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EFFECTS OF INPUT ELABORATION AND ENHANCEMENT ON SECOND  
LANGUAGE VOCABULARY ACQUISITION THROUGH READING BY KOREAN  
LEARNERS OF ENGLISH

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To Eun-Joo

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## ABSTRACT

The present study investigates the effects of lexical elaboration and typographical enhancement on the acquisition of second language (L2) vocabulary through reading by 297 Korean learners of Freshman English. The primary research questions are whether (1) lexical elaboration, typographical enhancement, or a combination of both, has an effect on L2 vocabulary acquisition through reading, and whether (2) two specific types of lexical elaboration, explicit or implicit, differentially affect L2 vocabulary acquisition. Participants were exposed to 26 low-frequency target words (TWs) by reading one of six versions of an experimental text containing these TWs. An explicitly lexically elaborated text had all TWs immediately followed by *which means* plus a synonym- or definition-type vocabulary explanation, whereas the TWs in an implicitly lexically elaborated text were immediately followed by an appositive vocabulary explanation only. A typographically enhanced text contained all TWs set in bold face in order to increase perceptual salience, in hopes of drawing participants' attention to the TWs while reading. The study adopted a 2 x 3 factorial multivariate analysis of variance design with typographical enhancement with two levels (enhanced, unenhanced) and type of lexical elaboration with three levels (explicit, implicit, unelaborated) as two independent variables, and form- and meaning-recognition vocabulary posttests as two dependent variables. The results were: (a) lexical elaboration alone did not aid *form* recognition of L2 vocabulary; (b) explicit lexical elaboration alone aided *meaning* recognition of L2 vocabulary; (c) typographical enhancement alone did not aid *form* and *meaning*

recognition of L2 vocabulary; (d) lexical elaboration and typographical enhancement combined did not aid *form* recognition of L2 vocabulary; (e) both explicit and implicit lexical elaboration aided *meaning* recognition of L2 vocabulary; (f) explicit and implicit lexical elaboration did not differ in their effect on *form* and *meaning* recognition of L2 vocabulary; and (g) whether a text was further enhanced in addition to either explicit or implicit lexical elaboration did not seem to make a difference in the acquisition of either the *forms* or the *meanings* of the previously unknown words in the text. Pedagogical implications are discussed and suggestions for future research are proposed.

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## CHAPTER 1

### STATEMENT OF THE RESEARCH PROBLEM

This dissertation research focused on how college-level English as a foreign language (EFL) learners in Korea acquired English vocabulary incidentally from reading either elaborated, enhanced, or both elaborated and enhanced written text in English, while their primary task was reading for meaning. The new empirical study was motivated by two strands of research in the field of second language acquisition (SLA), those on (a) elaborated and enhanced written input, and (b) incidental vocabulary acquisition through reading.

#### **1.1 Incidental second language vocabulary acquisition through reading**

Evidence exists that both L1 and L2 learners are able to acquire both first language (L1) vocabulary (see, e.g., Nagy, 1997; Nagy & Anderson, 1984; Nagy, Herman, & Anderson, 1985; Nagy & Herman, 1987; Nagy, Anderson, & Herman, 1987) and second language (L2) vocabulary (see, e.g., Hulstijn, 2001, 2003, for state-of-the-art reviews) while reading for meaning. Incidental learning has been suggested as the explanation for how L1 and L2 learners acquire a larger vocabulary than they have been explicitly taught (Hulstijn, 2003). The incidental-vocabulary-acquisition-from-reading evidence has often been interpreted in L2 pedagogy as showing that extensive reading being a fertile ground for vocabulary acquisition (see, e.g., Coady, 1997; Huckin & Coady, 1999).

However, not all contexts are created to be intrinsically reader-friendly. For example, clues that can help L2 readers infer the meanings of unknown words from context are not always present, or, if present, explicitly and saliently marked in the text (see, e.g., Nagy, 1997; Sternberg, 1987).

In addition, even when such clues are available, the success with which L2 readers infer word meaning, and their reading comprehension, depend in large part on their knowledge of a number of previously known word families<sup>1</sup> in a text, which functions as a threshold that they have to cross. Only when they know as many as 4,000 word families in academic texts (Hirsh & Nation, 1992), which accounts for 95% text coverage<sup>2</sup> (i.e., they know 19 of every 20 words in the text), will L2 readers be able to arrive at adequate text comprehension and infer the meanings of unfamiliar words they encounter.

Given the importance of academic vocabulary in L2 academic reading (e.g., a list of 570 word families in the *Academic Word List* [Coxhead, 1998, 2000]), instructional priority should be given to introducing academic vocabulary to university-level L2 learners as soon as they are familiar with the most frequent 2,000 general service words in English. When proper nouns and technical vocabulary are added to L2 learners' vocabulary stock of 2,570 word families, the requisite 95% text coverage can be achieved

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<sup>1</sup> A word family is a set of closely related words that consist of a headword (i.e., a base form) (e.g., swim), its inflections (e.g., swims, swimming, swam), and its derivatives (e.g., swimmer) (Bauer & Nation, 1993).

<sup>2</sup> Text coverage is defined as “the actual percentage of word tokens in a given text understood by a reader” (Laufer, 1992, p. 58).

(Nation, 2001, p. 197). Words beyond those 4,000 word families, however, are expected to be learned when L2 learners are actively engaged in, for example, doing academic work in their major field of study.

Thus, in order to facilitate L2 learners' acquisition of low-frequency words in English, which are still important if they are to comprehend the informational content in a text within their academic disciplines, but direct teaching of which may not be cost-effective, both (a) making meanings of such low-frequency words available in the text and, at the same time, (b) drawing L2 learners' attention to such low-frequency words, are expected to be effective approaches.

In sum, the question "Is incidental L2 vocabulary acquisition through reading possible?" is not at issue any more. The answer is definitely "yes." However, as native speaker (NS) text is not always helpful in its unmodified form for enabling L2 learners to acquire L2 vocabulary, as well as to comprehend the text, a more interesting question is "Which type of written text, modified or unmodified, is more conducive to incidental L2 vocabulary acquisition?"

## **1.2 Input modification in second language vocabulary acquisition**

Text primarily written by and for an audience of NSs may often be lacking in L2 reader-friendly features, a circumstance which could lead to comprehension difficulties or faulty comprehension, as well as to failure to acquire vocabulary from reading. In an attempt to make written text (i.e., input to which L2 learners are exposed while reading) comprehensible, an array of features, often observed in and characterized by spoken face-to-face conversational interaction between proficient and less proficient users of a

language (e.g., between NS and NNS, or between proficient NNS and less proficient NNS), has been employed. That is, results of research on modifications to the interactional structure of spoken discourse or negotiation for meaning in the oral mode have been fruitfully applied to written text modification research (see, e.g., Yano, Long, & Ross, 1994, for a comprehensive review).

In order to be rendered comprehensible primarily, and ultimately conducive to L2 learners' acquisition of L2 target features (e.g., lexical items or syntactic structures), L2 text is often subject to text modification. Text modification comes in two types: elaboration and simplification. Text elaboration enriches NS text by providing meanings of unknown words in the form of paraphrases which are normally deleted in text simplification and by making thematic or anaphoric relationships in a text more transparent. Text simplification results in increased comprehensibility of the texts, as compared to unsimplified texts, but comes at a hefty price, i.e., removal of potential candidates for SLA, e.g., lexical items or syntactic structures impressionistically deemed difficult by materials writers, and thus inappropriate, for the level of their intended users (Long, 1996a). In contrast, text elaboration does as good a job of making text easier to understand as text simplification, and, *in addition*, which is important from an acquisition perspective, retains items that would have been removed from a text by the simplification process.

In previous written text modification research, vocabulary has been adopted as a stand-alone acquisitional measure (e.g., Kim, 1996; Silva, 2000), or used along with a measure of reading comprehension (e.g., Chung, 1995; Urano, 2000). Also investigated has been the comparative effectiveness of type of (a) text modification (simplification,

elaboration, or non-modification) (e.g., Chung, 1995; Kim, 1996; Silva, 2000; Urano, 2000), (b) text elaboration (lexical, structural, or both lexical and structural) (e.g., Chung, 1995), and (c) lexical elaboration (explicit or implicit) (e.g., Silva, 2000).

Text modification research also subsumes written input enhancement research, in that the latter also attempts to modify certain linguistic features in a text to make them perceptually salient to L2 learners, with the intended purpose of (a) increased comprehensibility of the propositional content, and (b) enhanced acquirability of those features in the text.

Unlike L2 written input elaboration research, all L2 written input enhancement studies to date have investigated only the effect of typographical input enhancement on the acquisition of L2 morphosyntax, almost to the exclusion of L2 vocabulary (see, e.g., Alanen, 1995; Doughty, 1991; Izumi, 2002; Jourdenais, 1998; Jourdenais, Ota, Stauffer, Boyson, & Doughty, 1995; Leeman, Arteagoitia, Fridman, & Doughty, 1995; Leow, 1997, 2001; Overstreet, 1998; Shook, 1994; J. White, 1998; Wong, 2000).

Morphosyntactic L2 features employed as SLA targets include, among other things, English relative clauses (Doughty, 1991), Spanish present perfect tense and relative pronouns (Shook, 1994), semi-artificial Finnish locative suffixes and consonant gradation (Alanen, 1995), and English possessive determiners (J. White, 1998). But Laufer and Hill (2000) may be considered an exception to this trend to some extent.

Although not classified as a L2 written input enhancement study proper, Laufer and Hill (2000) used highlighting as a typographical input enhancement device in their CALL experiment, where 12 low-frequency target words were highlighted in red. In their study, unfortunately, highlighting was not systematically manipulated to investigate its

effect on incidental vocabulary acquisition from reading an electronic text on the computer screen with the help of ready access to a built-in electronic dictionary. Laufer and Hill (2000) reasoned that highlighting in their study could have rendered their input more salient, which in turn could have produced the better results they obtained than those in Knight (1994) and Hulstijn, Hollander, and Greidanus (1996), which also investigated incidental vocabulary acquisition from reading when L2 learners had access to a dictionary.

Given the brief overview of previous research above, it can be concluded that as yet, no study has systematically looked at (a) whether and how typographical written input enhancement affects incidental L2 vocabulary acquisition through reading, and (b) whether a combination of both input elaboration and enhancement in the written mode facilitates incidental L2 vocabulary acquisition through reading more than either elaboration or enhancement alone. Research on these issues is required.

### **1.3 Purpose of the present study**

A new study combined and extended the above-mentioned two lines of research in SLA to investigate incidental acquisition of L2 vocabulary from reading text that is both enhanced and elaborated. In addition, the relative effectiveness of explicit versus implicit lexical elaboration devices was investigated.

It was expected that when the meanings of unfamiliar words were provided via lexical elaboration, and the words themselves were made perceptually salient via typographical input enhancement (e.g., use of an attention-getting or “flagging” device used in this study, i.e., highlighting of unfamiliar words in the text), L2 learners’

incidental learning of low-frequency L2 vocabulary from reading would be maximized.

This expectation finds support in Hulstijn's (2001) observation:

The last ten years have witnessed the publication of a number of studies giving empirical evidence for the claim that L2 vocabulary acquisition during reading will be substantially enhanced when learners' attention is oriented towards unfamiliar words, e.g., when the meaning of unfamiliar words is given by means of marginal glosses or has to be looked up in a dictionary, or when reading is combined or supplemented with a simple fill-in exercise (pp. 273-274).

This study tested the following hypothesis: When, incidental to the primary L2 reading task, learners' attention is drawn to previously unknown or only partially known L2 words through lexical elaboration, typographical enhancement, or a combination of both, their performance on measures of L2 vocabulary acquisition will be better than that of learners who read L2 texts with no such attention-getting text-modification devices.

The study also addressed, directly or indirectly, three of the methodological principles (MPs) of Long's Task-Based Language Teaching (Doughty & Long, 2001, 2003): (1) MP3 Elaborate input; (2) MP4 Provide rich input; and (3) MP6 Focus on form. That is, the input to which participants in this study were exposed while reading (i.e., low-frequency L2 vocabulary) was elaborated and enriched in the elaboration process. Moreover, participants' attention may have been briefly drawn to formal features in the text while primarily engaged in the communicative activity of reading for meaning (i.e.,

task directions asked them to read a text carefully to take a reading comprehension test after reading).

#### **1.4 Outline of the dissertation**

Chapter 1 sets the stage for the present study by situating it in the larger picture of SLA research on elaborated and enhanced input, and on incidental vocabulary acquisition from reading, and describes the purpose of the study. Chapter 2 reviews the literature relevant to the two independent variables of the study, i.e., input elaboration and enhancement, when they relate to incidental L2 vocabulary acquisition from reading. The research questions and hypotheses are also presented. Chapter 3 provides a detailed description of the participants, how materials were prepared (e.g., how reading texts and target words were selected and modified), how assessment instruments were designed and scored, how the study was conducted, and how the data collected were analyzed. Chapter 4 presents the results of the statistical analyses. Chapter 5 discusses the results of the study in relation to the research questions and hypotheses presented in Chapter 2. Chapter 6 summarizes the study's findings, discusses implications and limitations, and suggests areas for future research.

## **CHAPTER 2**

### **REVIEW OF THE LITERATURE**

This chapter reviews the SLA literature relevant to the two independent variables in the new study: Input elaboration and input enhancement in the written mode, as they relate to incidental L2 vocabulary acquisition through reading.

#### **2.1 A brief background**

##### **2.1.1 The role of input and interaction in SLA**

Input has played a significant role as one of the important theoretical constructs in SLA (Gass, 1997; Long, 1996). As primary linguistic data that L2 learners have access to and from which they construct hypotheses about what L2 grammar looks like and how it works, input has been considered an important explanatory variable in L2 development. Krashen even claims that input made comprehensible to L2 learners (i.e., comprehensible input) is “the only causative variable in SLA” (1981, p. 57). Several aspects of input have been investigated in the SLA literature: Comprehensible input (Krashen, 1985), incomprehensible input (L. White, 1987), and comprehended input (Gass, 1988), evidencing the importance of input comprehension (or comprehensibility) in SLA.

Although the early interest of SLA researchers working from an interactionist perspective was limited to the nature of input addressed to NNSs (i.e., modified input) (e.g., foreigner talk and teacher talk), it is Long’s Interaction Hypothesis (1983a, 1983b) that goes beyond modified input and looks at how the conversational structure of NS-

NNS discourse itself is modified (i.e., modified interaction, also known as negotiation for meaning). Beyond descriptive work on how input or interaction is modified, of great interest in SLA research is how modified input or interaction enhances L2 comprehension and, ultimately, aids SLA.

### **2.1.2 The need for focus on form in SLA**

In addition, as a way of helping draw L2 learners' attention to the formal features of the L2 input they are exposed to, SLA researchers have investigated the role of enhanced input in L2 comprehension and SLA. Contrary to Krashen's claim that comprehensible input is both necessary and sufficient for SLA, empirical evidence from studies of Anglophone students in Canadian French immersion programs indicates that, although French immersion students' comprehension is as good as that of age-peer NSs of French, their production is far from nativelike (Swain, 1991). One potential solution to this problem is some type of form-focused instruction, e.g., *focus on form* (FonF) (as in Task-Based Language Teaching), as opposed to *focus on formS* (e.g., grammar-translation) and *focus on meaning* (as in immersion programs), which has been suggested as a viable option in communicative language teaching (Long & Robinson, 1998).

## **2.2 Modifications to input and interaction in SLA**

### **2.2.1 Input simplification and elaboration**

Although there is a productive line of research, much larger than that on written input modification, into the effects of orally modified input and interaction in L2

comprehension and SLA (see Doughty, 2000 for review), only written simplified and elaborated input is considered here for a focused discussion. Modifications to input and interaction in the written mode have been of two types: Simplification and elaboration. Simplification, as the majority of commercially available English Language Teaching graded readers demonstrate, removes difficult vocabulary items and complex syntactic structures from a text originally written by and for NSs. This results in a simplified text that is made easier to comprehend, since the two major factors determining readability, as reflected in most readability formulae, are lexis and syntax. Although a primary rationale for simplifying L2 input is to enhance its comprehensibility, L2 input, simplified by way of extreme linguistic adjustments to the point of rendering itself ungrammatical, is not necessarily facilitative of enhancing L2 comprehension (Issidorides, 1988; Issidorides & Hulstijn, 1992).

Elaboration, on the other hand, differs from simplification in that it retains difficult vocabulary items and complex syntactic structures and, instead, attempts to increase text comprehensibility by way of, for example, providing definitions of difficult vocabulary items, paraphrasing sentences containing complex syntactic structures, and enriching semantic detail. Input modification in the direction of elaboration is preferred on the grounds that elaborated input (a) retains the very material that L2 learners need for their SLA; (b) provides NNSs with natural NS discourse models; and (c) is generally almost as effective as simplified input in facilitating a higher level of comprehension than unmodified text. Simplified text shares many features in common with simplified register (e.g., foreigner talk), whereas elaborated text incorporates features of interactionally modified input, as it has been created from a written version of NSs or proficient NNSs

making interactional adjustments, as if talking with NNSs face-to-face, while delivering an unmodified text orally.

Previous written text modification studies have also been motivated by Long's Interaction Hypothesis (1983a, 1983b, 1996), which argues that "[s]atisfactory evidence of the a [input modification]  $\rightarrow$  b [comprehensible input] and b  $\rightarrow$  c [acquisition] relationship would allow the linguistic environment to be posited as an indirect causal variable in SLA" (1985, p. 378). These studies have sought to provide a link, in two steps, between modified text, whether by simplification or elaboration, and enhanced L2 reading comprehension (step 1), and between comprehensible text, as a result of modification, and SLA (of lexis, as an often-adopted measure of acquisition) (step 2). The majority of these studies, however, have been able to investigate only the first step of the relationship (e.g., R. Brown, 1987; Oh, 2001; Parker & Chaudron, 1987; Tsang, 1987; Yano, Long, & Ross, 1994). It has been consistently found that, when simplified and elaborated text are compared to unmodified text in terms of L2 reading comprehension, simplified text is statistically significantly more comprehensible than unmodified text, and that there is no statistically significant difference between the comprehensibility of simplified and elaborated text. This finding is encouraging, in that, when given the same amount of time allowed for text reading, participants reading elaborated text, which tends to become much longer than simplified text as a result of adding redundancy, manage to perform as well as those reading simplified text on measures of L2 reading comprehension, with elaborated text retaining, not eliminating, L2 input that is difficult to process but essential for learning, especially for lower-proficiency L2 learners.

Several studies (e.g., Chung, 1995; Kim, 1996; Silva, 2000; Urano, 2000) have gone one step further to investigate whether or not elaborated text leads to SLA via enhanced L2 comprehension. In terms of acquisitional measures, however, the effect of elaborated written input has been limited to investigating L2 vocabulary acquisition from reading elaborated text. The results of the above studies, except for Urano (2000), show that there is no significant difference in L2 vocabulary acquisition between reading elaborated and unmodified text (Chung, 1995; Kim, 1996; Silva, 2000) and between reading elaborated and simplified text (Chung, 1995). Urano (2000) reports that there is a significant difference between lexical elaboration and lexical simplification in scores on a form-recognition test, but not on a meaning-recognition test. Non-significant results are reported to be due to the time factor (e.g., time on task) and the increased processing burden, which may weaken the positive effects of elaboration (Silva, 2000).

In summary, elaboration is almost as facilitative of L2 reading comprehension as simplification, with the added advantages mentioned above, but it is yet to be demonstrated that improved comprehension by way of elaboration leads to L2 vocabulary acquisition (Chung, 1995).

### **2.2.2 Input enhancement**

Drawing L2 learners' attention to target language forms in otherwise primarily meaning- and communication-oriented situations is expected to help learners to notice the gap between their current interlanguage and the target language. According to Schmidt's Noticing Hypothesis, noticing L2 features in the written or spoken input to which L2 learners are exposed through reading or listening is "the necessary and sufficient

condition for the conversion of input into intake for [second language] learning” to take place (Schmidt, 1994, p.17). A set of pedagogical techniques that are designed to draw L2 learners’ attention to formal features in the L2 input has been variously called *consciousness-raising* (Sharwood Smith, 1981) or *input enhancement* (Sharwood Smith, 1991, 1993) in the instructed SLA literature.

Suggested as a type of a relatively unobtrusive, implicit, and proactive<sup>3</sup> *focus on form* (FonF) technique (Doughty & Williams, 1998), input enhancement has been used as an attention-getting device for L2 form-focused instruction. Input enhancement comes in two forms: (1) Typographical (written input) enhancement<sup>4</sup> and (2) intonational (oral input) enhancement. Input enhancement is expected to increase the chances that learners will pay attention to targeted grammatical features, by visually or acoustically flagging L2 input to enhance its perceptual saliency<sup>5</sup>, but with no guarantee that learners will attend to the features. Even when they do so, the attended input does not automatically become intake for further processing.

Previous input enhancement studies have predominantly been of the first type (i.e., typographical textual enhancement) (e.g., Alanen, 1995; Doughty, 1991; Izumi, 2002;

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<sup>3</sup> Long’s original definition of FonF includes only reactive, not proactive, FonF. In Long’s view, “proactive FonF” is an oxymoron (Long, personal communication).

<sup>4</sup> J. White (1996) defines typographical input enhancement as “an implicit technique designed to increase the perceptual saliency of a linguistic feature which learners were known to find problematic” (p. 4).

<sup>5</sup> J. White (1996) defines perceptual saliency as “the prominent or striking effect caused by the physical attributes of the target structure” (p. 39).

Jourdenais, 1998; Jourdenais, Ota, Stauffer, Boyson, & Doughty, 1995; Leeman, Arteagoitia, Fridman, & Doughty, 1995; Leow, 1997; 2001; Overstreet, 1998; Shook, 1994; J. White, 1998; Wong, 2000), where input enhancement is achieved by (a) manipulating typography (e.g., larger font sizes and different font types), (b) employing different typographical effects (e.g., **bold face**, *italic*, CAPITAL LETTERS, underlining, coloring), or a combination of techniques employed in both (a) and (b) simultaneously (Jourdenais, et al., 1995, p. 187). (See Table 2-1 for a summary of the findings from SLA research into textual enhancement.)

With the exception of a few studies (e.g., Leow, 1997, 2001; Overstreet, 1998), the effects of enhanced written input on L2 comprehension have not been systematically investigated. When such enhancement is investigated with measures of L2 reading comprehension, no effects of typographical manipulation on L2 reading comprehension have been reported (Leow, 1997, 2001). Conversely, Overstreet (1998) even reports that enhanced written input negatively affects L2 learners' comprehension of message content.

