possible that the text will no longer be natural and the readers will instead just have a heavier processing burden. Since the naturalness of elaborated texts is their main advantage over simplified texts, this is an important issue. Thus, for such a claim to be justified, more objective tests or judgments would be required.
REFERENCES


APPENDIX
FIVE VERSIONS OF A TEXT, AND AN ACCOMPANYING COMPREHENSION QUESTION

Ice

Unmodified (NS baseline)
When ice forms, it floats. Think what that means to people who live in cool climates. If ice sank, a pond or lake would gradually freeze from the bottom up, killing the fish and other creatures. If that happened, life as we know it could not exist. But ice actually helps prevent the cold air from freezing the water below.

Simplified
When ice forms, it floats. This is important for people in cool climates. If ice sank, a pond or lake would freeze from the bottom. The fish and other creatures would die. If that happened, life could not exist. But ice helps prevent the cold air from freezing the water below.

Lexically Elaborated
When ice forms, it floats and stays on top of the water. Think what that means to people who live in cool climates, for example, Eskimos. If ice sank to the bottom, a pond or lake would slowly and gradually freeze from the bottom up, killing the fish and other creatures such as plants and other animals in the water. If that happened, life as we know it could not exist and would die. But ice actually helps prevent the cold air and stop it from freezing the water below.

Structurally Elaborated
When ice forms, it floats. Ice doesn’t sink. Think what that means to people who live in cool climates. If ice sank, a pond or lake would gradually freeze from the bottom up, killing the fish and other creatures, so everything in the water would freeze. If that happened and ice sank, life as we know it could not exist and nothing could live in the water. But because ice is lighter than water, it floats and actually helps prevent the cold air from freezing the water below.
Lexically & Structurally Elaborated

When ice forms, it floats and stays on top of the water. Ice doesn’t sink. Think what that means to people who live in cool climates, for example, Eskimos. If ice sank to the bottom, a pond or lake would gradually freeze from the bottom up, killing the fish and other creatures such as plants and other animals in the water, so everything in the water would freeze. If that happened and ice sank, life as we know it could not exist and would die. Nothing could live. But because ice is lighter than water, it floats and actually helps prevent the cold air and stop it from freezing the water below.

Question

1. The writer says that
a) if it is too cold, a pond can freeze eventually
b) if the ice is too heavy, it can sink under water
c) the fish cannot live in cold water
d) it is good for the people in cold regions that ice doesn’t sink

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