Regarding the comparative effect of enhanced or unenhanced written input on SLA, Leow (2001) concludes, on the basis of his review of eight studies, where the effect of textual enhancement has been isolated as an independent variable, that only the results from Shook (1994) and Jourdenais et al. (1995) show significantly better performance by participants in the enhanced text conditions, whereas no significant difference is found in the remaining studies reviewed (i.e., Spanish studies such as Leow, 1997; Jourdenais, 1998; Overstreet, 1998; and non-Spanish studies such as Alanen, 1995; J. White 1998; Izumi, 2000).

The mixed results regarding the effect of enhanced written input in L2 typographical enhancement research may be traced to a set of research design factors, such as “the nature of the treatment conditions that involved textual enhancement, the assessment tasks used, the type of typographical cues used, and the learners’ experience with the L2” (Wong & Simard, 1999, p. 12). Few studies have manipulated the effect of textual enhancement as an independent variable in their research design. Thus, it is difficult to isolate its unique contribution to L2 learners’ comprehension of passage content or acquisition of formal features targeted in the studies. For example, Leeman et al. (1995) report that a FonF instruction group that read typographically enhanced reading materials and received teacher feedback performed better than a purely communicatively instructed group. However, it is not clear whether the effect was due mainly to typographical enhancement, teacher feedback, or a combination.

In addition, when different types of typographical cues are employed, they can be expected to affect the degree of perceptual saliency of the enhanced formal features differentially, and, ultimately, L2 learners’ noticing of them. Regardless of whether only one type of typographical cue (e.g., underlining) or a combination of more than two are used, the effect of typographical enhancement may be weakened unless the most effective type for L2 targets to be enhanced is selected. The level of text difficulty is also posited as a cause of inconclusive findings. Overstreet (1998) suggests that “[b]y simplifying the texts even more, the comprehension of the text would require even less of the learners’ [attentional] resources and would allow more to be used to attend to form” (p. 248).

**Table 2-1**  
**Summary of Studies of Textual Enhancement in L2 Comprehension and Acquisition**

Study	Participants	Targeted form(s)	Typographical cue(s)	Conditions	Assessment	General results
Doughty (1991)	20 ESL adults of different L1 backgrounds of intermediate L2 proficiency level	English relative clauses	1. Color 2. Underline 3. Caps  (computer presentation)	1. Rule-oriented a. Presentation of rules b. Reading passage 2. Meaning-oriented a. Typographically enhanced passage b. Paraphrases and vocabulary clarifications of passage 3. Control: No rules, no text enhancement, no paraphrase or vocabulary	Meaning & Form: 1. Free recall task of comprehension 2. Grammaticality judgment test 3. Sentence-combination test 4. Guided sentence-completion test 5. Oral test	Form: Participants in the rule-oriented and meaning-oriented groups performed significantly better than the control group, but the rule participants did not perform significantly better than the meaning-oriented subjects.  Meaning: The meaning-oriented group performed better than the rule and control groups.

*Note.* From "The effects of textual enhancement and simplified input on L2 comprehension and acquisition of non-meaningful grammatical form," by W. Wong, 2000, Unpublished doctoral dissertation, The University of Illinois at Urbana-Champaign, pp. 44-49. Copyright 2000 by the Name of the Copyright Holder. Adapted with permission.

**Table 2-1**

**(Continued) Summary of Studies of Textual Enhancement in L2 Comprehension and Acquisition**

Study	Participants	Targeted form(s)	Typographical cue(s)	Conditions	Assessment	General results
Shook (1994)	125 1st and 2nd year learners of Spanish	Spanish present perfect tense and relative pronouns	1. Larger font 2. Bolding	1. Text enhancement only 2. Text enhancement with directions to pay attention to form 3. Control: No enhancement, no directions to pay attention to form	Form only: 1. Production of relative pronouns 2. Production of present perfect 3. Recognition of relative pronouns 4. Recognition of present perfect	The two text enhancement groups performed significantly better than the control group on all tasks, but no significant difference was found between those explicitly asked to attend to form and those without such directions. Participants performed better on the present perfect tasks than on the relative pronoun tasks.

**Table 2-1**

**(Continued) Summary of Studies of Textual Enhancement in L2 Comprehension and Acquisition**

Study	Participants	Targeted form(s)	Typographical cue(s)	Conditions	Assessment	General results
Alanen (1995)	36 English-speaking adult learners of semi-artificial Finnish	Semi-artificial Finnish locative suffixes and consonant gradation	Italics	<ol style="list-style-type: none"> <li>1. Text enhancement only</li> <li>2. Explicit rule instruction only</li> <li>3. Text enhancement and explicit rule instruction</li> <li>4. Control: No enhancement, no explicit rule instruction</li> </ol>	Form only: <ol style="list-style-type: none"> <li>1. Surprise sentence-completion task</li> <li>2. Grammaticality judgment task with justification for response and rule statement</li> <li>3. Think-aloud protocols</li> </ol>	<p>Rule only and rule plus text enhancement groups differed significantly from the control group on the production task, but were not significantly differed from each other. The rule only group performed significantly better than the text enhancement only group.</p> <p>The two groups that received rules performed better on correct rule statements than the groups without rules. There was little difference between the text enhancement only group and the control group.</p> <p>All subjects receiving text enhancement learned a suffix, whereas the control group did not.</p>

**Table 2-1**

**(Continued) Summary of Studies of Textual Enhancement in L2 Comprehension and Acquisition**

Study	Participants	Targeted form(s)	Typographical cue(s)	Conditions	Assessment	General results
Jourdenais et al. (1995)	14 English-speaking adult learners of second semester Spanish	Spanish imperfect and preterit verb forms  (Subjects had been exposed to targets prior to treatment.)	A. Imperfect forms: 1. Underline 2. Larger font 3. Different fonts 4. Bolding  B. Preterit forms: 1. Underline 2. Larger font 3. Different fonts 4. Shadowing	1. Textual enhancement 2. Comparison group: No textual enhancement	Form only: 1. Think-aloud protocols 2. Picture-writing production task	Think-aloud protocols from the participants in the textual enhancement group contained significantly more episodes related to the targets than did those of members of the comparison group. Those exposed to enhanced texts also produced more target forms on the written production task.

**Table 2-1**

**(Continued) Summary of Studies of Textual Enhancement in L2 Comprehension and Acquisition**

Study	Participants	Targeted form(s)	Typographical cue(s)	Conditions	Assessment	General results
Leeman et al. (1995)	22 native English-speaking learners of advanced L2 Spanish	Spanish imperfect and preterit verb forms	1. Color highlighting 2. Underline	1. Communicative - No attention to form 2. Focus on form - Teacher feedback - Textually enhanced instructional materials	Form only: 1. In-class debate 2. In-class essay 3. Appropriateness judgment task 4. Modified cloze paragraph	The focus on form group significantly improved on all tasks, while the communicative group only improved on the essay task. Only the focus on form group demonstrated a significant increase in its use of the preterit and imperfect tense in obligatory contexts.

**Table 2-1****(Continued) Summary of Studies of Textual Enhancement in L2 Comprehension and Acquisition**

Study	Participants	Targeted form(s)	Typographical cue(s)	Conditions	Assessment	General results
Leow (1997)	84 native English-speaking second semester university learners of Spanish	Impersonal imperative forms of Spanish verbs	1. Underline 2. Bolding	1. Exposure to a long text with no textual enhancement 2. Exposure to a long text with textual enhancement 3. Exposure to a short text with no textual enhancement 4. Exposure to a short text with textual enhancement	Meaning & Form: 1. Short answer comprehension task in participants' L1 2. Multiple-choice recognition task of form	Form: No effect for text length nor textual enhancement on form.  Meaning: Main effect for text length on comprehension. No effect for textual enhancement on comprehension.

**Table 2-1**

**(Continued) Summary of Studies of Textual Enhancement in L2 Comprehension and Acquisition**

Study	Participants	Targeted form(s)	Typographical cue(s)	Conditions	Assessment	General results
Overstreet (1998)	50 native English-speaking third semester university learners of Spanish	Preterit and imperfect tenses in Spanish	<p>A. Imperfect forms:</p> <ol style="list-style-type: none"> <li>1. Underline</li> <li>2. Bolding</li> <li>3. Enlarging</li> <li>4. Different font</li> </ol> <p>B. Preterit forms:</p> <ol style="list-style-type: none"> <li>1. Underline</li> <li>2. Different font</li> <li>3. Enlarging</li> <li>4. Shadowing</li> </ol>	<ol style="list-style-type: none"> <li>1. Exposure to familiar content and textual enhancement</li> <li>2. Exposure to familiar content but no textual enhancement</li> <li>3. Exposure to unfamiliar content with textual enhancement</li> <li>4. Exposure to textual content with no textual enhancement</li> </ol>	<p>Meaning &amp; Form:</p> <ol style="list-style-type: none"> <li>1. True/false comprehension quiz in participants' L2</li> <li>2. Narration task of form</li> <li>3. Circle-the-verb task</li> </ol>	<p>Form:</p> <p>No positive effects for either content familiarity or textual enhancement on participants' intake of the target features or comprehension.</p> <p>Meaning:</p> <p>A negative effect for textual enhancement on comprehension.</p>

**Table 2-1**

**(Continued) Summary of Studies of Textual Enhancement in L2 Comprehension and Acquisition**

Study	Participants	Targeted form(s)	Typographical cue(s)	Conditions	Assessment	General results
J. White (1998)	86 6th grade native French-speaking children in intensive ESL	English possessive determiners	<ol style="list-style-type: none"> <li>1. Italics</li> <li>2. Bolding</li> <li>3. Enlarging</li> <li>4. Underline</li> </ol>	<ol style="list-style-type: none"> <li>1. Exposure to typographically enhanced input flood of targets, in addition to extensive reading and listening</li> <li>2. Exposure to typographically enhanced input flood of targets</li> <li>3. Exposure to typographically unenhanced input flood of targets</li> </ol>	Form only: <ol style="list-style-type: none"> <li>1. Passage correction task</li> <li>2. Multiple-choice task</li> <li>3. Picture-description task</li> </ol>	Participants in all three conditions used more possessive determiners, both correctly and incorrectly, on the posttest than on the pretest. However, only the scores of the two treatment groups increased significantly from pretest to posttest.

**Table 2-1**

**(Continued) Summary of Studies of Textual Enhancement in L2 Comprehension and Acquisition**

Study	Participants	Targeted form(s)	Typographical cue(s)	Conditions	Assessment	General results
Jourdenais (1998)	123 native English-speaking university learners of Spanish	Spanish imperfect and preterit verb forms	<ol style="list-style-type: none"> <li>1. Underline</li> <li>2. Bolding</li> <li>3. Typeface manipulation</li> </ol>	<ol style="list-style-type: none"> <li>1. Exposure to enhanced preterit forms</li> <li>2. Exposure to enhanced imperfect forms</li> <li>3. Exposure to both enhanced preterit and imperfect forms</li> <li>4. Exposure to non-enhancement</li> <li>5. Control group: No textual enhancement</li> </ol>	Form: <ol style="list-style-type: none"> <li>1. Multiple-choice tasks</li> <li>2. Narrative essay tasks</li> </ol>	<ol style="list-style-type: none"> <li>1. There were no significant differences between the enhanced and unenhanced groups in noticing the target forms.</li> <li>2. There was no significant effect of exposure to the enhanced imperfect forms on scores in the MC tasks.</li> <li>3. There was no significant effect of exposure to the enhanced imperfect and preterit forms on scores in the narrative essay tasks.</li> </ol>

**Table 2-1**

**(Continued) Summary of Studies of Textual Enhancement in L2 Comprehension and Acquisition**

Study	Participants	Targeted form(s)	Typographical cue(s)	Conditions	Assessment	General results
Wong (2000)	81 native English-speaking second semester university learners of French	French past participle agreement in relative clauses	<ol style="list-style-type: none"> <li>1. Bolding</li> <li>2. Italics</li> <li>3. Underline</li> <li>4. Larger font</li> </ol>	<ol style="list-style-type: none"> <li>1. Exposure to +enhanced, +simplified input</li> <li>2. Exposure to -enhanced, +simplified input</li> <li>3. Exposure to +enhanced, -simplified input</li> <li>4. Exposure to -enhanced, -simplified input (Comparison group)</li> </ol>	Meaning & Form: <ol style="list-style-type: none"> <li>1. Error correction task (acquisition)</li> <li>2. Three free-recall tasks, one for each of the three texts (comprehension)</li> </ol>	Form: Neither textual enhancement nor input simplification helped participants acquire the target form.  Meaning: <ol style="list-style-type: none"> <li>1. Participants who read simplified versions of the texts obtained higher comprehension recall scores than those who read unsimplified versions.</li> <li>2. Participants who read enhanced versions of the texts recalled more enhanced idea units in the texts than those who read unenhanced versions.</li> </ol>

**Table 2-1****(Continued) Summary of Studies of Textual Enhancement in L2 Comprehension and Acquisition**

Study	Participants	Targeted form(s)	Typographical cue(s)	Conditions	Assessment	General results
Leow (2001)	38 native English-speaking first semester university learners of Spanish	Formal imperative/command in Spanish	1. Underline 2. Bolding	1. Exposure to a typographically enhanced text 2. Control group: No textual enhancement	Meaning & Form: (Both immediate and delayed) 1. Multiple-choice recognition task of form 2. Fill-in-the blank production task 3. 11-item comprehension task 4. Think-aloud protocols	No statistically significant differences were found between the enhanced and unenhanced (i.e., control) groups in the amount of participants' reported noticing of the target form, text comprehension, and immediate and delayed intake.

**Table 2-1**  
**(Continued) Summary of Studies of Textual Enhancement**

Study	Participants	Targeted form(s)	Typographical cue(s)	Conditions	Assessment	General results
Izumi (2002)	61 English as a second language adults of different L1 backgrounds of low intermediate, intermediate, and high intermediate L2 proficiency level	English relative clauses	1. Bolding 2. Shadowing 3. Different fonts 4. Different sizes 5. Highlighting 6. Underline  (computer presentation)	1. Required to produce output, exposure to enhanced input (+O+IE group) 2. Required to produce output, exposure to unenhanced input (+O-IE group) 3. Not required to produce output, exposure to enhanced input (-O+IE group) 4. Not required to produce output, exposure to unenhanced input (-O-IE group) 5. Control: No output requirement, no input enhancement	Meaning & Form: 1. Grammaticality judgment test 2. Interpretation test 3. Sentence combination test 4. Picture-cued sentence-completion test	1. Participants exposed to enhanced input noticed more of the target structure than those exposed to unenhanced input; no positive effect of output on noticing measures. 2. Participants engaged in output-input activities significantly outperformed those in input comprehension activities; no difference between enhanced and unenhanced group scores.

### 2.2.3 Elaboration and enhancement

Overstreet's (1998) suggestion is an interesting one, as it can lead to a cross-fertilization of L2 text elaboration research and L2 typographical enhancement research. Before this potential is explored in depth, a further suggestion from Wong and Simard (1999) is in order. In their seven guidelines for designing an effective study to assess the effects of typographical enhancement, Wong and Simard (1999) suggest that what is meant by typographical enhancement in a study be clearly operationalized and specified. Terminological confusion makes it difficult to isolate typographical enhancement as a variable and to tease out its effect in research. As both elaborated and enhanced input are intended to *modify* L2 input with a dual goal of improved L2 comprehension and acquisition, text elaboration and typographical enhancement, both, can be subsumed under the umbrella term of text modification.

When it comes to focused types of text modification, such as lexical or structural elaboration previously used in L2 text elaboration research (e.g., Chung, 1995; Silva, 2000; Urano, 2000), it may be possible to elaborate (i.e., modify) either lexis or syntax only and investigate its unique effect on comprehension and acquisition. Likewise, when a formal feature in L2 input, e.g., lexis or morphosyntax, full understanding of which is so critical to comprehending propositional content of the text containing it that L2 learners cannot ignore or skip it while reading (i.e., meaning-bearing input in the VanPattenian sense), is typographically enhanced, typographical modification of the formal feature can be expected to attract L2 learners' attention to it.

As Wong (2000) is the only study to date that has explored whether both enhanced and simplified written input affect not only comprehension of passage content

but also acquisition (of French participle agreement in relative clauses), it is described in more detail. Wong (2000) classifies simplification as a type of input enhancement technique on the basis of her reasoning that “research on simplified input tends to focus exclusively on how simplified input affects comprehension” (p. 33) and further claims that, “[b]ecause no other studies have looked at the impact of simplified input on intake, the jury is still out regarding the role of input simplification and acquisition” (p. 71). She is apparently unaware of a growing number of studies on this very topic (see, e.g., Chung, 1995; Kim, 1996; Silva, 2000; Urano, 2000). Wong’s definition of simplified input is a mixture of features of both simplification and elaboration, making it difficult to tease out the separate effects of either simplification or elaboration. The results of her study were as follows: (1) There was no significant difference in acquisition between those who read enhanced texts and those who read unenhanced texts; (2) there was a significant difference in acquisition between those who read simplified texts and those who read unsimplified texts; (3) there was a significant difference in comprehension (in terms of enhanced idea units recalled) between those who read the enhanced texts and those who read the unenhanced text, but no such difference in comprehension (in terms of total idea units recalled) between those who read the enhanced texts and those who read the unenhanced text; (3) there was a significant difference in comprehension (in terms of total idea units recalled) between those who read the simplified texts and those who read the unsimplified texts; (4) there was no significant interaction effect between typographical enhancement and input simplification in either comprehension or acquisition. In a nutshell, no combined synergistic effect of elaborated and modified (in

this case, simplified) written input on L2 comprehension and acquisition has yet been reported.

#### **2.2.4 Elaborated input, enhanced input, FonF, and noticing**

Unless explicitly told otherwise, L2 learners' primary goal in reading is to extract information from a passage to arrive at message comprehension. It is expected that elaborated input will be facilitative of reading comprehension and that some level of incidental acquisition of L2 vocabulary will be achieved. While engaged in a reading task, however, learners may not pay due attention to form, unless their inability to process it proves itself to be an obstacle to message comprehension. When the form is typographically enhanced, it is expected that they will be able to better notice it. Thus, the following is expected to happen when written input is elaborated and/or enhanced, each step leading to the next, although not always following a fixed sequence: Increased perceptual saliency → increased noticeability → increased comprehensibility (especially, when elaborated and enhanced formal input features contain bits of information that are critical to understanding passage content) → increased acquirability (or learnability).

A study is needed, incorporating successful research design features and, at the same time, overcoming limitations reported in previous studies, to better address the issue of elaboration, enhancement, FonF, and noticing in L2 comprehension and acquisition.

### **2.3 Incidental L2 vocabulary acquisition from reading modified input**

As Grabe (1991) observes, “virtually all [L2] reading researchers agree that vocabulary development is a critical component of reading comprehension” (p. 392); the

vocabulary knowledge and reading ability are closely related. Reading is how L2, as well as L1, learners acquire a much larger vocabulary than explicit vocabulary instruction alone can account for. Acknowledging the power of reading, Krashen (1992) repackages his Input Hypothesis to accommodate this incidental vocabulary acquisition through reading hypothesis in light of SLA.

Emphasizing the importance of input comprehensibility in SLA, Krashen and Terrell (1983) claim:

Acquisition depends crucially on the input being comprehensible. And comprehensibility is dependent directly on the ability to recognize the meaning of key elements in the utterance. Thus, acquisition will not take place without comprehension of vocabulary” (p. 155).

That is, Krashen’s Input Hypothesis, as it relates to the question of incidental acquisition of L2 vocabulary and spelling from reading, asserts that mere exposure to comprehensible input (e.g., vocabulary and spelling) through extensive reading will lead to its acquisition (Krashen, 1989).

As pointed out earlier (see Chapter 1), however, much of the naturally occurring L2 written input to which L2 learners are exposed is not always comprehensible to them, and thus, not available for SLA. In L1 vocabulary acquisition research, Beck, McKeown, and McCaslin (1983) distinguish two types of context: pedagogical and natural. It is the former that is specifically designed to promote vocabulary acquisition from context, similar to Schouten-van Parreren’s (1989) “pregnant” context. It seems that the richer the

context that surrounds unknown words in a text, the easier L2 learners' task of guessing of word meanings from context and retention of correctly guessed words<sup>6</sup>. In sum, reading is believed to constitute an important source of input to L2 learners, but may have a limited role if unmodified NS text is not "pregnant" or, if so, not made comprehensible.

Regarding how input is made comprehensible, however, Krashen's Input Hypothesis is not explicit. In contrast, Long's Interaction Hypothesis shows that input is made comprehensible through modification of the interactional structure of the conversation between proficient and less proficient users of a language<sup>7</sup>. When L2 text is prepared in such a way that formal L2 features potentially available for SLA are made comprehensible through interactional modification, L2 learners are expected to acquire them incidentally through multiple exposures.

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<sup>6</sup> If the context is too rich, L2 learners' vocabulary acquisition may not be facilitated. In an experiment concerning L1 Dutch learners' guessing of L2 French word meanings from context, Mondria and Wit-De Boer (1991) offer an explanation for the lack of an effect for a pregnant context on a translation task, used as a vocabulary retention measure: Participants exposed to the pregnant context may have found the task of guessing word meanings from context not challenging, and as a result, may not have exerted enough mental effort to retain the meanings of unknown words.

<sup>7</sup> Interactional modification is defined as "modification and restructuring of interaction that occurs when learners and their interlocutors anticipate, perceive, or experience difficulties in message comprehensibility" (Pica, 1994, p. 494).

Table 2-2 summarizes findings from SLA research carried out within the theoretical framework of Long's Interaction Hypothesis, as applied to incidental vocabulary acquisition from reading modified text: Chung (1995), Kim (1996), Silva (2000), and Urano (2000).

Table 2-2

Summary of Studies of Input Modification in L2 Reading Comprehension and Vocabulary Acquisition

Study	Participants	Modification type(s)	Condition(s) for vocabulary acquisition	Assessment	General results
Chung (1995)	484 9 <sup>th</sup> grade Korean EFL learners	<ol style="list-style-type: none"> <li>1. Unmodified</li> <li>2. Simplified</li> <li>3. Lexically elaborated</li> <li>4. Structurally elaborated</li> <li>5. Lexically &amp; structurally elaborated</li> <li>6. Control: Unmodified text different from the above five treatment texts</li> </ol>	Incidental	<p>Comprehension: 20-item multiple-choice reading comprehension test</p> <p>Acquisition (20 TWs):</p> <ol style="list-style-type: none"> <li>1. Form-recognition posttest</li> <li>2. Immediate meaning-recognition posttest</li> <li>3. Delayed meaning-recognition posttest</li> </ol>	<p>Comprehension:</p> <ol style="list-style-type: none"> <li>1. simplified &gt; unmodified*<sup>8</sup></li> <li>2. elaborated (all versions) &gt; unmodified, but <i>ns</i><sup>9</sup></li> <li>3. simplified &gt; elaborated (all versions), but <i>ns</i></li> <li>4. structural &gt; lexical, but <i>ns</i></li> <li>5. lexical &amp; structural &gt; lexical, but <i>ns</i></li> <li>6. lexical &amp; structural &gt; structural, but <i>ns</i></li> </ol> <p>Acquisition:</p> <ol style="list-style-type: none"> <li>1. Form: simplified &gt; elaborated (all versions), but <i>ns</i></li> <li>2. (Both immediate and delayed) meaning: <i>ns</i> difference between elaborated (all versions), simplified, and unmodified</li> </ol>

<sup>8</sup> \* = statistically significant

<sup>9</sup> *ns* = statistically non-significant

**Table 2-2**

**(Continued) Summary of Studies of Input Modification in L2 Reading Comprehension and Vocabulary Acquisition**

Study	Participants	Modification type(s)	Condition(s) for vocabulary acquisition	Assessment	General results
Kim (1996)	211 college freshmen Korean EFL learners	1. Unmodified 2. Elaborated 3. Control: Unmodified text different from the above two treatment texts	1. Incidental 2. Intentional	<p>Comprehension: Two 8-item multiple-choice reading comprehension tests, one for the elaborated groups and the other for the control groups (not analyzed)</p> <p>Acquisition (33 TWs): 1. Immediate decontextualized supply-definition posttest 2. Delayed decontextualized supply-definition posttest</p>	<p>Acquisition: (Both immediate and delayed)</p> <p>1. intentional &gt; incidental* 2. elaborated &gt; unmodified, but <i>ns</i> 3. elaborated-intentional &gt; unmodified-intentional, but <i>ns</i> 4. elaborated-incidenta &gt; unmodified-incidenta, but <i>ns</i> 5. elaborated-intentional &gt; elaborated-incidenta, but <i>ns</i> 6. unmodified-intentional &gt; unmodified-incidenta, but <i>ns</i></p>

**Table 2-2**

**(Continued) Summary of Studies of Input Modification in L2 Reading Comprehension and Vocabulary Acquisition**

Study	Participants	Modification type(s)	Condition(s) for vocabulary acquisition	Assessment	General results
Silva (2000)	35 ESL learners in the US	1. Unmodified 2. Lexically elaborated A, B, and C <sup>10</sup> 3. Control: Unmodified text different from the above two treatment texts	Incidental	Comprehension: Two 10-item multiple-choice reading comprehension tests, one for the elaborated groups and the other for the control group (not analyzed)  Acquisition (45 TWs): 1. Form-recognition posttest 2. Decontextualized supply-definition posttest	Acquisition: 1. lexically elaborated > unmodified, but <i>ns</i> 2. explicit > unmodified > implicit, but <i>ns</i> 3. equal non-effectiveness of implicit elaboration and non-elaboration

<sup>10</sup> The order of the three types of lexical elaboration devices (i.e., explicit, implicit, and unelaborated) was counterbalanced, which resulted in the creation of three elaborated text versions (A, B, and C, respectively). Data from these three text versions formed those for the lexically elaborated group.

**Table 2-2**

**(Continued) Summary of Studies of Input Modification in L2 Reading Comprehension and Vocabulary Acquisition**

Study	Participants	Modification type(s)	Condition(s) for vocabulary acquisition	Assessment	General results
Urano (2000)	45 L1 Japanese ESL learners in the US	1. Unmodified 2. Lexically simplified 3. Lexically elaborated	Incidental	Comprehension: 1. Mean reading times 2. Sentence comprehension questions  Acquisition (40 nonsense TWs): 1. Form-recognition posttest 2. Meaning-recognition posttest	Comprehension: 1. Mean reading times: Lexically modification (i.e., elaboration and simplification) significantly shortened mean reading times. 2. Sentence comprehension questions: Lexically modification had a positive, but <i>ns</i> , effect on comprehension. 1 & 2 → Positive effects of lexical modification on L2 sentence-level comprehension  Acquisition: 1. Form: lexically elaborated > lexically simplified*; unmodified > lexically elaborated, but <i>ns</i> ; and unmodified > lexically simplified*  2. Meaning: <i>ns</i> difference between lexically elaborated, lexically simplified, and unmodified

## 2.4 Research questions

The general and specific research questions investigated in the new study were as follows:

Research question 1. Does lexical elaboration have an effect on incidental L2 vocabulary acquisition from reading, given no enhancement?

- 1-1. Does reading lexically elaborated text have an effect on L2 vocabulary acquisition as measured by a *form*-recognition L2 vocabulary acquisition posttest? (D vs. F and E vs. F)
- 1-2. Does reading lexically elaborated text have an effect on L2 vocabulary acquisition as measured by a *meaning*-recognition L2 vocabulary acquisition posttest? (D' vs. F' and E' vs. F')

Research question 2. Does typographical enhancement have an effect on incidental L2 vocabulary acquisition from reading, given no elaboration?

- 2-1. Does reading typographically enhanced text have an effect on L2 vocabulary acquisition as measured by a *form*-recognition L2 vocabulary acquisition posttest? (C vs. F)
- 2-2. Does reading typographically enhanced text have an effect on L2 vocabulary acquisition as measured by a *meaning*-recognition L2 vocabulary acquisition posttest? (C' vs. F')

Research question 3. Is there an interaction effect of lexical elaboration and typographical enhancement on incidental L2 vocabulary acquisition from reading?

- 3-1. Is there an interaction effect of reading text that is (a) lexically elaborated, and (b) typographically enhanced, on L2 vocabulary acquisition as measured by a *form*-recognition L2 vocabulary acquisition posttest? (A vs. C and B vs. C)
- 3-2. Is there an interaction effect of reading text that is (a) lexically elaborated, and (b) typographically enhanced, on L2 vocabulary acquisition as measured by a *meaning*-recognition L2 vocabulary acquisition posttest? (A' vs. C' and B' vs. C')

Research question 4. Do specific types of lexical elaboration differentially affect incidental L2 vocabulary acquisition from reading?

- 4-1. Which type of lexical elaboration device is more conducive to L2 vocabulary acquisition as measured by a *form*-recognition L2 vocabulary acquisition posttest? (D vs. E)
- 4-2. Which type of lexical elaboration device is more conducive to L2 vocabulary acquisition as measured by a *meaning*-recognition L2 vocabulary acquisition posttest? (D' vs. E')

Research question 5. Is there an interaction effect of the specific type of lexical elaboration device and typographical enhancement on incidental L2 vocabulary acquisition from reading?

- 5-1. Is there an interaction effect of reading text that is (a) lexically elaborated, using either an explicit or implicit lexical elaboration device, and (b) typographically enhanced on L2 vocabulary acquisition as measured by a *form*-recognition L2 vocabulary acquisition posttest? (A vs. B)
- 5-2. Is there an interaction effect of reading text that is (a) lexically elaborated, using either an explicit or implicit lexical elaboration device, and (b) typographically enhanced on L2 vocabulary acquisition as measured by a *meaning*-recognition L2 vocabulary acquisition posttest? (A' vs. B')

## **2.5 Research hypotheses**

In order to address the above research questions, the following research hypotheses were posited:

Hypothesis 1-1. There will be no significant difference in scores on a *form*-recognition L2 vocabulary acquisition posttest between participants who read an (explicitly) lexically elaborated text (i.e., Group D) and those who read an unelaborated NS baseline text (i.e., Group F).

Hypothesis 1-2. Participants who read an (explicitly) lexically elaborated text (i.e., Group D) will perform significantly better on a *meaning*-recognition L2 vocabulary acquisition posttest than those who read an unelaborated NS baseline text (i.e., Group F).

Hypothesis 1-3. There will be no significant difference in scores on a *form*-recognition L2 vocabulary acquisition posttest between participants who read an (implicitly) lexically elaborated text (i.e., Group E) and those who read an unelaborated NS baseline text (i.e., Group F).

Hypothesis 1-4. There will be no significant difference in scores on a *meaning*-recognition L2 vocabulary acquisition posttest between participants who read an (implicitly) lexically elaborated text (i.e., Group E) and those who read an unelaborated NS baseline text (i.e., Group F).

Hypothesis 2-1. Participants who read an enhanced text (i.e., Group C) will perform significantly better on a *form*-recognition L2 vocabulary acquisition posttest than those who read an unenhanced NS baseline text (i.e., Group F).

Hypothesis 2-2. There will be no significant difference in scores on a *meaning*-recognition L2 vocabulary acquisition posttest between participants who read an enhanced text (i.e., Group C') and those who read an unenhanced NS baseline text (i.e., Group F').

Hypothesis 3-1. There will be no significant difference in scores on a *form*-recognition L2 vocabulary acquisition posttest between participants who read an (explicitly) lexically elaborated and enhanced text (i.e., Group A) and those who read an enhanced, but not elaborated text (i.e., Group C).

Hypothesis 3-2. Participants who read an (explicitly) lexically elaborated and enhanced text (i.e., Group A') will perform significantly better on a *meaning*-recognition L2 vocabulary acquisition posttest than those who read an enhanced, but not elaborated text (i.e., Group C').

Hypothesis 3-3. There will be no significant difference in scores on a *form*-recognition L2 vocabulary acquisition posttest between participants who read an (implicitly) lexically elaborated and enhanced text (i.e., Group B) and those who read an enhanced, but not elaborated text (i.e., Group C).

Hypothesis 3-4. Participants who read an (implicitly) lexically elaborated and enhanced text (i.e., Group B') will perform significantly better on a *meaning*-recognition L2

vocabulary acquisition posttest than those who read an enhanced, but not elaborated text (i.e., Group C').

Hypothesis 4-1. There will be no significant difference in scores on a *form*-recognition L2 vocabulary acquisition posttest between participants who read an explicitly lexically elaborated text (i.e., Group D) and those who read an implicitly lexically elaborated text (i.e., Group E).

Hypothesis 4-2. Participants who read an explicitly lexically elaborated text (i.e., Group D) will perform significantly better on a *meaning*-recognition L2 vocabulary acquisition posttest than those who read an implicitly lexically elaborated text (i.e., Group E').

Hypothesis 5-1. There will be no significant difference in scores on a *form*-recognition L2 vocabulary acquisition posttest between participants who read an explicitly lexically elaborated and enhanced text (i.e., Group A) and those who read an implicitly lexically elaborated and enhanced text (i.e., Group B).

Hypothesis 5-2. Participants who read an explicitly lexically elaborated and enhanced text (i.e., Group A) will perform significantly better on a *meaning*-recognition L2 vocabulary acquisition posttest than those who read an implicitly lexically elaborated and enhanced text (i.e., Group B').

The assumption that participants will pay attention to what their attention is directed towards (i.e., that the treatment will be delivered) and the general principle that people learn what they pay attention to (and very little about what they do not attend to) motivate the following hypotheses<sup>11</sup>:

Lexical elaboration (i.e., giving learners the meaning of a word) will enhance vocabulary learning as measured by a meaning-recognition vocabulary posttest. This should certainly be predicted when the lexical elaboration is explicit, i.e., H 1-2 is so motivated, as is H 3-4. It is not so clear whether the same prediction should be made when the lexical elaboration is “implicit,” when learners are given meaning without it being clear that they are being told the meaning of a word. Whether that works should partly depend on whether they understand the function of appositives in intra-textual definition. Previous research (Silva, 2000; Toya, 1992; Watanabe, 1997) has shown that such implicit elaboration is often not effective, so that motivates a non-directional hypothesis in the case of H 1-4. The same line of argument motivates H 4-2 and H 5-2.

Lexical elaboration does not by itself direct learners’ attention to word form, so under the principle that we (only) learn what we pay attention to this motivates a non-directional hypothesis (the null hypothesis, no predicted difference) in the case of H 1-1, H 1-3, H 4-1, and H 5-1, for all of which the outcome measure is a form-recognition vocabulary posttest.

Typographical enhancement, on the other hand, directs learners’ attention to word form. Once again, the principle that we learn (only) what we pay attention to predicts a

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<sup>11</sup> I would like to acknowledge and thank Dick Schmidt for his tremendous help with motivating the research hypotheses.

positive effect for the learning of form (H 2-1) but none for the learning of word meaning (H 2-2 and H 3-2).

The same principle that we learn what we pay attention to also motivates H 3-1 and H 3-3. For form-recognition, when form is typographically enhanced, whether or not meanings are elaborated (explicitly, implicitly or not at all) should not matter. For meaning-recognition, when meanings are elaborated explicitly, it should not matter whether forms are typographically enhanced (H 3-4).

## CHAPTER 3

### METHOD

#### 3.1 Participants

Participants in this study were adult Korean EFL learners at Korea University, Seoul, Korea ( $n = 297$ ). They were drawn from six intact Freshman English classes. They were freshmen majoring in Business Administration, Education, Humanities, Political Science and Economics, and Nursing. At the time of data collection, they were enrolled in different sections of Freshman English 1, which is a mandatory foreign language requirement course for all freshmen entering Korea University. They met for two 50-minute classes per week. According to the course description, Freshman English 1 was primarily aimed at developing course participants' reading comprehension skills in English. Their initial proficiency in English was reported to be at an intermediate level. However, as this estimation was not based on results from a standardized test of EFL proficiency, such as the Test of English as a Foreign Language (TOEFL), and course participants had not been placed into their classes according to their proficiency in EFL, no information was available to determine equivalence in their initial EFL proficiency prior to the study. Thus, a cloze test was administered for this purpose (see **3.3.1 Overall EFL proficiency measure** below).

Only data from those participants who were freshmen, signed a consent form, were present in both of the data-collection sessions, and took all the tests (i.e., a cloze test and three post-treatment vocabulary tests) were used for the study. Initially, there were participants who were not freshmen ( $n = 8$ ), and their data were not included. The reason

only freshmen were asked to participate in the study was that no substantial amount of exposure to new EFL vocabulary other than that covered in high school English was expected to have occurred before they entered university in March, when a new academic year begins in Korean universities. University sophomores, juniors, and seniors were expected to vary widely in their knowledge of EFL proficiency and vocabulary.

In addition, based on their responses to a biodata questionnaire, the data from those participants with extensive experience of living in English-speaking countries or attending English-medium schools in either English- or non-English-speaking countries ( $n = 11$ ) were excluded from data analysis, as they were expected to be different in their initial English proficiency from the other participants.

## **3.2 Materials**

This section provides a detailed description of (1) how a reading text for the experimental groups was selected, and the selection criteria applied; (2) how the reading text thus selected was elaborated and/or typographically enhanced; and (3) how target words (TWs) were selected, and the selection criteria applied.

### **3.2.1 Selection and preparation of the unmodified<sup>12</sup> baseline NS text**

A weekly magazine article that had been written by a NS of English for an audience of NSs of English was initially selected as an unmodified baseline NS text. The

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<sup>12</sup> *Unmodified* means that the text was neither lexically elaborated nor typographically enhanced, but it does not mean that the text was not edited to control for certain textual features for experimental purposes.

article chosen was *Alaska's Billion-Dollar Quandary* from *Time* (September 28, 1992). The article dealt with the issue of how Alaskans could put the settlement money received from the tragic *Exxon Valdez* oil spill accident in 1989 to best use for the restoration and protection of the Alaskan environment.

The selected article went through a two-stage editing process. To begin with, the first six paragraphs and last paragraph in the original article were combined to form an excerpt. This was necessary to create a text that could be read in 20 minutes with reasonable comprehension by participants in the study. A NS of English with extensive experience of teaching ESL and EFL to East Asian--especially Japanese and Korean--learners of English was asked to evaluate this excerpt to determine whether the newly combined text read naturally and smoothly, forming a coherent and self-contained story. This was determined to be the case.

Secondly, some words in the text likely to be already known to participants were replaced with low-frequency words to be used as TWs in the study. For example, the verb "to criticize" was replaced with another verb "to lambaste." At the same time, some words that could have been either familiar or unfamiliar to participants were replaced with high-frequency words to make text comprehension manageable for participants. When selecting the total number of TWs to be tested in the study, the following logistical constraints were taken into consideration: (1) Due to logistical constraints, only 20 minutes could be allowed for reading the texts, and (2) TW selection would have to focus on only a small number of words that could be realistically expected to be learned from a single exposure while reading a text where TWs have been experimentally controlled to appear only once. Thus, the resulting list of TWs was expected not to be overwhelming

for participants. As a result, this second round of editing helped select and control for the total number of TWs eventually used in the study (see **3.2.3 Target words** below for more information).

The resulting text was further evaluated by the researcher and a Korean-speaking EFL teacher, who had previously taught Freshman English for many years at the same university where the data were collected, to determine whether it would be (1) neither too familiar nor too unfamiliar to participants, in terms of content schemata (i.e., a topic on an environmental issue); (2) of general interest; (3) intellectually challenging at university level; (4) not overly challenging in terms of lexical and morphosyntactic complexity, except for the TWs that participants would be expected to learn incidentally from reading; and (5) not too long for them to read in 20 minutes. The text was determined to be suitable for the target group of university-level Korean EFL learners.

The resulting text, with the features [-EL, -EN], i.e., neither elaboration nor enhancement, was labeled the *unmodified baseline NS text* in that it (1) did not undergo text modification in the form of elaboration and/or enhancement; (2) was the raw, or baseline, material from which the experimental texts were created; and (3) was selected from a pool of texts, not prepared with NNSs of English in mind for a pedagogic purpose, but instead written primarily by and for NSs of English. It also served as a text to be read by the control group, which was needed to investigate whether or how much participants in this group could learn TWs from a text that had been neither elaborated nor enhanced (i.e., [-EL, -EN]), in comparison to the treatment groups, who read one of the versions of the elaborated only, enhanced only, or both elaborated and enhanced texts.

### 3.2.2 Texts for the treatment groups and the control group

The unmodified [-EL, -EN] version then went through text modification. The resulting texts were of five different types, varying in the combination of two main text modification types (i.e., lexical elaboration, which was further divided into either an explicit or implicit type, and typographical enhancement): (1) a text that was both explicitly lexically elaborated and typographically enhanced [EXP, +EN]; (2) a text that was both implicitly lexically elaborated and typographically enhanced [IMP, +EN]; (3) a text that was typographically enhanced only, without any type of lexical elaboration [-EL, +EN]; (4) a text that was explicitly lexically elaborated only, with no typographical enhancement [EXP, -EN]; (5) a text that was implicitly lexically elaborated only, with no typographical enhancement [IMP, -EN]; and additionally, (6) a text with no typographical enhancement and without any type of lexical elaboration [-EL, -EN] (i.e., the same as an unmodified baseline NS text).

The first three texts above shared a feature [+EN], and only varied in whether they were either explicitly or implicitly elaborated or not elaborated at all. The last three above had the feature [-EN] in common, but were different in the type of lexical elaboration applied (i.e., explicit, implicit, or none). During the treatment, the first five texts each (i.e., [1] to [5] above) were read by each of the five experimental groups, labeled A to E, while the last (i.e., [6] above) was read by the control group, labeled F (see Table 3-4 in **3.6 Research design** for more information on this labeling system).

The six texts were slightly different in terms of, especially, the total number of words and the percentage of passive sentences, as shown in Table 3-1. Two explicitly enhanced texts (i.e., texts for Groups A and B) were the longest, as they contained

multiple instances of *which means*, in addition to lexical elaborations (see 3.2.2.1 **Lexical elaboration** for more information). Microsoft Word<sup>®</sup> was used to calculate readability statistics for each text.

**Table 3-1.**  
**Text Readability Characteristics**

Article I. Text	A	B	C	D	E	F
Characteristic						
# of Words	808	808	756	756	663	663
# of Paragraphs	7	7	7	7	7	7
# of Sentences	29	29	29	29	29	29
Sentences per Paragraph	4.1	4.1	4.1	4.1	4.1	4.1
Words per Sentence	27.8	27.8	26.0	26.0	22.8	22.8
Characters per Word	5.1	5.1	5.1	5.1	5.2	5.2
Passive Sentences (%)	13%	13%	13%	13%	10%	10%
Flesch Reading Ease	35.2	35.2	35.2	35.2	35.2	35.2
Flesch-Kincaid Grade Level	12.0	12.0	12.0	12.0	12.0	12.0

*Note.* A = Explicitly Elaborated and Typographically Enhanced Text (i.e., [EXP, +EN]); B = Implicitly Elaborated and Typographically Enhanced Text (i.e., [IMP, +EN]); C = Typographically Enhanced Only Text (i.e., [-EL, +EN]); D = Explicitly Elaborated Only Text (i.e., [EXP, -EN]); E = Implicitly Elaborated Only Text (i.e., [IMP, -EN]); and F = Unmodified NS Baseline Text (i.e., Control Text) (i.e., [-EL, -EN])

Before a detailed description of how each of the first five different texts was prepared, an operational definition is in order of lexical elaboration and typographical enhancement as manipulated in this study.

### 3.2.2.1 Lexical elaboration

The unmodified baseline NS text was lexically elaborated as follows. As there are no available standardized guidelines for text elaboration, a description of text elaboration procedures, either suggested or actually implemented in the previous text modification studies, was consulted. Although a need for a fine-grained approach to text elaboration to determine the differential effectiveness of various types of text elaboration on the level of morphosyntax, semantics, lexis, or discourse, or any combination of these on L2 comprehension and acquisition, was first pointed out by Kim (1994), and a study to address this issue was later conducted by Chung (1995)<sup>13</sup>, a clearer picture of which type of text elaboration is more conducive to L2 comprehension and/or acquisition is yet to be obtained. Rather than further explore this issue, which is a full investigation in its own right, text elaboration in this study focused solely on the area of lexis in the unmodified baseline NS text (i.e., lexical elaboration) because the primary research question of this study was a comparative investigation of the effects of elaborated and/or enhanced written input in the area of L2 lexis on L2 acquisition. It was expected that elaboration of only the TWs in the text (i.e., lexical elaboration only), while keeping other L2 target features intact, would show a clearer effect on L2 vocabulary acquisition from reading than would be the case where elaboration of morphosyntax, semantics, lexis, or discourse, or any combination of these, was attempted.

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<sup>13</sup> Chung (1995) reports that text elaboration in the area of syntax, which she called *structural elaboration*, appeared to be more effective, even though the effect did not reach statistical significance, than text elaboration in the area of lexis, which she called *lexical elaboration*, in terms of EFL reading comprehension.

A preference for the type of focused text elaboration (i.e., elaboration primarily at the level of lexis) to that of broadly defined (or not fine-tuned) elaboration was also motivated by the difference in scope of the L2 target features that are normally manipulated in L2 written input between elaboration and enhancement. Unless targeted at a selected set of L2 features in a written text (e.g., complex syntax or unfamiliar lexis), text elaboration in general tends to be applied to a text as a whole, with a primary goal of enhancing L2 learners' overall comprehension. Typographical input enhancement, on the other hand, tends to be much narrower in scope, targeting specific L2 features only, such as preterit and imperfect forms of Spanish, as in Jourdenais, et al. (1995) or third person singular possessive determiners in English, as in J. White (1998). Thus, it was deemed appropriate to choose *lexical elaboration* as the only type of text elaboration in the present study, in order clearly to investigate any effect of this text modification type when analyzing participants' performance on the dependent measures (i.e., two vocabulary posttests). With L2 lexis as the L2 target to be elaborated and enhanced in this study, it was expected that, when combined, the treatment would be better able to attract L2 learners' attention to TWs and contribute to acquisition of such words.

After the TWs were selected, they were lexically elaborated, as follows. Several ESL/EFL learners' dictionaries were consulted to find the most appropriate synonyms or definitions for the TWs. When the synonyms or definitions were inserted right next to the TWs, a NS of English was asked to make any necessary changes to the synonyms or definitions directly from learners' dictionaries to render the lexical elaborations to the TWs more sensitive or appropriate to the surrounding context in which they were embedded. The same NS of English also checked whether the synonyms or definitions

inserted fitted naturally in the text as a whole while reading the elaborated text aloud.

Two more NSs of English were asked to read and comment on the elaborated text, and their feedback indicated that the elaborated text sounded natural.

The definitions for the TWs used defining vocabulary only from a list of under 2000 words, as used in defining entry words in the Cambridge International Dictionary of English (Proctor, et al., 1995), in order to ensure that when lexical elaborations are provided, L2 learners could understand them<sup>14</sup>. These words were selected according to the following principles: Defining vocabulary “contains words useful for explaining other words, uses common words of high frequency, uses words which have the same meaning in British and American English, is easy for learners to understand, avoids old-fashioned words, avoids words which are often confused with other words in English, [and] avoids words which are often confused with foreign words” (Proctor, et al., 1995, p. 1702). Once a synonym or definition was prepared for each TW, the words used in the synonym or definition were carefully examined to see whether they were within the range of defining vocabulary to ensure that participants would be able to understand the lexical elaborations when provided.

The lexical elaboration devices used in the study were of two types: Explicit and implicit. The degree of explicitness or saliency of lexical elaboration devices largely depends on the clarity or transparency to L2 learners of lexical elaborations that

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<sup>14</sup> Silva (2000, p. 35) selected words used in lexical elaborations either in the form of synonyms or definitions from “the two highest frequency bands (five and four) of the Collins COBUILD English Dictionary (1995), which account for the most frequent 1,900 words in spoken and written English.”

accompany TWs. Examples of implicit lexical elaboration devices include such structures as apposition, parallelism, and paraphrase (Chaudron, 1982, p. 175), classified as syntactic,<sup>15</sup> which were found in L2 teachers' oral discourse to L2 learners and employed for lexical elaboration. In contrast, examples of explicit lexical elaboration devices include such structures as definition, questioning, naming, and description (Chaudron, 1982, p. 175). The difference between these devices is that in the case of implicit lexical elaboration devices, "there is usually little explicit indication of the relationships between the first lexical item mentioned and the following words(s) or phrase(s) meant to elaborate its meaning" (Chaudron, 1982, p. 175). It has been reported that L2 learners often fail to recognize lexical elaborations as synonymous restatements, as the relationships between the TWs and their lexical elaborations may be perceived by L2 learners as ambiguous and interpreted as additional rather than alternative information (Vidal, 2003, p. 60).

Regarding the differential effects of type of lexical elaboration used in the study (i.e., explicit versus implicit versus no lexical elaboration), previous research has indicated that explicit forms of lexical elaboration are more facilitative of L2 vocabulary acquisition than implicit ones (Toya, 1992; Vidal, 2003), whereas Silva (2000) found no such superiority of explicit over implicit devices. Vidal (2003) reported that the TWs "that received elaboration achieved greater gains than those that received no elaboration and that the more explicit the elaboration that accompanied the [TW], the bigger the

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<sup>15</sup> In addition to syntactic structures, Chaudron's classification includes phonological and prosodic structures, morphological structures, discourse structures, and semantic-cognitive relationships (1982, pp. 171-175).

gain” (p. 82). One explanation offered by Silva (2000, pp. 69-70) as to why explicit lexical elaboration was not superior to either implicit or no lexical elaboration in his study is that explicit lexical elaboration devices “may not have made [the elaboration] explicit enough for [the participants in the elaborated group].” The explicit lexical elaboration devices used in Silva (2000) (e.g., *which is to say, that is, in other words*) were later thought to have not been as clear to L2 learners as those used in Toya (1992) (e.g., *X means Y; by X, I mean Y; X is the same as Y*)<sup>16</sup>. Given these research findings, the most explicit form of lexical elaboration (i.e., synonyms or definitions: *X, which means Y*) was chosen in this study and compared to the least explicit form of lexical elaboration (i.e., apposition: *X, Y*).

In addition, implicit lexical elaboration has been reported to be almost as ineffective as non-lexical elaboration in acquiring L2 vocabulary either from L2 listening (Toya, 1992) or L2 reading (Silva, 2000). L2 learners are left unaided even though a clue to the meaning of an unknown lexical item has been provided in the elaborated input to which they are exposed via listening to or reading an L2 text.

### **3.2.2.2 Typographical enhancement**

The unmodified baseline NS text was enhanced as follows. Text enhancement took the form of typographical input enhancement, which is intended to render L2 target

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<sup>16</sup> As Silva (2000, p. 70) correctly pointed out, the inconsistency in research findings may have been due to the difference in research design in both studies: Toya’s study employed an intentional vocabulary acquisition design, whereas an incidental vocabulary acquisition design was adopted in Silva.

forms in a written text perceptually salient, in order to draw L2 learners' attention to them, by manipulating the typographical features of the text (e.g., **boldfacing**, *italicizing*, underlining, **enlarging the font size**, changing the font type, or any combination of these). As it has been reported in the literature that various types of typographical input enhancement seem to be differentially effective in inducing L2 learners' noticing of targeted L2 forms in the input, which depends on the type of L2 targets enhanced or L2 learners exposed to such enhanced input (Wong & Simard, 1999), several versions of a text employing different types of typographical enhancement were prepared and compared to each other by the researcher and the previously mentioned Korean-speaking EFL teacher to choose the most salient kind of typographical input enhancement for the study. As boldfacing TWs was thought to be the most salient typographical enhancement type, and was in fact used in introducing new words in each unit in the textbooks for the study participants, boldfacing was chosen. Thus, each TW was either boldfaced or not, which created a condition of  $\pm$ Enhancement (i.e., [+EN] and [-EN]).

### 3.2.2.3 [EXP, +EN] text

TWs in the unmodified baseline NS text were both elaborated by using an explicit lexical elaboration device (i.e., *which means*) and providing their meanings in the form either of synonyms or definitions, and typographically enhanced by boldfacing them. An example of a TW that was both explicitly lexically elaborated and typographically enhanced is shown below, where a TW (i.e., **windfall**) is boldfaced and its meaning is provided in the form of a definition right after *which means* (see **Appendix C**):

Unfortunately for Alaska, the **windfall**, which means money you receive unexpectedly, is far less than it seems.

#### 3.2.2.4 [IMP, +EN] text

TWs in the unmodified baseline NS text were both elaborated by using an implicit lexical elaboration device (i.e., apposition with the use of commas) and providing their meanings in the form either of synonyms or definitions, and typographically enhanced by boldfacing them. An example of a TW that was both implicitly lexically elaborated and typographically enhanced is shown below, where a TW (i.e., *windfall*) is boldfaced and its meaning is provided in the form of an appositional definition within commas (see **Appendix D**):

Unfortunately for Alaska, the **windfall**, money you receive unexpectedly, is far less than it seems.

#### 3.2.2.5 [-EL, +EN] text

TWs in the unmodified baseline NS text were not elaborated, but typographically enhanced only by boldfacing them. An example of a TW that was not elaborated but typographically enhanced only is shown below, where a TW (i.e., *windfall*) is boldfaced and its meaning is not provided (see **Appendix E**):

Unfortunately for Alaska, the **windfall** is far less than it seems.

### 3.2.2.6 [EXP, -EN] text

TWs in the unmodified baseline NS text were elaborated by using an explicit lexical elaboration device (i.e., *which means*) and providing their meanings in the form either of synonyms or definitions, but not typographically enhanced at all. An example of a TW that was explicitly lexically elaborated but not typographically enhanced is shown below, where a TW (i.e., *windfall*) is not boldfaced and its meaning is provided in the form of a definition right after *which means* (see **Appendix F**):

Unfortunately for Alaska, the windfall, which means money you receive unexpectedly, is far less than it seems.

### 3.2.2.7 [IMP, -EN] text

TWs in the unmodified baseline NS text were elaborated by using an implicit lexical elaboration device (i.e., apposition with the use of commas) and providing their meanings in the form either of synonyms or definitions, but not typographically enhanced at all. An example of a TW that was implicitly lexically elaborated but not typographically enhanced is shown below, where a TW (i.e., *windfall*) is not boldfaced and its meaning is provided in the form of an appositional definition within commas (see **Appendix G**):

Unfortunately for Alaska, the windfall, money you receive unexpectedly, is far less than it seems.

### 3.2.2.8 [-EL, -EN] text

This text is the same as the unmodified baseline NS text. An example of a TW that was neither lexically elaborated nor typographically enhanced is shown below, where a TW (i.e., *windfall*) is not boldfaced and its meaning is not provided (see **Appendix H**):

Unfortunately for Alaska, the windfall is far less than it seems.

### 3.2.3 Target words

The majority of previous text modification studies that have investigated the effects of text modification on L2 acquisition from reading have predominantly used L2 lexis as a measure of L2 acquisition, whereas the majority of previous text enhancement studies that have investigated the effects of text enhancement on L2 acquisition from reading have predominantly used L2 morphosyntax as a measure of L2 acquisition. For reasons already discussed, in this study, L2 lexis was chosen as the measure of L2 acquisition from reading either elaborated, enhanced, or both elaborated and enhanced texts.

#### 3.2.3.1 Selection of target words for the treatment groups and the control group

The TWs were identified from the already selected and minimally edited reading text. When the text went through the second editing phase, some words in the text were replaced either by high- or low-frequency words (see **3.2.1 Selection and preparation of the unmodified baseline NS text** above). Thus, it could be said that, to some extent, text preparation and TW selection went hand in hand.

Initially, the researcher selected a set of potential target words which, without lexical elaboration, were perceived to be too difficult for, and therefore potentially unknown to, participants. Then, the previously mentioned Korean-speaking EFL teacher, who had helped in selecting a suitable text for the study, was asked again to read the text and circle the words that he felt would most likely be unknown to participants. His extensive experience teaching both college preparation English and Freshman English proved to be a valuable resource. Through extensive consultation with the teacher, a list of TWs for the study was finalized.

Then, additionally, another Korean-speaking EFL teacher, who was currently teaching Freshmen English at the institution where the data were collected, was presented with the above list and asked whether the words in it would indeed be unfamiliar to her students<sup>17</sup> taking Freshmen English 1. She verified that this would be the case. To further lessen any possibility that the selected TWs would already be known to participants, the basic word list of 2,067 English words, recommended by the Korean Ministry of Education and Human Resources Development to be taught from K3 through K10, was cross-referenced, and it was found that no selected TW appeared on this list.

In addition, the text was submitted to an online version of *VocabProfile* ([http://www.er.uqam.ca/nobel/r21270/cgi-bin/webfreqs/web\\_vp.cgi](http://www.er.uqam.ca/nobel/r21270/cgi-bin/webfreqs/web_vp.cgi)), created by Tom Cobb at the Université du Québec à Montréal, to determine the frequency levels of the words in the text<sup>18</sup>. *VocabProfile*, originally developed by Paul Nation at Victoria

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<sup>17</sup> No students in her Freshman English 1 classes participated in this study.

<sup>18</sup> Silva (2000) used frequency information based on the Collins COBUILD English Dictionary (1995) in selecting potential TWs for his study.

University of Wellington, is a lexical text analysis computer program that is used to investigate the proportions of high- and low-frequency words in a written text (Laufer, 1995). This program classifies words in a written text into four frequency bands: (a) The first 1000 most frequent words of English, (b) the next most frequent 1000 words (i.e., 1001-2000), (c) the academic words of English (e.g., the *Academic Word List*), and (d) the words not found in the other frequency bands. The analysis revealed that none of the TWs belonged to the first three bands; all were off-list words.

The final list of TWs included a total of 26 words: 10 nouns, 10 verbs, and 6 adjectives (see Table 3-2).

**Table 3-2**

**Target Words<sup>19</sup> Used for the Study**

TWs ( <i>k</i> = 26)	Part of Speech
adverse	adjective
appraisal	noun
bizarre	adjective
dismantling	verb
enkindled	verb
gash	noun
havoc	noun
hemorrhaging	verb
impervious	adjective
indignation	noun
lambaste	verb
levied	verb
litigation	noun
mollify	verb
overhead	noun
plummeted	verb
pristine	adjective
residue	noun
scalding	adjective
slick	noun
squabbles	noun
squandered	verb
sullied	verb
undaunted	adjective
vying	verb
windfall	noun

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<sup>19</sup> The TWs in this table are in the same form as they appeared in the text, and presented in alphabetical order.

The chosen TWs appeared in the text only once each. With 26 TWs in a 673-word unmodified baseline NS text that would have to be read within 20 minutes, it was determined not to be feasible systematically to vary the frequency of occurrence of TWs, which would have resulted in a much longer text. Since previous findings confirm that “multiple exposures to an unfamiliar lexical item positively affect learning” (Rott, 1999, p. 609), the effect of frequency of exposure to TWs on vocabulary gains was not investigated in this study.

### **3.3 Instrumentation**

This section provides a detailed description of the measures employed to assess participants’ (1) overall L2 proficiency, and (2) L2 acquisition (i.e., acquisition of L2 vocabulary knowledge), and the rationale for choosing those measures over other options. Measures of vocabulary acquisition were the two dependent variables (DVs) in this study.

#### **3.3.1 Overall EFL proficiency measure**

##### **3.3.1.1 Cloze test**

Information on participants’ EFL proficiency based on a reliable standardized measure, such as the TOEFL, was not available. Thus, a cloze test was administered instead in order to see if participants differed in EFL proficiency. Cloze tests are generally known to be a reliable measure of overall EFL proficiency (e.g., Oller & Jons, 1994). The cloze test used in this study, originally developed by J. Brown (1980), was a modified version that had previously been used in Kim (1996) with a group of Korean

EFL learners drawn from a population similar to that from which participants in this study were drawn. Kim (1996) reports that the reliability of this test was .73 by Cronbach's alpha, when scored using an acceptable-answer scoring method (see **3.5 Scoring** below for more information).

The 50-item cloze test was based on a 399-word passage, *Man and His Progress*, adapted from *Man and His World: A Structured Reader* (Kurilecz, 1969). Except for the first two sentences and the last sentence in the passage (to provide context to its readers), the cloze test had every seventh word systematically deleted from the passage, leaving a total of 50 blanks. The parts of speech of the deleted words were nouns, verbs, adjectives, adverbs, prepositions, articles, etc. The deleted blanks were of the same length. In the modified version, the written instructions in English in the original test were prepared in Korean to help test takers better understand the exact nature of the test and what they were being asked to do. Test takers were explicitly encouraged to supply personal pronouns, articles, and conjunctions, in addition to nouns and verbs, as they might otherwise focus mainly on content words (e.g., nouns and verbs), often considered important in understanding text content, as the only possible answers. They were asked to provide only one word for each blank in the column to the right of the cloze passage (see **Appendix B**).

As the primary purpose of administering the cloze test was to determine pre-treatment group equivalence in EFL proficiency among participants, the test scores from the cloze test were analyzed for this purpose only and not further used in the main statistical analysis (see **3.7 Analyses** below for more information).

### **3.3.2 L2 vocabulary acquisition measures**

#### **3.3.2.1 Absence of a vocabulary pretest**

In order clearly to attribute participants' acquisition of any TWs through reading to their exposure to the different types of texts during the treatment, a pretest-posttest design could have been chosen. A vocabulary pretest was, however, not administered in order not to alert the participants to the nature of the experimental treatment (i.e., incidental vocabulary acquisition through reading). Several measures were taken in order to ascertain that participants did not know any of the TWs before the treatment. As already discussed, a list of potential TWs were presented to a Korean EFL teacher with extensive experience of teaching Freshman English at the institution where the data were collected. None of the words were reported as possibly familiar to first-year university students taking Freshman English classes. Secondly, participants were randomly assigned to experimental conditions. Prior knowledge of TWs can therefore be assumed to have been evenly distributed among participants. Though not a direct test of vocabulary, a cloze test was administered as a measure of overall EFL reading proficiency. Given a close relationship of vocabulary to reading comprehension, the result of no statistically significant difference among groups indicated group equivalency in terms of overall EFL reading proficiency. Finally, a retrospective vocabulary "pretest" was administered after the treatment (thus, the label "retrospective"). Administration of this test allowed the removal of those participants who reported to have known even one of the TWs before reading the text. These additional measures were taken as a failsafe measure to minimize

the disadvantage of not being able to administer a vocabulary pretest due to the research design adopted in this study.

### **3.3.2.2 Justification for recognition-only immediate posttests**

Two forms of a test of L2 vocabulary acquisition were used to assess the effects of lexical elaboration (explicit and implicit), typographical enhancement, or a combination thereof, on L2 vocabulary acquisition. Given the incremental and gradual nature of vocabulary acquisition over repeated exposure to the same vocabulary item occurring in various meaningful contexts and the limited number of newly learned lexical items from a single encounter only, it was expected that (1) a measure of L2 productive vocabulary knowledge would not be able adequately to reflect incidental vocabulary acquisition that could be shown from the scores of an immediate production posttest, and (2) the amount of initial vocabulary acquisition retained one or two weeks later measured by a one- or two-week delayed posttest would be very minimal. Thus, (1) a receptive (or recognition) L2 vocabulary test was preferred, and (2) only an immediate posttest was used.

The justification for absence of any delayed posttest of L2 vocabulary in this study finds further support from Hulstijn (2001). Hulstijn (2001, p. 274) distinguishes between “measuring the effect of information processing during initial exposure to new (lexical) information (e.g., incidental vocabulary learning during the performance of an L2 reading comprehension task) and measuring the effect of presence and absence of information processing after initial exposure (e.g., whether or not, and if, how and how often, words encountered during reading are encountered again, e.g., through rehearsal)”

and recommends: “If the aim of the investigation is to assess incidental learning taking place during initial exposure, an immediate post-test is all one needs.”

### **3.3.2.3 Non-administration of an announced reading comprehension test**

Immediately after the treatment, participants were presented with a battery of three<sup>20</sup> surprise (i.e., unexpected and unannounced) vocabulary tests. They had been told in advance that they would be tested on their comprehension of the text content after reading, but no test of reading comprehension was in fact administered. A reading comprehension test was announced in advance to function as a decoy. This procedure was necessary to “create conditions conducive to incidental vocabulary learning: [Participants’] attention was turned away from *particular unknown words* and directed towards an understanding of the *text as a whole*” (Hulstijn, et al. 1996, p. 331; emphasis in original).

#### **3.3.2.3.1 Form-recognition vocabulary posttest**

The first vocabulary posttest administered was a form-recognition test. Participants were presented with a total of 43 words, consisting of the 26 TWs and 17

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<sup>20</sup> The total number of vocabulary tests administered after the treatment were three, including a retrospective vocabulary “pretest,” whose scores were not analyzed, but used to adjust participants’ performance on the two DVs (see **3.5 Scoring** for more detail).

non-words (i.e., a 3:2 ratio of TWs to non-words<sup>21</sup>), in isolation in the form of a list. This test asked participants to put a check mark in the parentheses right next to each word they thought they had seen while reading the text (see **Appendix I**). They were told that the words on the test consisted of both those that had appeared in the text and those that had not, in order to encourage participants to choose only those they thought they had encountered. A list of random numbers was created using a random number generation function in Microsoft Excel<sup>®</sup> to randomize the presentation order of these 43 words on the test.

Non-words were included in the test in order to see whether participants' overestimation of their sight recognition of the words during the treatment would have any influence on their performance on the two DVs. Each participant's score on the non-words ( $k = 17$ ) was first converted into a percentage score (i.e., the number of non-words recognized divided by the total number of non-words on the test) and used a covariate in the analysis (see **3.7 Analyses**).

The final set of non-words used in this test (see Table 3-3 below for this list) was initially selected from a list of 80 nonsense words in Urano (2000)<sup>22</sup>, where they were created by "changing one phoneme of existing English words, while obeying the morpho-

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<sup>21</sup> This 3:2 ratio is based on Anderson and Freebody (1983), where a yes/no test of vocabulary size administered to 120 L1 English fifth graders included 195 English words and 131 non-words.

<sup>22</sup> I would like to thank Ken Urano for kindly allowing me to use the nonwords used in his study.

phonetic rules of English” (p. 20). Intuition of a NS of English was consulted to choose the most plausible seeming non-words in English.

**Table 3-3.**

**Non-words<sup>23</sup> Used on the Form-Recognition Vocabulary Posttest**

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Non-words ( <i>k</i> = 17)
ausit
benile
conpealed
crail
cratic
exlume
lassaging
marfle
megates
nace
ragget
rascine
rebairs
shapper
smubbing
sporling
tepsined

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<sup>23</sup> The non-words in this table are in the same form as appeared on the test, and presented in alphabetical order.

### 3.3.2.3.2 Meaning-recognition vocabulary posttest

The second vocabulary posttest administered was a meaning-recognition test (see **Appendix J**). Participants were presented with the 26 TWs only in the form of a list and asked to select the correct meaning for each TW from a list of 52 meanings in Korean (i.e., a type of a select-definition test). They were told that all 26 words had appeared in the text. The list contained 26 correct meanings for the TWs and another 26 incorrect meanings in Korean, functioning as distractors, which could have been erroneously perceived by test takers to be semantically, though distantly, related to the meanings of the TWs to some extent. No two words in this list were in an antonym relationship with one another, which might otherwise have increased the likelihood of participants' selecting correct meanings by chance, as a result of comparing two contrasting meanings as part of a test-taking strategy. The TWs on the test were in the same form as appeared in the text and were presented in a randomized order. Presentation order for the 52 Korean meanings was also randomized.

### 3.3.2.3.3 Retrospective vocabulary “pretest”<sup>24</sup>

The third vocabulary posttest administered was a retrospective vocabulary “pretest” in checklist format (see **Appendix K**). As a measure of prior knowledge of them, participants were presented with a list of the 26 TWs, all of which they were told had appeared in the same form in the text, and asked to indicate whether they had known the meanings of these words BEFORE reading the text by placing a check mark in the

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<sup>24</sup> I would like to thank Dick Schmidt for suggesting this term, meaning a retrospective report of prior knowledge of TWs.

parentheses right next to each word. In order to correct for their overestimation of their self-reported prior knowledge of the TWs, any TW that was reported to have been known prior to reading the text, but whose correct meaning in Korean was not selected in the meaning-recognition vocabulary posttest, was not acknowledged as having been known by participants. Participants' scores on this test were adjusted downward accordingly. This resulted in a fairly conservative measure of participants' prior knowledge of the TWs. It was decided in advance that when participants' scores still indicated that they had previously known one or more TWs, even after downward score adjustment, their scores would either be dropped from the analysis or kept only when the average number of TWs reported to have been previously known would have been so small as to be considered almost nonexistent<sup>25</sup>. Participants' scores on the test were also used to adjust their performance on both the meaning- and form-recognition vocabulary posttests to arrive at the most conservative interpretation of their test performance (see **3.5 Scoring** for more detail).

### **3.4 Procedures**

The experiment was conducted in two separate data-collection sessions. During Session One, participants were asked to read and sign a consent form, and then take the

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<sup>25</sup> Hulstijn et al. (1996, p. 331) report that their participants' reported prior knowledge of the TWs, after a similar score adjustment procedure adopted in this study, was almost non-existent, and that they were successful in having selected TWs that were unfamiliar to their participants prior to the study. On average, only 0.2 out of a total of 8 TWs (i.e., 2.5%) were reported to have been previously known in their study.

50-item cloze test. During Session Two, they were asked to read the text and then take three vocabulary posttests in a row.

#### **3.4.1 Session One**

The consent form was distributed among participants (see **Appendix A**). A test administrator explained to them that they would participate in a study of the acquisition of English as a foreign language, that their participation was voluntary, and that any information gathered from them in the study would be kept strictly confidential. They were promised compensation for their time and any inconvenience that they might experience during the study in the form of a handout that would help them read texts in English in their major field of study. On page 2, toward the end of the consent form, there was a brief questionnaire asking about any experience they had of living in English-speaking countries. Data from participants with more than one year of such experience were excluded from the analysis (see **3.1 Participants** above). The test administrator then explained the cloze test they would take. Both oral and written instructions of what the test was about and what they were expected to do on the test were given. Then, they were asked to take the cloze test. Twenty minutes were given for the cloze test.

#### **3.4.2 Session Two**

Participants were randomly assigned to one of six groups by random distribution of six different versions of the experimental text (see **3.2.2 Texts for the treatment groups and the control group** above). They were told they would be asked to read a text in English for 20 minutes and that they would have to pay attention to the text content

while reading, as the text would be collected after reading, and they would then be tested on their comprehension of the text content without the text present. No mention whatsoever of any vocabulary posttests was made either to the teacher of the class or to the participants, in order to create an experimental condition of incidental vocabulary acquisition from reading. The text was collected after 20 minutes, and then three vocabulary posttests, in the order of a form-recognition vocabulary posttest (Test 1), a meaning-recognition vocabulary posttest (Test 2), and a retrospective vocabulary “pretest” (Test 3), were administered. Contrary to an earlier announcement of a post-reading test of text content comprehension, no such test was actually administered (see **Non-administration of an announced reading comprehension test** above). Participants were given five minutes for Test 1; after five minutes, the test was collected. Then, Tests 2 and 3 were given. Fifteen minutes and 5 minutes were given for Tests 2 and 3, respectively. The reason that Test 1 was administered separately from Tests 2 and 3 was that on Tests 2 and 3, it was written that all the words on the tests had appeared in the text, whereas on Test 1, it was indicated that some of the words on the test had not appeared in the text (i.e., 17 non-words). All participants received the same experimental materials during both Sessions One and Two, except for the reading text, which was the treatment in the study. After the experiment, all students in the six participating classes, regardless of their participation in the study, received a four-page handout containing the 570-word *Academic Word List* (Coxhead, 1998, 2000).

### **3.5 Scoring**

This section describes in detail how each measure in the study was scored.

#### **3.5.1 Cloze test**

The acceptable-answer scoring method was used to score the cloze test. This method was found to be the best overall scoring method (J. D. Brown, 1980) with higher reliability and validity than other methods, such as exact-answer scoring and a clozentropy procedure. The set of acceptable answers to the 50 blanks on the cloze test was selected from the responses to an open-ended cloze test provided by at least two of 77 NSs of English taking an English composition course at UCLA. The number of acceptable answers per blank ranged from one (e.g., Item No. 3) to as many as 26 (e.g., Item No. 44). Participants' answers with minor spelling mistakes were still scored correct as long as a scorer was able to recognize what participants had written as their answers to each blank. Each item was assigned one point, so the maximum possible score for each participant was 50 (i.e., 50 items x one point each).

#### **3.5.2 Vocabulary tests**

As participants' scores on the retrospective vocabulary "pretest" were used to adjust scores on the two DVs downward, the retrospective vocabulary "pretest" was scored first, and its scoring procedure is described first, below.

### 3.5.2.1 Retrospective vocabulary pretest

Participants were asked, in Korean, “Did you know the meaning of each of the following words before reading the text?” The test comprised a total of 26 TWs that had appeared in the text, and each TW to which participants answered “yes” received one point, so the maximum possible score for each participant was 26 (i.e., 26 TWs x one point each), which would indicate that participants knew every TW before the treatment, or less due to downward score adjustment (see below for more detail). The lower the score, the fewer TWs previously known.

In order to correct for participants’ overestimation of their self-reported prior knowledge of TWs, the scores on this test were adjusted downward by their performance on the meaning-recognition vocabulary posttest.

For example, when a participant answered “no” to 22 TWs, these 22 TWs were ignored. The four TWs to which she answered “yes” (e.g., *gash*, *slick*, *adverse*, and *havoc*) were not automatically given four points. Her performance on those four TWs on the meaning-recognition vocabulary posttest was examined simultaneously. When incorrect meanings were selected for, say, two of them (e.g., *gash* and *slick*), her score on these two words was not acknowledged on the grounds that even though she reported having known the meanings of these two words before reading the retrospective vocabulary “pretest,” she was not able to select correct meanings for them; thus she might not have known them before reading. When correct meanings were selected for, say, the remaining two TWs (e.g., *adverse* and *havoc*), there were two possible interpretations: (1) She might have known the meanings of these two TWs before reading, as she reported on the retrospective vocabulary “pretest,” or (2) she might not have

known them before reading, but come to know them while reading (i.e., via the treatment) as a result of incidental vocabulary acquisition, which might especially be the case if she belonged to one of the lexical elaboration groups, where the meanings of the TWs were provided in the text, right next to the TWs, either explicitly or implicitly.

The most conservative interpretation would be to consider those two TWs (i.e., *adverse* and *havoc*), the meanings of which she reported having known before reading and the correct meanings of which were selected on the meaning-recognition vocabulary posttest, previously known. As a result, it would be determined that only the two TWs (i.e., *adverse* and *havoc*) were previously known and the rest (i.e., 24 TWs) were previously unknown. However, the scores on the retrospective vocabulary “pretest” were not included in the main statistical analysis.

### **3.5.2.2 Meaning-recognition vocabulary posttest**

Participants were asked to select one correct meaning for each of the TWs from a list of the 52 meanings in Korean. Participants’ correct responses to each TW were credited with one point, so the maximum possible score for each participant was 26 (i.e., 26 TWs x one point each). But the total number of the TWs for which correct meanings would be selected could be lower than 26, if participants’ verified self-report indicated they had known some of the TWs before the treatment.

For example, when incorrect meanings were selected for the six TWs, a participant’s score for those six words was ignored. Even though correct meanings were provided for the other 20 TWs on this test, not all 20 points were acknowledged for this participant. If she reported having known the meanings of, say, two TWs on the

retrospective vocabulary “pretest” and correctly selected the meanings of these words on this test, the verified number of previously known TWs was two. Then her score was adjusted downward to 18. As a result, it would be determined that correct meanings were selected only for the 18 TWs that had not previously been known.

However, each participant’s maximum possible score on this test varied, as any prior knowledge of the TWs, reported on the retrospective vocabulary “pretest” and simultaneously verified by her performance on the meaning-recognition test, was taken into consideration in arriving at the final score. Thus, each participant’s score was converted to a percentage score.

### **3.5.2.3 Form-recognition vocabulary posttest**

Participants were asked, in Korean, “Did you encounter the following words while reading the text?” Participants’ responses to the TWs only, not to the non-words, were scored. The maximum possible score for each participant was 26 (i.e., 26 TWs x one point each), or less if the score was adjusted downward by the same participant’s score on the retrospective vocabulary “pretest.”

For example, out of the 26 TWs, if one participant checked 24 TWs as having been encountered while reading, two interpretations were possible: (1) Either she might previously have encountered some or all of those words before reading, or (2) she might have encountered them for the first time while reading. If these 24 TWs included two TWs (e.g., *adverse* and *havoc*), the meanings of which she reported having known previously on the retrospective vocabulary “pretest,” which was also verified by her performance on the meaning-recognition vocabulary posttest, those two TWs were not

acknowledged as having been encountered while reading, and her score was adjusted downward. As a result, it would be determined that her final score on this test was 22 (i.e., she encountered only 22 previously unknown TWs while reading the text).

As with the scoring procedure for the meaning-recognition test, each participant's score on this test was also converted to a percentage.

### 3.6 Research design

As already discussed, a posttest only control group design was used in the study. Although not randomly selected due to a variety of logistical constraints (i.e., intact classes were used), participants were randomly assigned to treatment and control conditions by random distribution of the six versions of the experimental reading text. This random assignment resulted in the six groups (see Table 3-4 below).

**Table 3-4.**

**2 x 3 Factorial MANOVA Design Used in the Study**

<b>Independent Variable #1</b>	<b>Independent Variable #2</b>	<b>Dependent Variable #1</b>	<b>Dependent Variable #2</b>
Type of Typographical Enhancement	Type of Lexical Elaboration	Form-Recognition Vocabulary Posttest	Meaning-Recognition Vocabulary Posttest
Enhanced (+)	Explicit	A	A'
	Implicit	B	B'
	Unelaborated (-)	C	C'
Unenhanced (-)	Explicit	D	D'
	Implicit	E	E'
	Unelaborated (-)	F	F'

The statistical analysis employed was a two-way factorial multivariate analysis of variance (MANOVA), with type of lexical elaboration (three levels: explicit, implicit, unelaborated) and type of typographical enhancement (two levels: enhanced, unenhanced) as between-subjects factors.

The independent variables (IVs) were type of lexical elaboration and type of typographical enhancement. The DVs were (1) a form-recognition vocabulary posttest and (2) a meaning-recognition vocabulary posttest.

### **3.7 Analyses**

First, a one-way univariate analysis of variance (ANOVA) was conducted on participants' cloze test scores to determine whether the six groups were equivalent in terms of overall EFL proficiency.

Second, a multivariate regression analysis was conducted, in order to determine whether participants' tendency to overestimate their sight recognition of vocabulary while reading, as reflected in their scores on the non-words on the form-recognition vocabulary posttest, by itself or in combination with the effect of the treatment variables (i.e., elaboration and enhancement), would have any significant effect on participants' performance on the form- and meaning-recognition vocabulary posttests. No statistically significant effects involving the non-words were anticipated.

Third, once the non-words had been determined to have no effects on the two dependent variables, a two-way multivariate analysis of variance was conducted. If a significant multivariate effect for elaboration, enhancement, and elaboration x enhancement were to be obtained, univariate two-way ANOVAs on each of the two

dependent measures were performed. Were significant  $F$  ratios to be found, a post hoc multiple comparison test, such as Scheffé's test, was to be applied.

Fourth, with no significant elaboration x enhancement interaction effect from the results of the MANOVA and ANOVAs, contrast analyses were conducted. Where results indicated significant differences among the six groups, Scheffé's test were used to locate mean differences among the seven contrasts of research interest.

## **CHAPTER 4**

### **RESULTS**

This chapter reports on the results of the statistical analyses, both descriptive and inferential, of the cloze test and vocabulary posttest scores.

#### **4.1 Cloze test**

The overall mean and standard deviation of the cloze test scores were 18.047 and 7.549, respectively, with scores ranging from 1 to 38. Reliability for the 50-item cloze test was calculated to be .8139, using the Kuder-Richardson formula 21 (K-R21). (See Table 4-1 for the descriptive statistics for the cloze test.)

**Table 4-1.**  
**Descriptive Statistics for the Cloze Test<sup>26</sup>**

Group		<i>n</i>	<i>M</i>	<i>SD</i>
EXP, +EN	(A)	48	17.333	7.421
IMP, +EN	(B)	53	19.528	8.040
-EL, +EN	(C)	47	18.255	7.467
EXP, -EN	(D)	52	16.558	7.247
IMP, -EN	(E)	48	17.896	7.340
-EL, -EN	(F)	49	18.673	7.723

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<sup>26</sup> These six groups were referred to as Groups A to F in Table 3-3. That is, [EXP, +EN] = A; [IMP, +EN] = B; [-EL, +EN] = C; [EXP, -EN] = D; [IMP, -EN] = E; and [-EL, -EN] = F.

To identify any preexisting difference in overall EFL proficiency among the six groups, a univariate one-way ANOVA was performed on participants' cloze test scores ( $N = 297$ ). As Table 4-2 shows, no significant differences were found ( $F(5, 291) = .977, p = .4321$ ).

**Table 4-2.**

**Univariate ANOVA Summary Results for the Cloze Test**

Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Group	5	278.448	55.690	.977	.4321
Residual	291	16588.892	57.007		

The statistically non-significant results suggest that the six groups were of similar overall EFL proficiency, as measured by the cloze test, prior to the study. Having served its purpose, the results of the cloze test were not used any further.

## 4.2 Vocabulary posttests<sup>27</sup>

The overall means and standard deviations of the form-recognition vocabulary posttest were 56.968 and 14.451, respectively, with scores ranging from 7.692 to 88. Those for the meaning-recognition vocabulary posttest were 5.856 and 5.824, respectively, with scores ranging from 0 to 34.615. Reliability indices for the 26-item form- and meaning-recognition vocabulary posttests<sup>28</sup> were calculated to be .8915 and .8459, respectively, using K-R21. (See Tables 4-3 and 4-4 for descriptive statistics for the form- and meaning-recognition vocabulary posttests.)

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<sup>27</sup> The scores for the two vocabulary posttests used in the analysis were percentage scores, as the total possible maximum scores for each participant were different, as raw scores on the tests were adjusted for prior knowledge of TWs using their scores on the retrospective “pretest.” For example, if a participant’s self-reported and independently verified test score on the retrospective “pretest” was 2 (i.e., this participant knew the meanings of two words before the treatment), then her total possible maximum score for the two vocabulary posttests became 24 (i.e., 26 - 2). In this case, a percentage score for that participant, based on how many words she recognized herself as having encountered while reading the text on the form-recognition posttest (say, 18 words) and how many words she correctly selected the meanings of for the TWs on the meaning-recognition posttest (say, four words), was .75 (i.e., 18/24), or 75, and .167 (i.e., 4/24), or 16.7, respectively.

<sup>28</sup> For the form-recognition vocabulary posttest, participants’ scores only on the 26 TWs, not the 17 non-words, also included on the test, were used in the analysis.

The mean and standard deviation of the retrospective “pretest” were .495 and .897, respectively. That is, on average, only .495 out of 26 TWs were reported to have been previously known (i.e., 1.9%). As the average number of previously known TWs was so small, all participants’ scores were included in the analysis (see **3.3.2 L2 vocabulary acquisition measure**).

Table 4-3 displays the findings on the form-recognition vocabulary posttest. Higher means obtained for the three enhanced groups (i.e., [EXP, +EN], [IMP, +EN], and [-EL, +EN]). This was expected, as the boldfaced TWs that learners were exposed to in the text while reading could draw their attention to those words better than the text where no such textual enhancement was available. As a result, these groups were able to notice more TWs while reading and recognize more of them on the post-exposure form-recognition vocabulary posttest.

Table 4-4 shows that the two explicitly and one implicitly lexically elaborated groups (i.e., [EXP, +EN], [EXP, -EN], and [IMP, +EN]) had higher means on the meaning-recognition vocabulary posttest. That was also expected as, compared to other groups (i.e., [-EL, +EN] and [-EL, -EN]), where no lexical elaborations of the TWs were provided, those groups read the text where the TWs were elaborated. Regarding the [IMP, -EN] group’s performance, participants seemed not to have taken advantage of lexical elaboration, but that result could have been due to the fact that for them, the TWs were not boldfaced.

**Table 4-3.**

**Descriptive Statistics for the Form-Recognition Vocabulary Posttest**

Group		<i>n</i>	<i>M</i>	<i>SD</i>
EXP, +EN	(A)	48	62.394	13.032
IMP, +EN	(B)	53	60.808	12.391
-EL, +EN	(C)	47	59.751	14.878
EXP, -EN	(D)	52	54.531	15.333
IMP, -EN	(E)	48	53.595	14.505
-EL, -EN	(F)	49	50.719	13.276

**Table 4-4.**

**Descriptive Statistics for the Meaning-Recognition Vocabulary Posttest**

Group		<i>n</i>	<i>M</i>	<i>SD</i>
EXP, +EN	(A)	48	8.997	6.802
IMP, +EN	(B)	53	7.285	6.154
-EL, +EN	(C)	47	3.489	3.624
EXP, -EN	(D)	52	8.152	6.952
IMP, -EN	(E)	48	4.406	3.613
-EL, -EN	(F)	49	2.488	3.023

Participants' scores on the two vocabulary posttests were then submitted to a multivariate regression analysis, which was chosen to determine whether participants' overestimation of their self-reported sight recognition of vocabulary while reading would have any influence on their performance on the two dependent measures.

Overestimation, as measured by participants' performance on the non-words on the form-recognition vocabulary posttest, alone or in relation to the two IVs, was not statistically significant: There was no significant main effect for overestimation (Wilks' Lambda = .996,  $F(2, 284) = .574$ , *ns*,  $p > .05$ ); the interaction between overestimation and elaboration was not significant (Wilks' Lambda = .991,  $F(4, 568) = .660$ , *ns*,  $p > .05$ ); no significant interaction was found between overestimation and enhancement (Wilks' Lambda = .997,  $F(2, 284) = .474$ , *ns*,  $p > .05$ ); and the overestimation x elaboration x enhancement interaction was not significant, either (Wilks' Lambda = .984,  $F(4, 568) = 1.132$ , *ns*,  $p > .05$ ).

As planned, subsequently, once the effect of overestimation was found to be statistically non-significant, the IV of overestimation was removed, and a two-way MANOVA was performed instead on the two vocabulary posttests, in order to examine the effects of elaboration and enhancement on vocabulary recognition. The results of the MANOVA yielded a significant main effect for elaboration (Wilks' Lambda = .840,  $F(4, 580) = 13.218$ ,  $p < .0001$ ) and for enhancement (Wilks' Lambda = .921,  $F(2, 290) = 12.522$ ,  $p < .0001$ ), but a non-significant elaboration x enhancement interaction effect (Wilks' Lambda = .989,  $F(4, 580) = .833$ , *ns*,  $p = .5045$ ).

The effect of elaboration was evident in the difference between +EL (i.e., EXP and IMP) and -EL, with the difference being in the anticipated direction; the effect of

enhancement was evident in the difference between +EN and -EN, with the difference being in the anticipated direction, as well.

To follow up on the significant main MANOVA, univariate two-way ANOVAs were performed on each of the two dependent measures. Tables 4-5 and 4-6 show the results of a univariate two-way ANOVA on the form- and meaning-recognition vocabulary posttests, respectively. The ANOVA on the form-recognition vocabulary posttest indicated that there was a significant main effect for enhancement ( $F(1, 291) = 24.653, p < .0001$ ) only, which was in the anticipated direction, but neither the main effect for elaboration nor the elaboration x enhancement interaction effect was statistically significant ( $F(1, 291) = 1.331, ns, p = .2659$  and  $F(2, 291) = .107, ns, p = .8934$ , respectively).

Another two-way ANOVA on the meaning-recognition vocabulary posttest revealed that both the main effects for elaboration and enhancement were significant ( $F(2, 291) = 26.877, p < .0001$  and  $F(1, 291) = 6.471, p = .0115$ , respectively), which was in the anticipated direction, whereas there was a non-significant elaboration x enhancement interaction effect ( $F(2, 291) = 1.127, ns, p = .3253$ ).

In conclusion, the following can be stated:

1. The effect of elaboration was evident in both DVs.
2. The effect of enhancement was more evident on the form-recognition vocabulary posttest than on the meaning-recognition vocabulary posttest.
3. The effects of the two IVs were additive, which means that the performance of the six groups could be predicted reliably from the separate effects of

elaboration and enhancement. In other words, the effect of elaboration was largely independent of the effect of enhancement, or vice versa.

**Table 4-5.**

**Univariate ANOVA Table for the Form-Recognition Vocabulary Posttest**

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Elaboration	2	516.594	258.297	1.331	.2659
Enhancement	1	4785.522	4785.522	24.653	< .0001
Elaboration x Enhancement	2	41.607	20.804	.107	.8984
Residual	291	56487.840	194.116		

**Table 4-6.**

**Univariate ANOVA Table for the Meaning-Recognition Vocabulary Posttest**

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Elaboration	2	1526.739	763.369	26.877	< .0001
Enhancement	1	183.787	183.787	6.471	0.0115
Elaboration x Enhancement	2	64.043	32.021	1.127	0.3253
Residual	291	8265.131	28.403		

Where significant  $F$  ratios were found, differences between pairs of means among the levels of the two IVs were analyzed using Scheffé's test, considered the most conservative post hoc multiple comparison test (see Table 4-7).

As Table 4-8 shows, the mean of the explicitly lexically elaborated group (58.305) was larger than that of the implicitly lexically elaborated group (57.380), which in turn was larger than that of the unelaborated group (55.141). But none of the differences between the three pairs of means in the IV of elaboration on the form-recognition vocabulary posttest was statistically significant; the null hypothesis ( $H_0: \mu_{EXP} = \mu_{IMP} = \mu_{-EL}$ ) could not be rejected. But the mean difference between the enhanced group (60.987) and the unenhanced group (52.976) on the same posttest was significant at  $p < .05$ ; the null hypothesis ( $H_0: \mu_{+EN} = \mu_{-EN}$ ) could be rejected (see Table 4-10).

On the meaning-recognition vocabulary posttest, the mean of the explicitly lexically elaborated group (8.558) was larger than that of the implicitly lexically elaborated group (5.917), which in turn was larger than that of the unelaborated group (2.978) (see Table 4-9). The mean differences of the three pairs were all significant at  $p < .05$ ; the null hypothesis ( $H_0: \mu_{EXP} = \mu_{IMP} = \mu_{-EL}$ ) could be rejected (see Table 4-7). The mean difference between the enhanced group (6.635) and the unenhanced group (5.083) on the same posttest was significant at  $p < .05$ ; the null hypothesis ( $H_0: \mu_{+EN} = \mu_{-EN}$ ) could be rejected (see Table 4-11).

Figures 4-1 and 4-2 graphically display the means of the six groups on the two dependent measures.

**Table 4-7.**

**Results for Scheffé Test for the Effect of Elaboration  
on the Meaning-Recognition Vocabulary Posttest**

	<i>Mean Difference</i>	<i>Critical Difference</i>	<i>p</i>
EXP vs. -EL	-5.579	1.874	< .0001*
IMP vs. -EL	-2.939	1.869	0.0007*
EXP vs. IMP	2.641	1.850	0.0024*

*Note.* Significant at  $\alpha = .05$

**Table 4-8.**

**Means Table for Different Levels of Elaboration  
on the Form-Recognition Vocabulary Posttest**

	<i>n</i>	<i>M</i>	<i>SD</i>
EXP	100	58.305	14.742
IMP	101	57.380	13.850
-EL	96	55.141	14.726

**Table 4-9.**

**Means Table for Different Levels of Elaboration  
on the Meaning-Recognition Vocabulary Posttest**

	<i>n</i>	<i>M</i>	<i>SD</i>
EXP	100	8.558	6.859
IMP	101	5.917	5.284
-EL	96	2.978	3.351

**Table 4-10.**

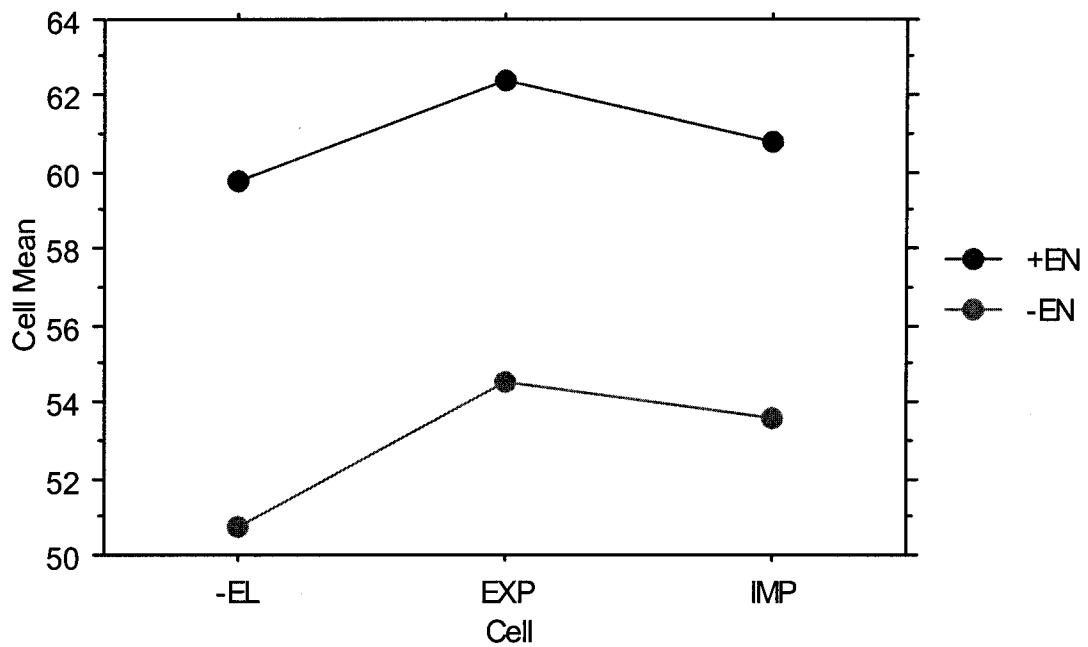
**Means Table for Different Levels of Enhancement  
on the Form-Recognition Vocabulary Posttest**

	<i>n</i>	<i>M</i>	<i>SD</i>
+EN	148	60.987	13.380
-EN	149	52.976	14.410

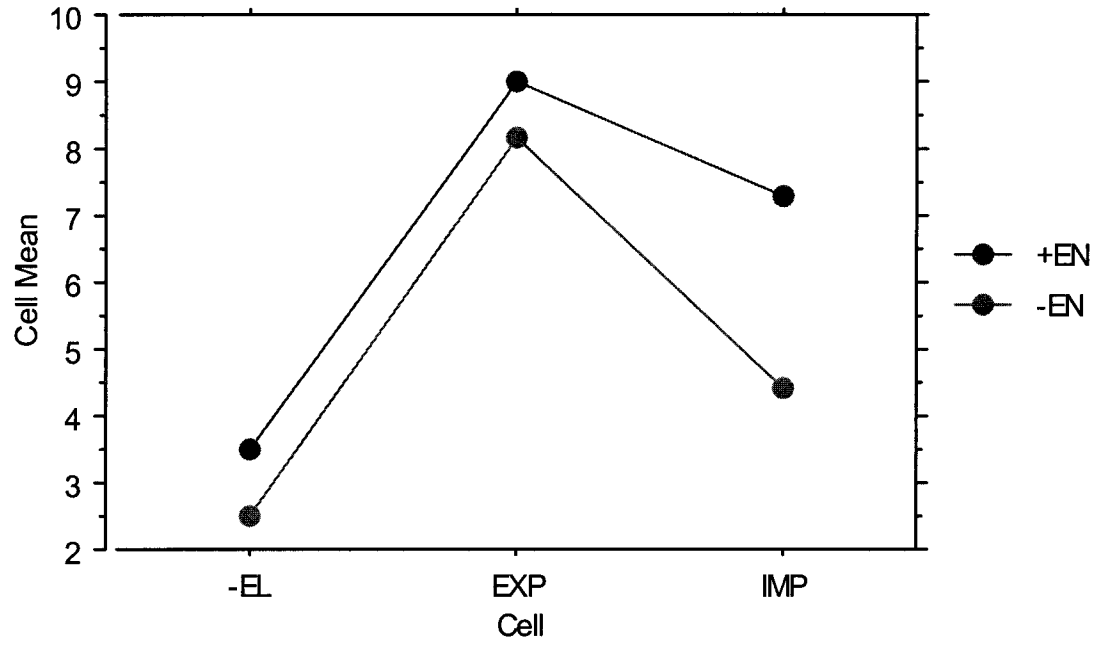
**Table 4-11.**

**Means Table for Different Levels of Enhancement  
on the Meaning-Recognition Vocabulary Posttest**

	<i>n</i>	<i>M</i>	<i>SD</i>
+EN	148	6.635	6.119
-EN	149	5.083	5.427



**Figure 4-1. Elaboration x Enhancement Interaction Plot for the Form-Recognition Vocabulary Posttest**



**Figure 4-2. Elaboration x Enhancement Interaction Plot for the Meaning-Recognition Vocabulary Posttest**

As none of the elaboration x enhancement interaction effects in the MANOVA and the subsequent two two-way univariate ANOVAs, each on one of the two dependent measures, was significant at  $p < .05$ , any interactional effect between elaboration and enhancement was not pursued any further. Instead, each level of elaboration with three levels and enhancement with two levels (i.e.,  $2 \times 3$ ) was combined to produce six groups, and then all possible comparisons were conducted among the six groups on the two DVs separately, using Scheffé's test.

There were as many as 15 pairwise mean comparisons, but only seven of them would be considered from both of the Scheffé's test results, reported on Tables 4-12 and 4-13. It was these 14 group mean contrasts, seven each for the scores on the form- and meaning-recognition vocabulary posttests, respectively, that were tested in the research hypotheses (see **2.5 Research hypotheses** in Chapter 2). These 14 contrasts were A vs. B, A vs. C, B vs. C, C vs. F, D vs. E, D vs. F, and E vs. F on the form-recognition vocabulary posttest and A' vs. B', A' vs. C', B' vs. C', C' vs. F', D' vs. E', D' vs. F', and E' vs. F' on the meaning-recognition vocabulary posttest.

As Table 4-14 shows, the group mean was in the order of A (62.394) > B (60.808) > C (59.751) > D (54.531) > E (53.595) > F (50.719) on the form-recognition vocabulary posttest. On this test, there were no significant differences, at adjusted  $\alpha = .003$ , among the seven mean contrasts of interest, as Table 4-12 indicates.

As shown in Table 4-15, the group mean was in the order of A' (8.997) > B' (8.152) > C' (7.285) > D' (4.406) > E' (3.489) > F' (2.488) on the meaning-recognition vocabulary posttest. On this test, there were significant differences, at adjusted  $\alpha = .003$ ,

for two out of the seven mean contrasts of interest: A' vs. C' and D' vs. F' (see Table 4-13).

Figures 4-3 and 4-4 graphically display the means of the six groups on the two dependent measures and Table 4-16 summarizes the results of the Scheffé's test.

**Table 4-12.**

**Results for Scheffé Test for Group  
on the Form-Recognition Vocabulary Posttest**

<i>Contrast</i>	<i>Mean Difference</i>	<i>Critical Difference</i>	<i>p</i>
<b>A = B</b>	1.586	9.301	0.9971
<b>A = C</b>	2.643	9.579	0.9732
A vs. D	7.863	9.343	0.1628
A vs. E	8.799	9.528	0.0918
A vs. F	11.675	9.48	0.0053
<b>B = C</b>	1.057	9.353	0.9996
B vs. D	6.277	9.111	0.3797
B vs. E	7.213	9.301	0.2433
B vs. F	10.809	9.251	0.0223
C vs. D	5.22	9.395	0.6291
C vs. E	6.156	9.579	0.4635
<b>C &gt; F</b>	9.032	9.53	0.0763
<b>D = E</b>	0.937	9.343	0.9998
<b>D = F</b>	3.813	9.294	0.8638
<b>E = F</b>	2.876	9.48	0.9596

*Note.* Significant at adjusted  $\alpha = .003$  (i.e.,  $\alpha = .05$  divided by 15 contrasts)

**Table 4-13.**

**Results for Scheffé Test for Group  
on the Meaning -Recognition Vocabulary Posttest**

<i>Contrast</i>	<i>Mean Difference</i>	<i>Critical Difference</i>	<i>p</i>
<b>A' &gt; B'</b>	1.712	3.558	.7614
<b>A' &gt; C'</b>	5.508	3.664	.0002*
A' vs. D'	.845	3.574	.9866
A' vs. E'	4.591	3.645	.0038
A' vs. F'	6.509	3.626	<.0001*
<b>B' &gt; C'</b>	3.796	3.578	.0293
B' vs. D'	-.867	3.485	.9831
B' vs. E'	2.879	3.558	.1995
B' vs. F'	4.797	3.539	.0012*
C' vs. D'	-4.663	3.594	.0025*
C' vs. E'	-.917	3.664	.9826
<b>C' = F'</b>	1.001	3.646	.9738
<b>D' &gt; E'</b>	3.746	3.574	.0329
<b>D' &gt; F'</b>	5.664	3.555	<.0001*
<b>E' = F'</b>	1.918	3.626	.6784

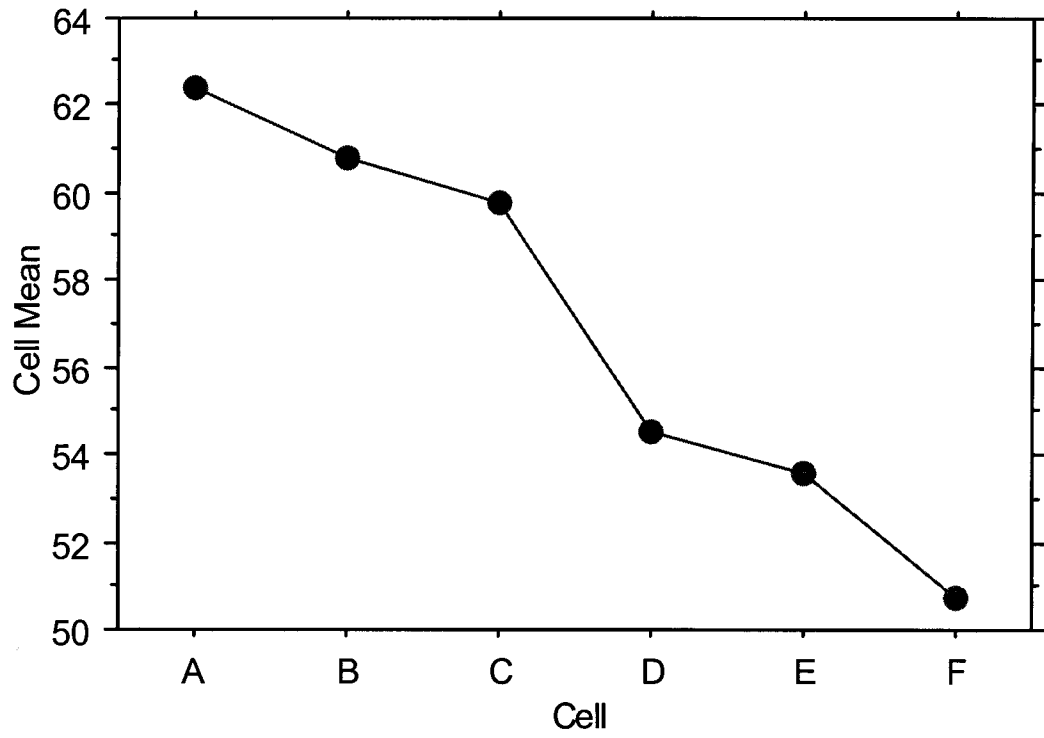
*Note.* Significant at adjusted  $\alpha = .003$  (i.e.,  $\alpha = .05$  divided by 15 contrasts)

**Table 4-14.**  
**Means Table for Group**  
**on the Form-Recognition Vocabulary Posttest**

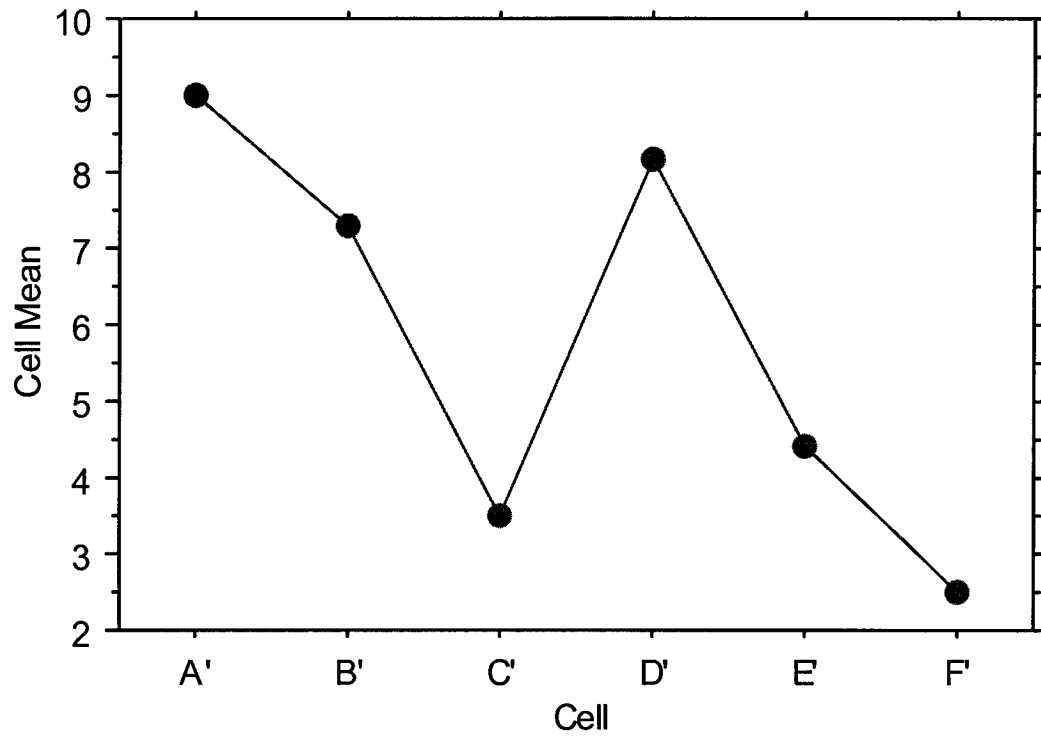
Groups	<i>n</i>	<i>M</i>	<i>SD</i>
A	48	62.394	13.032
B	53	60.808	12.391
C	47	59.751	14.878
D	52	54.531	15.333
E	48	53.595	14.505
F	49	50.719	13.276

**Table 4-15.**  
**Means Table for Group**  
**on the Meaning-Recognition Vocabulary Posttest**

Groups	<i>n</i>	<i>M</i>	<i>SD</i>
A'	48	8.997	6.802
B'	53	7.285	6.154
C'	47	3.489	3.624
D'	52	8.152	6.952
E'	48	4.406	3.613
F'	49	2.448	3.023



**Figure 4-3. Interaction Line Plot for the Six Groups on the Form-Recognition Vocabulary Posttest**



**Figure 4-4. Interaction Line Plot for the Six Groups on the Meaning-Recognition Vocabulary Posttest**

**Table 4-16.**

**Summary of the Scheffé Test Results**

Hypothesis	Prediction	Results	Effect Size (Cohen's <i>d</i> )
1-1	EXP-EN = -EL-EN on a <i>form</i> -recognition test	Supported	0.05
1-2	EXP-EN > -EL-EN on a <i>meaning</i> -recognition test	Supported*	0.10
1-3	IMP-EN = -EL-EN on a <i>form</i> -recognition test	Supported	0.04
1-4	IMP-EN = -EL-EN on a <i>meaning</i> -recognition test	Supported	0.04
2-1	-EL+EN > -EL-EN on a <i>form</i> -recognition test	Not supported	0.12
2-2	-EL+EN = -EL-EN on a <i>meaning</i> -recognition test	Supported	0.02
3-1	EXP+EN = -EL+EN on a <i>form</i> -recognition test	Supported	0.04
3-2	EXP+EN > -EL+EN on a <i>meaning</i> -recognition test	Supported*	0.10
3-3	IMP+EN = -EL+EN on a <i>form</i> -recognition test	Supported	0.01
3-4	IMP+EN > -EL+EN on a <i>meaning</i> -recognition test	Not supported	0.07
4-1	EXP-EN = IMP-EN on a <i>form</i> -recognition test	Supported	0.01
4-2	EXP-EN > IMP-EN on a <i>meaning</i> -recognition test	Not supported	0.07
5-1	EXP+EN = IMP+EN on a <i>form</i> -recognition test	Supported	0.02
5-2	EXP+EN > IMP+EN on a <i>meaning</i> -recognition test	Not supported	0.03

*Note.* Significant at adjusted  $\alpha = .003$ .

## CHAPTER 5

### DISCUSSION

In this chapter, the results of the study are discussed in relation to the research questions and specific research hypotheses presented in Chapter 2.

#### 5.1 Research question 1

The first research question concerned whether reading a text that is lexically elaborated, regardless of the specific type of lexical elaboration device used (i.e., explicit vs. implicit), has an effect on L2 vocabulary acquisition, measured by a form- or meaning-recognition vocabulary posttest, given no textual enhancement via typographical cuing. The study tested the performance of the three groups on the two dependent measures, two of which read a lexically elaborated text (i.e., Groups D and E [or Groups D' and E']) and one of which read an unelaborated text (i.e., Group F [or Group F'])<sup>29</sup>.

The specific research hypotheses tested to address the research question compared the mean test scores of Groups D vs. F (i.e., Hypothesis 1-1) and Groups E vs. F (i.e., Hypothesis 1-3) on the form-recognition vocabulary posttest and those of Groups D' vs. F' (i.e., Hypothesis 1-2) and Groups E' vs. F' (i.e., Hypothesis 1-4) on the meaning-

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<sup>29</sup> In order to distinguish participants' performance on the form- or meaning-recognition vocabulary posttest, “'” was used to denote their mean test scores on the meaning-recognition vocabulary posttest. Thus, Groups D and D', E and E', and F and F' are the same groups.

recognition vocabulary posttest. It was hypothesized in Hypotheses 1-1, 1-3, and 1-4 that there would be no significant difference between the two groups compared, whereas Hypothesis 1-2 predicted that there would be a significant difference between Groups D' and F', with Group D' performing significantly better than Group F'.

As hypothesized, there was no significant difference in the mean test scores of Groups D and F, Groups E and F, and Groups E' and F' (i.e., in Hypotheses 1-1, 1-3, and 1-4), but the difference in the mean test scores of Groups D' and F' (5.664) was significant at  $p < .003$  (i.e., Hypothesis 1-2), as Tables 4-12 and 4-13 show.

As Groups D and F both read a text that was not typographically enhanced (i.e., the TWs in the text were not set in boldface), lexical elaborations in the text for Group D alone did not seem to differentiate significantly between Group D's performance on the form-recognition vocabulary posttest and that of Group F, although Group D's mean test score was higher than that of Group F ( $M = 54.531$  and  $M = 50.719$ , respectively). The same may have been the case with Groups E and F, both of which also read an unenhanced text, with a similar pattern in the mean test scores ( $M = 53.595$  and  $M = 50.719$ , respectively). Both Hypotheses 1-1 and 1-3 were supported.

The difference in the feature of the text that Groups D' and F' read was that the text for Group D' had lexical elaborations, which were absent in the text for Group F'. As the lexical elaborations provided took the form of synonyms or definitions of the TWs in the text, most of the meanings of words which participants in the study had not known previously (only 1.9% of the TWs on average were reported to have been previously known), Group D' was clearly put in an advantageous position over Group F' in regard to the potential for learning vocabulary incidentally from being exposed to the TWs and

their lexical elaborations during reading. Group D's comparative advantage over Group F' was expected to be reflected in Group D's higher mean test score on the meaning-recognition vocabulary posttest, where participants were asked to select one correct meaning in Korean for each TW presented. As Table 4-15 shows, Group D's mean test score was 8.152, a significant difference of 5.664 points from that of Group F' ( $M = 2.488$ ) at  $p < .003$ . Hypothesis 1-2 was supported.

The text for Group E' did include lexical elaborations, which were of an implicit variety (i.e., apposition: *X, Y*), whereas that for Group D' used an explicit lexical elaboration device (i.e., synonyms or definitions: *X, which means Y*). As previous research (e.g., Toya, 1992; Silva, 2000) has found, when L2 learners read or listen to a written or spoken text where TWs are elaborated by implicit lexical elaboration devices, they often do not notice, nor take advantage of, those helpful clues to the meanings of previously unknown words in the text. Thus, unless the TWs are flagged in such a way that L2 learners' attention can be drawn to them, lexical elaborations may not be available for use by L2 learners. Group E's mean test score was higher than that of Group F' ( $M = 4.406$  and  $M = 2.488$ , respectively), but the difference (1.918), as hypothesized in Hypothesis 1-4, did not reach statistical significance at  $p < .003$ . Hypothesis 1-4 was supported.

Reading a text with lexical elaborations alone, regardless of the type of elaboration device used, did not seem to affect the degree to which L2 learners recognized the L2 target formal features (i.e., the TWs not set in boldface). However, reading a text with explicit lexical elaborations seemed to be more conducive to L2

learners' recognition of the meanings of unknown TWs in the text than reading a text with implicit lexical elaborations.

## 5.2 Research question 2

The second research question concerned whether reading a text that is typographically enhanced has an effect on L2 vocabulary acquisition, measured by a form- or meaning-recognition vocabulary posttest, given no lexical elaboration. The study tested the performance of the two groups on the two dependent measures, one of which read a typographically enhanced text (i.e., Group C [or Group C']) and the other an unenhanced text (i.e., Group F [or Group F']<sup>30</sup>).

The specific research hypotheses tested to address the research question compared the mean test scores of Groups C and F (i.e., Hypothesis 2-1) on the form-recognition vocabulary posttest and those of Groups C' and F' (i.e., Hypothesis 2-2) on the meaning-recognition vocabulary posttest. It was predicted in Hypothesis 2-1 that there would be a significant difference between Groups C and F, with Group C performing significantly better than Group F, whereas Hypothesis 2-2 predicted that there would be no significant difference between the two groups compared.

Regarding Hypothesis 2-1, textual enhancement did not seem to favor Group C's performance on the form-recognition vocabulary posttest. Only Group C read a text that was enhanced, but the mean test score difference between Groups C and F (9.032) was not statistically significant. Hypothesis 2-1 was not supported.

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<sup>30</sup> The text read by Group F or Group F' was neither elaborated nor enhanced.

As hypothesized in Hypothesis 2-2, there was no significant difference between Groups C' and F' on the meaning-recognition vocabulary posttest. As both groups read a text that was not lexically elaborated, textual enhancement alone could not seem to affect L2 learners' acquisition of the meanings of unknown words in the text. This may have resulted in their mean test scores on the meaning-recognition vocabulary posttest ( $M = 3.489$  and  $M = 2.488$ , respectively) differing not significantly. Hypothesis 2-2 was supported.

Reading a text that is typographically enhanced was expected to be more conducive than reading an unenhanced text to L2 learners' recognition of the TWs. Group C's mean test score was higher than that of Group F (59.751 and 50.719, respectively), but the difference was statistically non-significant. This may have been due to the fact that the control group (i.e., Group F), who read a text where the TWs were not set in boldface, was still able to report having encountered about half of the TWs while reading the text ( $M = 50.719$ <sup>31</sup>) as Table 4-14 shows. This group may have attempted to pay as much attention to and, during reading, recognized, as many of these previously unknown TWs as the treatment groups, in order to understand text content, which was a task instruction, since understanding the meanings of the words in a text that L2 learners encountered for the first time may have been essential to understanding what the text was about. This may have been particularly the case as only 1.9% of the TWs on average were reported to have been previously known, and the TWs in the text may have been perceived as novel by participants, which, in turn, may have called for their attention to

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<sup>31</sup> Reported as a percentage score. See footnote 2 in Section 4.2 Vocabulary posttests in Chapter 4.

the TWs met in the text. The TWs may not only have been novel but also caused participants problems in understanding text content, which may have required them to revisit the TWs as often as needed within the given time limit of 20 minutes.

An alternative explanation for the nonsignificant finding in regard to Hypothesis 2-1 is that even though boldfacing was chosen as the potentially most salient textual enhancement technique for this study, its salience could have been maximized by using a combination of several textual enhancement techniques (i.e., boldfacing + underlining + using a bigger front size) at the same time, as long as L2 readers were not distracted.

The effect of typographical enhancement on form recognition of L2 vocabulary during reading did not seem to be large enough to be statistically significant. Reading a text that is typographically enhanced, given no lexical elaboration, did not seem to influence L2 learners' recognition of the meanings of unknown words in the text, either, as the meanings of TWs did not seem to have been easily guessable from surrounding context.

### **5.3 Research question 3**

The third research question concerned whether reading a text that is both lexically elaborated, regardless of the specific type of lexical elaboration device used (i.e., explicit vs. implicit), and typographically enhanced has an effect on L2 vocabulary acquisition, measured by a form- or meaning-recognition vocabulary posttest. The study tested the performance of the three groups on the two dependent measures, two of which read such a text (i.e., Groups A and B [or Groups A' and B']) and one of which read an enhanced, but unelaborated text (i.e., Group C [or Group C']).

The specific research hypotheses tested to address the research question compared the mean test scores of Groups A and C (i.e., Hypothesis 3-1) and Groups B and C (i.e., Hypothesis 3-3) on the form-recognition vocabulary posttest and those of Groups A' and C' (i.e., Hypothesis 3-2) and Groups B' and C' (i.e., Hypothesis 3-4) on the meaning-recognition vocabulary posttest. It was hypothesized in Hypotheses 3-1 and 3-3 that there would be no significant difference between the two groups compared, whereas Hypotheses 3-2 and 3-4 predicted that there would be a significant difference between Groups A' and C' and between Groups B' and C', with both Groups A' and B' performing significantly better than Group C'.

As hypothesized, regarding the performance of Groups A and B in comparison to that of Group C (i.e., Hypotheses 3-1 and 3-3), there was no significant difference at  $p < .003$  between the groups. Groups A, B, and C all read an enhanced text, and lexical elaborations for Groups A and B were not expected to influence their performance to such an extent that their scores on the form-recognition vocabulary posttest were significantly different from that of Group C. That is, as far as participants' recognition of the L2 target formal features (i.e., the TWs) was concerned, an overriding effect of textual enhancement appeared to exist. Both Hypotheses 3-1 and 3-3 were supported.

When it comes to the same participants' performance on the meaning-recognition vocabulary posttest, only the mean test score of Group A' ( $M = 8.997$ ) was significantly different from that of Group C' (3.489) at  $p < .003$ , as hypothesized. But the mean test score of Group B' ( $M = 7.285$ ) was not. As both Groups A' and B' read a text that was both elaborated and enhanced, it was expected that both groups would be put in an advantageous position, as far as their performance on the meaning-recognition

vocabulary posttest was concerned, over Group C', which was not provided with the meanings of TWs in the text that it read. The effect of implicit lexical elaborations embedded in the text for Group B', when combined with that of textual enhancement, did not seem to have led to such a large amount of vocabulary learning, when measured by the meaning-recognition vocabulary posttest, to produce a significant difference from Group C'. Hypothesis 3-2 was supported, but Hypothesis 3-4 was not.

The non-significant finding for Hypothesis 3-4 may have been due to the lexical elaborations accompanying the boldfaced TWs in the text being of the most implicit variety. Although implicitly elaborated, when combined with textual enhancement, the TWs in the text that Group B' read were expected to become more salient, which would lead to L2 learners paying more attention to neighboring lexical elaborations. As a result, L2 learners were expected to make a more transparent link between TWs themselves and their lexical elaborations. This prediction was not borne out by the study. The effect of the most implicit lexical elaboration device used in the study seemed to have been too weak for participants who read a text elaborated this way to benefit from additional textual enhancement provided to such an extent that would lead to a statistically significant finding.

As far as form recognition was concerned, the presence or absence of lexical elaboration in a text did not seem to affect L2 learners differentially, when they all read a text that was enhanced, as well. However, meaning recognition by L2 learners who read an explicitly, but not implicitly, lexically elaborated text seemed to be significantly better than those who read a text without lexical elaboration, when they all read a text that was enhanced as well.

#### 5.4 Research question 4

The fourth research question concerned whether reading a text that is either explicitly or implicitly lexically elaborated is comparatively effective, given no textual enhancement, in L2 vocabulary acquisition, measured by a form- or meaning-recognition vocabulary posttest. The study tested the performance of the two groups on the two dependent measures, one of which read an explicitly lexically elaborated text (i.e., Group D or [Group D']) and the other of which read an implicitly lexically elaborated text (i.e., Group E or [Group E']).

The specific research hypotheses tested to address the research question compared the mean test scores of Groups D and E (i.e., Hypothesis 4-1) on the form-recognition vocabulary posttest and Groups D' and E' (i.e., Hypothesis 4-2) on the meaning-recognition vocabulary posttest. It was hypothesized in Hypothesis 4-1 that there would be no significant difference between the two groups compared, whereas Hypothesis 4-2 predicted that there would be a significant difference between Groups D' and E', with Group D' performing significantly better than Group E'.

As hypothesized, there was no significant difference between Groups D and E on the form-recognition vocabulary posttest, as the text for both groups was not enhanced. Hypothesis 4-1 was supported. When the non-significant findings from both Hypotheses 1-1 and 4-1 are considered together, it seems that when L2 learners are exposed to previously unknown words, which are not enhanced in the text, during reading, whether it is (a) elaborated or not, and (b) explicitly or implicitly elaborated, does not have an effect on form recognition.

Unexpectedly, neither was there a significant difference between Groups D' and E' at  $p < .003$ . The difference between the mean test scores for the two groups ( $M = 8.152$  and  $M = 4.406$ , respectively) was in the anticipated direction, but may not have been large enough to be statistically significant. Under an equal condition of no textual enhancement, the type of explicit lexical elaboration device used in the text for Group D' was expected to be more conducive to recognition of the meanings of the TWs during reading than an implicit one, but this was not borne out by these data. This study shares a similar non-significant finding with Silva (2000), but does not confirm findings from previous research (e.g., Toya, 1992; Vidal, 2003). Hypothesis 4-2 was not supported.

The non-significant finding for Hypothesis 4-2 may have been due to a difference in the research design adopted. Silva (2000) and this study both adopted an incidental vocabulary learning design, whereas Toya (1992) used an intentional vocabulary learning design. Under an incidental vocabulary learning condition, L2 learners' attention may not be drawn to the TWs, which may result in a lesser amount of vocabulary learning than under an intentional vocabulary learning condition. Thus, the difference in meaning recognition between Group D' ([EXP, -EN]) and Group E' ([IMP, -EN]) may not have been as great as if an intentional vocabulary learning design had been adopted. The type of lexical elaboration device used did not seem to affect L2 learners' recognition of the L2 target formal features in the text differentially, nor to have a significant effect on their recognition of the meanings of unknown words in the text.

## **5.5 Research question 5**

The fifth research question concerned whether reading a text that is both typographically enhanced and either explicitly or implicitly lexically elaborated in L2 vocabulary acquisition is comparatively effective, measured by a form- or meaning-recognition vocabulary posttest. The only difference between Research Questions 4 and 5 is that the groups compared in the former read an unenhanced text, whereas those in the latter read an enhanced text, with all groups in both research questions reading a text that was either explicitly or implicitly lexically elaborated. The study tested the performance of the two groups on the two dependent measures, one of which read a typographically enhanced and explicitly lexically elaborated text (i.e., Group A or [Group A']) and the other a typographically enhanced and implicitly lexically elaborated text (Group B or [Group B']).

The specific research hypotheses tested to address the research question compared the mean test scores of Groups A and B (i.e., Hypothesis 5-1) on the form-recognition vocabulary posttest and those of Groups A' and B' (i.e., Hypothesis 5-2) on the meaning-recognition vocabulary posttest. It was hypothesized in Hypothesis 5-1 that there would be no significant difference between the two groups compared, whereas Hypothesis 5-2 predicted that there would be a significant difference between Groups A' and B', with Group A' performing significantly better than Group B'.

As hypothesized, there was no significant difference between Groups A vs. B on the form-recognition vocabulary posttest. Groups A and B read both an enhanced and elaborated text, and, as was the case with Hypotheses 3-1 and 3-3 above, lexical elaboration was not expected to influence those two groups' performance to such an

extent that their scores on the form-recognition vocabulary posttest would be significantly different. Hypothesis 5-1 was supported.

Contrary to expectations, Group A' did not perform significantly better on the meaning-recognition vocabulary posttest than Group B'. Results for Hypotheses 3-2 and 3-4 above show that the difference between Groups A' and C' was significant on the meaning-recognition vocabulary posttest and that the difference between Groups B' and C' was not. Here, the difference between Groups A' and B' was not significant at  $p < .003$ . Hypothesis 5-2 was not supported.

The non-significant finding for Hypothesis 5-2 may have been due to the fact that Group A's mean test score could not reach a level high enough to render the mean test score difference between Groups A' and B' statistically significant. The following factors may have contributed to this:

- (1) The amount of vocabulary learning that could be realistically expected from an incidental vocabulary learning design was smaller than if an intentional vocabulary learning design had been adopted; and
- (2) The amount of vocabulary learning that could be realistically expected from a single exposure while reading a text was small, as well. For example, the mean test score of Group A', which scored highest, was 8.997 (i.e., about 9 percent).

As a result, with the factors mentioned above and the most implicit lexical elaboration device used in the text for Group B', the mean test score difference between Groups A' and B' was not as large as had been initially predicted.

The type of lexical elaboration device used did not seem differentially to affect L2 learners' recognition of L2 target formal features in the text when textual enhancement was applied to the text at the same time, the latter having an overriding effect on form recognition. Given textual enhancement, the difference in meaning recognition by L2 learners who read either an explicitly or implicitly lexically elaborated text was not statistically significant.

## CHAPTER 6

### CONCLUSION

In this chapter, first, the findings of the present study are summarized and the pedagogical implications for EFL in the Korean context that can be inferred are suggested. Second, the limitations of the present study are discussed and suggestions made for future research.

#### 6.1 Summary of the findings

The findings of the present study can be summarized as follows:

1. **Lexical elaboration alone does not aid form recognition of L2 vocabulary from reading.** Reading an L2 text where previously unknown words are (either explicitly or implicitly) lexically elaborated does not seem to contribute to the acquisition of the *forms* of those words. Participants who read an (either explicitly or implicitly) lexically elaborated text did not perform significantly better on the form-recognition vocabulary posttest than those who read an unelaborated text.
2. **Explicit lexical elaboration alone aids meaning recognition of L2 vocabulary from reading.** Reading an L2 text where previously unknown words are explicitly lexically elaborated does seem to contribute to the acquisition of the *meanings* of those words. Only participants who read an explicitly lexically elaborated text performed significantly better on the

meaning-recognition vocabulary posttest than those who read an unelaborated text, whereas those who read an implicitly lexically elaborated text did not.

3. **Typographical enhancement alone does not aid form recognition of L2 vocabulary from reading.** Reading an L2 text where previously unknown words are typographically enhanced does not seem to contribute to the acquisition of the *forms* of those words. Participants who read a typographically enhanced text did not perform significantly better on the form-recognition vocabulary posttest than those who read an unenhanced text.
4. **Typographical enhancement alone does not aid meaning recognition of L2 vocabulary from reading.** Reading an L2 text where previously unknown words are typographically enhanced does not seem to contribute to the acquisition of the *meanings* of those words. Participants who read a typographically enhanced text did not perform significantly better on the meaning-recognition vocabulary posttest than those who read an unenhanced text.
5. **Lexical elaboration and typographical enhancement combined does not aid form recognition of L2 vocabulary from reading.** Reading an L2 text where previously unknown words are both (either explicitly or implicitly) elaborated and enhanced does not seem to contribute to the acquisition of the *forms* of those words. Participants who read an (either explicitly or implicitly) elaborated and enhanced text did not perform significantly better on the form-recognition vocabulary posttest than those who read an unelaborated and

unenanced text (see the contrast between Groups A and F and Groups B and F, respectively, both of which were not significant at  $p < .003$  in Table 4-12).

6. **Lexical elaboration and typographical enhancement combined aid meaning recognition of L2 vocabulary from reading.** Reading an L2 text where previously unknown words are both (either explicitly or implicitly) elaborated and enhanced does seem to contribute to the acquisition of the *meanings* of those words. Participants who read an (either explicitly or implicitly) elaborated and enhanced text performed significantly better on the meaning-recognition vocabulary posttest than those who read an unelaborated and unenhanced text (see the contrast between Groups A' and F' and Groups B' and F', respectively, both of which were significant at  $p < .003$  in Table 4-13).
7. **Explicit and implicit lexical elaboration do not differ in their effect on form recognition of L2 vocabulary from reading.** Reading an L2 text where previously unknown words are either explicitly or implicitly elaborated does not seem to make a difference in the acquisition of the *forms* of those words. Participants who read an explicitly elaborated text did not perform significantly better on the form-recognition vocabulary posttest than those who read an implicitly elaborated text.
8. **Explicit and implicit lexical elaboration do not differ in their effect on meaning recognition of L2 vocabulary from reading.** Reading an L2 text where previously unknown words are explicitly elaborated does not result in the acquisition of the *meanings* of more of those words than reading an L2

text where the same words are implicitly elaborated. Participants who read an explicitly elaborated text did not perform significantly better on the meaning-recognition vocabulary posttest than those who read an implicitly elaborated text.

9. Regarding the last two summary points (i.e., 7 and 8 above), whether a L2 text is further enhanced in addition to either explicit or implicit lexical elaboration does not seem to make a difference in the acquisition of either the *forms* or the *meanings* of the previously unknown words in the text. Participants who read an explicitly elaborated text, which was either enhanced or not, did not perform significantly better on either the form- or the meaning-recognition vocabulary posttest than those who read an implicitly elaborated text, which was either enhanced or not.

Explicit lexical elaboration was found to have a positive effect on the acquisition of word meanings from reading (see the contrast between Groups D' and F', with Group F' as a control group, in Table 4-13) and its positive effect was maintained when typographical enhancement was added (see the contrast between Groups A' and F', with Group F' as a control group, in Table 4-13). Implicit lexical elaboration was found to have a positive effect on the acquisition of word meanings from reading only when typographical enhancement was present (see the contrast between Groups B' and F', with Group F' as a control group, in Table 4-13). As far as form recognition (i.e., acquisition of the forms of the TWs in the text) was concerned, neither the distinction between

explicit and implicit lexical elaboration nor the presence of typographical enhancement made a significant difference. Table 6-1 summarizes the research findings.

**Table 6-1.**  
**Summary of the Findings**

<b>Conditions</b>	<b>Findings</b>
Explicit lexical elaboration alone →	<b>Positive</b> effect on <b>meaning</b> recognition
Explicit lexical elaboration + typographical enhancement →	<b>Positive</b> effect on <b>meaning</b> recognition
Implicit lexical elaboration alone →	<b>No positive</b> effect on <b>meaning</b> recognition
Implicit lexical elaboration + typographical enhancement →	<b>Positive</b> effect on <b>meaning</b> recognition
Distinction between explicit and implicit lexical elaboration →	<b>No positive</b> effect on <b>form</b> recognition
Presence of typographical enhancement →	<b>No positive</b> effect on <b>form</b> recognition

## **6.2 Pedagogical implications**

The pedagogical implications that can be drawn from the findings of the current study are as follows:

1. In order to help L2 learners better learn (i.e., recognize the meanings of) low-frequency L2 vocabulary from reading, explicit elaboration of such L2 vocabulary in the text is considered to be an effective approach. Different types of lexical elaboration devices on the explicit end of the continuum can be called upon for this purpose.
2. To maximize the effect of explicit lexical elaboration, the text can be further enhanced typographically. Although not systematically manipulated, different types of typographical input enhancement devices that are proven to work best

with college-level Korean learners of EFL can be combined to further increase their effectiveness.

3. This study enhanced only the TWs to be learned through reading, not their lexical elaborations. However, as long as the least distracting type of typographical input enhancement device can be used optimally, both TWs and their lexical elaborations can be enhanced together. This “double treatment” is expected to better draw L2 learners’ attention to form (i.e., TWs) and meaning (i.e., lexical elaborations) at the same time.
4. As with Laufer & Hill (2000) and Lomicka (1998), an electronic or online version of a reading text that is elaborated and enhanced can be used to harness what Information Technology has in store for the teaching of reading comprehension and vocabulary. Extensive use of hyperlinked text and multimedia is expected to maximize what little significant effect that was found in the present study. Easy access to high-speed Internet connection that is virtually available anywhere at fairly reasonable cost in Korea would put Korean EFL into a strategic advantage.
5. As was the case with previous research into incidental L2 vocabulary acquisition from reading, the amount of vocabulary acquisition from a single exposure in this study was small, but selectively significant to some extent. This provides at least indirect evidence that multiple exposures to the same words in different contexts are necessary to consolidate knowledge of those words.

6. Related to 5 above, multiple exposures to the same words entail that L2 learners either meet those words in the same text multiple times in one sitting or encounter them repeatedly over an extended period of time. For example, freshman English programs in Korea can design a reading program that extends over a semester or so, where college-level learners of English choose reading materials of interest and relevance to their academic areas. The reading materials will have words previously unknown or partially known to them explicitly elaborated and typographically enhanced.

### **6.3 Limitations of the present study and suggestions for future research**

First, this study only looked at the effect of lexical elaboration and textual enhancement on L2 vocabulary acquisition. Logistical constraints prevented exploration of such effects on L2 reading comprehension. Thus, the first step in Long's three-step argument (1985) (i.e., Does input/interaction modification facilitate L2 comprehension?) could not be directly investigated in this study. Bypassing this step, only the second step (i.e., Does modified, thus comprehensible, and, as a result, comprehended input/interaction facilitate L2 acquisition?) in the form of an investigation of the effect of text modification (i.e., lexical elaboration and textual enhancement) on L2 acquisition, with L2 vocabulary as a measure of acquisition, was studied empirically instead. It would be interesting to include a measure of L2 comprehension (e.g., a reading comprehension test) in order to investigate whether the effect of enhanced L2 lexis leads positively to increased comprehensibility of the propositional content of the text. This inclusion may be able to directly address the first step in Long's three-step argument (1985).

Second, in order to measure the effect of text modification on L2 acquisition, L2 vocabulary was adopted as a measure of acquisition in this study. Similarly, the majority of previous text modification studies that have investigated such effects on L2 acquisition from reading have predominantly used L2 vocabulary as a measure of L2 acquisition. The type of TWs used in previous research and this study, however, has been limited to a traditional view of L2 vocabulary as single words. No text modification study has isolated multi-word lexical units, such as collocations, as a variable and employed them as a measure of L2 acquisition. Given the important role of formulaic language in L2 comprehension and production (see Wray, 2002, for a comprehensive review), future research needs to investigate whether and how effectively both L2 single words and collocations can be learned from reading elaborated and/or enhanced L2 written text.

Third, it must be noted that the frequency of occurrence of TWs in the texts in the study was controlled to be once (i.e., single exposure), due to logistical constraints. This does not necessarily mean, however, that participants encountered the TWs only once and never revisited them during reading. A strong caveat is needed about single exposure to TWs. This may account in part for the failure to obtain statistically significant findings in some of the hypotheses. Thus, it will be important to vary the frequency of appearance of TWs in the text (i.e., multiple exposure) and use it as an IV in future research to investigate how the effect of elaboration, enhancement, or a combination of the two will be affected. The frequency of TW occurrence can be varied either by exposing e.g., three groups of participants to the same TWs repeatedly (e.g., two, four, or six times, respectively, over a period of 13 weeks, as in Rott, 1999) or by preparing an experimental text where TWs are controlled to appear in varying frequency (e.g., once, two, four, or

six times) in the same text that will be read by different groups of participants in one data-collection session.

With regard to the issue of how multiple exposures to TWs will affect the influence of text modification, there is a need for more longitudinal studies. As vocabulary development is gradual in nature (see, e.g., Henriksen, 1999; Schmitt, 1998), a longitudinal design would be better able to track how multiple exposures to the TWs in different contexts consolidates and contributes to L2 learners' vocabulary development over time.

Fourth, only one type of input elaboration was used in this study (i.e., lexical elaboration) in order specifically to address whether elaboration of the TWs has a direct effect on study participants' acquisition of these words. Where acquisition of L2 vocabulary from reading elaborated text in previous research is concerned, Chung (1995) compared the effect of reading a text that was lexically, structurally, or both lexically and structurally elaborated, on L2 reading comprehension and vocabulary learning, whereas Kim (1996) compared the effect of reading a text that was elaborated primarily in the area of lexis, with attention being secondarily paid to the features of syntax, semantics, and discourse in the text, as well. In future research, the L2 units to be elaborated in L2 written text need to be expanded to include L2 syntax, semantics, and discourse, to investigate whether and how elaboration of each or any combination of those features will have an effect on L2 vocabulary acquisition from reading, with or without lexical elaboration in the text.

If different types of elaboration, in addition to lexical elaboration, are to be employed in future research, a drastic increase in text length is to be expected in the

elaborated text. As borne out by previous research, when an original text first goes through a process of elaboration, not simplification, which entails that the L2 target forms in the text, which L2 learners need to acquire to develop and further refine their interlanguage system, are not removed but instead made more comprehensible, the resulting elaborated text will retain those L2 target forms in a much lengthier textual environment, due to the process of elaboration.

An intriguing suggestion by Long, worthy of an empirical investigation, in this context, is simplification of an already elaborated text. The rationale for this additional text modification procedure is based on an observation that elaborated texts used in the previous studies tend to become much lengthier than unelaborated texts as a result of text elaboration. For example, Kim (1996) reports that the text length of his elaborated text was 1463 words, 799 more words than the unelaborated baseline NS text of 664 words, although the text difficulty for each text was 12 and 13, respectively, in terms of the Flesch-Kincaid grade level, a type of readability index. By simplifying an already elaborated text, it is expected that L2 learners reading simplified elaborated texts, regardless of whether texts have been typographically enhanced, will improve their comprehension of propositional content and acquisition of the TWs during reading. To simplify an already elaborated text, Long suggests cutting up overly long sentences (Long, personal communication) in order to ease the burden of a heavier information-processing load in the elaborated text on the part of L2 readers, thus rendering the task more manageable.

Fifth, this study used textual enhancement with typographical cuing (i.e., boldfacing the TWs), in order to investigate its unique or interactional (i.e., with the help

of lexical elaboration) contribution to L2 vocabulary acquisition from reading. Future research can investigate L2 vocabulary acquisition from listening to an elaborated and/or enhanced oral text, as no previous research into L2 vocabulary acquisition from listening has investigated intonational input enhancement as an IV, although type of lexical elaboration device as an IV has been investigated (see, e.g., Vidal, 2003; Toya, 1992). When it comes to enhancing an oral input to L2 learners, another type of input enhancement needs to be employed: Intonational input enhancement, an oral version of input enhancement.

Sixth, input enhancement as an externally-induced way of making input perceptually more salient to L2 learners (Sharwood Smith, 1993) does not necessarily guarantee that L2 learners exposed to enhanced input will pay attention to it. Leow (1999, 2001) considers offline measures of attention (e.g., multiple choice recognition, free recall, grammaticality judgment, narration, or picture description tasks) course-grained, and calls for studies employing a more robust research design, employing online measures of attention (e.g., concurrent think-aloud protocol analysis), to increase internal validity. Based on a critical review of 23 empirical studies, Leow (1999) concluded that only three (13%) used online measures, while 20 (87%) failed to use such measures. Leow (1999, p. 66) further argues:

“If conclusions are to logically follow from the data collected (namely, subjects paid attention to targeted forms in the input due to the study’s special instructional treatment or exposure), then the major criterion that

studies need to seriously address is the collection of data that directly measure subjects' processes while interacting with the L2 input."

Due to logistical constraints, this study was not able to use online measures (e.g., think-aloud), but future research needs to make more extensive use of online measures, as in Jourdenais (1998).

#### **6.4 Conclusion**

This study set out to investigate whether input elaboration and enhancement, in isolation or in combination, can facilitate incidental acquisition of L2 vocabulary through reading by college-level Korean learners of EFL. Statistically significant effects were only found for (a) lexical elaboration and typographical enhancement combined and (b) explicit lexical elaboration alone on meaning recognition of L2 vocabulary. Non-significant findings of the present study may have been due to, among other things, lack of ample exposure to L2 vocabulary during the treatment and limited effectiveness of a typographical enhancement device used (i.e., highlighting of TWs in the text) for the particular group of L2 learners who participated in the study.

This study was unique in that it was the first to investigate (a) the effect of both input elaboration and enhancement in a single study and (b) the combined effect of input elaboration and enhancement on acquisition of L2 vocabulary, not L2 morphosyntax, which has not so far been systematically investigated in the L2 written typographical input enhancement literature.

Taking into serious consideration some of the suggestions made above to improve the quality of further investigations in this area, future research, which can completely overcome or at least keep under control some of the similar logistical constraints that have faced this study and are often part and parcel of conducting research in non-laboratory studies, is expected to shed more light into the role of elaborated and enhanced input in incidental L2 vocabulary acquisition through reading.

## **APPENDIX A: CONSENT FORM**

### **AGREEMENT TO PARTICIPATE IN RESEARCH**

A Study of Reading Comprehension in English as a Foreign Language

**Investigator:** Youngkyu Kim, ABD in SLA

**Faculty Supervisor:** Dr. Michael H. Long

Department of Second Language Studies

University of Hawai'i at Mānoa

1890 East-West Road Moore Hall 570

Honolulu, HI 96822 USA

#### **Purpose of this Research**

The purpose of this research is to investigate the performance of Korean college learners' reading comprehension in English as a foreign language.

#### **What You Will Be Expected to Do**

If you agree to participate in this research, you will be asked to do the following things in two sessions:

##### **Session 1**

1. You will be asked to fill out a consent form and a brief biodata questionnaire in class.
2. You will then be given and asked to read and fill in the blanks of a text in English for 20 minutes.

##### **Session 2**

1. You will be given and asked to read a text in English for 20 minutes.
2. Immediately after reading, you will be asked to do reading-based class activities for a total of 25 minutes.

Compensation for your time or any inconvenience will be provided to you in the form of written information that you will find helpful in reading texts in English in your major field of study.

#### **Your Rights**

- **To Confidentiality**

Any information that is obtained in connection with this project and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. All the data obtained through this project will be kept in the place that can only be accessed by the researcher. Further, any data that may be reported in the dissertation will not reveal your personal identity.

- **To Ask Questions at Any Time**

You may ask questions about the research at any time. Call the investigator at (808) 956-8469. If the investigator cannot answer your questions, contact the faculty supervisor at (808) 956-2785.

- **To Withdraw at Any Time**

You may withdraw from the study at any time, and you may require that your data be destroyed, without any consequences or loss of compensation.

**Benefits**

Expected benefits include improvement of instruction of English reading comprehension in your program in particular and advancement of better understanding of how Korean college-level learners read texts in English as a foreign language in general.

**Possible Risks**

To the best of my knowledge, there are no reasonably foreseeable risks or discomforts involved in the study.

**Signature**

I certify that I have read and understand the above, that I have been given satisfactory answers to any questions about the research, and that I have been advised that I am free to withdraw my consent and to discontinue participation in the research at any time, without any prejudice or loss of benefits or compensation.

I agree to be a part of this study with the understanding that such permission does not take away any of my rights, nor does it release the investigator or the institution (or any agent or employee thereof) from liability for negligence.

If I cannot obtain satisfactory answers to my questions, or have comments or complaints about my participation in this study, I may contact: Committee on Human Studies (CHS), University of Hawai'i, 2540 Maile Way, Honolulu, HI 96822, USA. Phone: (808) 956-5007.

\_\_\_\_\_

(print your name)

(date)

\_\_\_\_\_

(signature)

cc: Signed copy to participant

소속: \_\_\_\_\_ 학번: \_\_\_\_\_ 이름: \_\_\_\_\_

학년: 1 학년 [ ] 2 학년 [ ] 3 학년 [ ] 4 학년 [ ]

성별: 남 [ ] 여 [ ] 나이 (만): \_\_\_\_\_ 세

영어사용권 국가 거주 경험이 있습니까? 예 [ ] 아니오 [ ]

있다면 그 기간은? \_\_\_\_\_ 년 \_\_\_\_\_ 개월



## MAN AND HIS PROGRESS

답

Man is the only living creature that can make and use tools. He is the most teachable of living beings, earning the name of Homo sapiens. (1)\_\_\_\_\_ ever restless brain has used the (2)\_\_\_\_\_ and the wisdom of his ancestors (3)\_\_\_\_\_ improve his way of life. Since (4)\_\_\_\_\_ is able to walk and run (5)\_\_\_\_\_ his feet, his hands have always (6)\_\_\_\_\_ free to carry and to use (7)\_\_\_\_\_. Man's hands have served him well (8)\_\_\_\_\_ his life on earth. His development, (9)\_\_\_\_\_ can be divided into three major (10)\_\_\_\_\_, is marked by several different ways (11)\_\_\_\_\_ life.

Up to 10,000 years ago, (12)\_\_\_\_\_ human beings lived by hunting and (13)\_\_\_\_\_. They also picked berries and fruits, (14)\_\_\_\_\_ dug for various edible roots. Most (15)\_\_\_\_\_, the men were the hunters, and (16)\_\_\_\_\_ women acted as food gatherers. Since (17)\_\_\_\_\_ women were busy with the children, (18)\_\_\_\_\_ men handled the tools. In a (19)\_\_\_\_\_ hand, a dead branch became a (20)\_\_\_\_\_ to knock down fruit or to (21)\_\_\_\_\_ for tasty roots. Sometimes, an animal (22)\_\_\_\_\_ served as a club, and a (23)\_\_\_\_\_ piece of stone, fitting comfortably into (24)\_\_\_\_\_ hand, could be used to break (25)\_\_\_\_\_ or to throw at an animal. (26)\_\_\_\_\_ stone was chipped against another until (27)\_\_\_\_\_ had a sharp edge. The primitive (28)\_\_\_\_\_ who first thought of putting a (29)\_\_\_\_\_ stone at the end of a (30)\_\_\_\_\_ made a brilliant discovery: he (31)\_\_\_\_\_ joined two things to make a (32)\_\_\_\_\_ useful tool, the spear. Flint,

1. \_\_\_\_\_
2. \_\_\_\_\_
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found (33)\_\_\_\_ many rocks, became a common cutting  
(34)\_\_\_\_ in the Paleolithic period of man's (35)\_\_\_\_.  
Since no wood or bone tools (36)\_\_\_\_ survived, we know  
of this man (37)\_\_\_\_ his stone implements, with which  
he (38)\_\_\_\_ kill animals, cut up the meat, (39)\_\_\_\_ scrape  
the skins, as well as (40)\_\_\_\_ pictures on the walls of  
the (41)\_\_\_\_ where he lived during the winter.

(42)\_\_\_\_ the warmer seasons, the man wandered on  
(43)\_\_\_\_ steppes of Europe without a fixed (44)\_\_\_\_, always  
foraging for food. Perhaps the (45)\_\_\_\_ carried nuts and  
berries in shells (46)\_\_\_\_ skins or even in light, woven  
(47)\_\_\_\_. Wherever they camped, the primitive people  
(48)\_\_\_\_ fires by striking flint for sparks (49)\_\_\_\_ using  
dried seeds, moss, and rotten (50)\_\_\_\_ for tinder. With fires  
that he kindled himself, man could keep wild animals away  
and could cook those that he killed, as well as provide  
warmth and light for himself.

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## APPENDIX C: [EXP, +EN] TEXT

소속: \_\_\_\_\_ 학번: \_\_\_\_\_ 이름: \_\_\_\_\_

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But looks can deceive. According to biologists, Exxon's \$2.5 billion cleanup effort was by no means as effective as the company has proclaimed. Many killer whales have vanished from Prince William Sound, while the social structure of the remaining groups appears to be breaking down. Several large **squabbles**, which means groups, of seagulls have not produced any chicks in the years since the spill. Harlequin ducks, black oyster catchers and other animals have been contaminated by eating oil-covered mussels, and sea-otter populations are **hemorrhaging**, which means bleeding, literally and figuratively -- an **adverse**, which means harmful, side effect of hydrocarbon poisoning.

Part of the problem is the disaster's magnitude, but scientists and environmentalists charge that Exxon **squandered**, which means wasted, vast

sums on paperwork, poorly planned cleanup techniques and heroic rescues. It cost the company about \$80,000 for each of the several hundred otters it cleaned, many of which died anyway. The use of **scalding**, which means extremely hot, pressurized seawater to hose down beaches left many areas almost sterile.

No amount of money could ever fully compensate for the **havoc**, which means damage or trouble, caused by the *Valdez* spill, but the record \$1.025 billion in fines and damages **levied**, which means forced to pay, against Exxon by a federal judge last October should have provided the state and federal governments with an extraordinary opportunity to take further protective measures, assess remaining problems and **mollify**, which means to make less angry, resentful citizens. Instead, the deal has suddenly started a chorus of **indignation**, which means a strong feeling of shock and anger, from residents and environmentalists, who wanted a minimum of \$2 billion, and has **enkindled**, which means started, a fierce debate over how best to spend the sum. Says biologist Rick Steiner of the University of Alaska: "The last thing we want to see out of this is a stack of studies, symposia and who knows what else."

Unfortunately for Alaska, the **windfall**, which means money you receive unexpectedly, is far less than it seems. After deducting the sums owed to federal and state governments for past cleanup, **litigation**, which means legal action, expenses and damage **appraisal**, which means a calculation of the cost, Alaska can expect just \$635 million. How to spend it is the official business of the six-member oil spill trustee council, which includes the Alaska attorney general along with representatives from two state and three federal departments. The body has already come under fire. Alaskans claim that Washington's representatives are watching out for the Bush Administration's interests and that the council is **impervious**, which means unable to be influenced by something, to the views of the public. Environmentalists **lambaste**, which means to criticize severely, the council for acting too slowly and for wasting money on items like excessive **overhead**, which means day to day business costs.

But this hasn't stopped **undaunted**, which means fearless and unworried, Alaskans from going aggressively after a slice of the pie. The trustee council has

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With so many groups **vying**, which means competing, for money, some are bound to go without. Trustees say privately that they will probably devote some of the settlement to habitat protection and scientific studies but bank most of it in an endowment. A preliminary plan could be released early next year. But given the competing claims and heated emotions, it, like the *Exxon Valdez* spill itself, will almost certainly leave in its wake a **residue**, which means something that is left behind, of anger and disappointment.

## APPENDIX D: [IMP, +EN] TEXT

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## APPENDIX F: [EXP, -EN] TEXT

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Unfortunately for Alaska, the windfall is far less than it seems. After deducting the sums owed to federal and state governments for past cleanup, litigation expenses and damage appraisal, Alaska can expect just \$635 million. How to spend it is the official business of the six-member oil spill trustee council, which includes the Alaska attorney general along with representatives from two state and three federal departments. The body has already come under fire. Alaskans claim that Washington's representatives are watching out for the Bush Administration's interests and that the council is impervious to the views of the public. Environmentalists lambaste the council for acting too slowly and for wasting money on items like excessive overhead.

But this hasn't stopped undaunted Alaskans from going aggressively after a slice of the pie. The trustee council has received nearly 450 proposals from environmentalists, scientists, government employees, tour-boat operators, fisherman and others. There are a few bizarre ideas, like dismantling the trans-Alaska pipeline, but most are worthwhile projects -- expanding wildlife refuges and parks, for example, or building fish ladders and establishing a marine public-information center.

With so many groups vying for money, some are bound to go without. Trustees say privately that they will probably devote some of the settlement to

habitat protection and scientific studies but bank most of it in an endowment. A preliminary plan could be released early next year. But given the competing claims and heated emotions, it, like the *Exxon Valdez* spill itself, will almost certainly leave in its wake a residue of anger and disappointment.

APPENDIX I: FORM-RECOGNITION VOCABULRY POSTTEST

Test 1

소속: \_\_\_\_\_ 학번: \_\_\_\_\_ 이름: \_\_\_\_\_

다음의 단어 목록은 방금 전에 읽었던 지문에서 나왔던 단어들과 나오지 않았던 단어들로 이루어져 있습니다. 총 43 개의 단어들 중 방금 전에 읽었던 지문에서 보았다고 생각되는 단어들만 골라 괄호안에 체크표시(√)를 하세요.

- |               |     |                 |     |
|---------------|-----|-----------------|-----|
| 1 squabbles   | ( ) | 23 adverse      | ( ) |
| 2 ausit       | ( ) | 24 litigation   | ( ) |
| 3 pristine    | ( ) | 25 levied       | ( ) |
| 4 slick       | ( ) | 26 havoc        | ( ) |
| 5 plummeted   | ( ) | 27 residue      | ( ) |
| 6 marfle      | ( ) | 28 dismantling  | ( ) |
| 7 undaunted   | ( ) | 29 scalding     | ( ) |
| 8 shapper     | ( ) | 30 ragget       | ( ) |
| 9 crail       | ( ) | 31 squandered   | ( ) |
| 10 tepsined   | ( ) | 32 smubbing     | ( ) |
| 11 appraisal  | ( ) | 33 bizarre      | ( ) |
| 12 exlume     | ( ) | 34 gash         | ( ) |
| 13 mollify    | ( ) | 35 indignation  | ( ) |
| 14 conpealed  | ( ) | 36 overhead     | ( ) |
| 15 impervious | ( ) | 37 sporling     | ( ) |
| 16 windfall   | ( ) | 38 sullied      | ( ) |
| 17 rascine    | ( ) | 39 rebairs      | ( ) |
| 18 cratic     | ( ) | 40 nace         | ( ) |
| 19 vying      | ( ) | 41 enkindled    | ( ) |
| 20 lambaste   | ( ) | 42 hemorrhaging | ( ) |
| 21 megates    | ( ) | 43 lassaging    | ( ) |
| 22 benile     | ( ) |                 |     |

APPENDIX J: MEANING-RECOGNITION VOCABULARY POSTTEST

Test 2

소속: \_\_\_\_\_ 학번: \_\_\_\_\_ 이름: \_\_\_\_\_

다음의 단어들은 방금 전에 읽었던 지문에서 나왔던 단어들입니다. 각 단어는 지문에서 나왔던 형태와 동일하게 제시되어 있습니다. 각 단어별로 가장 알맞은 의미를 아래의 보기에서 하나씩만 골라, 그 번호를 각 단어 옆의 빈 칸에 적어 넣으세요.

- |                    |                     |
|--------------------|---------------------|
| 1 appraisal ( )    | 14 residue ( )      |
| 2 overhead ( )     | 15 sullied ( )      |
| 3 mollify ( )      | 16 bizarre ( )      |
| 4 enkindled ( )    | 17 squabbles ( )    |
| 5 squandered ( )   | 18 impervious ( )   |
| 6 plummeted ( )    | 19 undaunted ( )    |
| 7 slick ( )        | 20 levied ( )       |
| 8 vying ( )        | 21 hemorrhaging ( ) |
| 9 dismantling ( )  | 22 pristine ( )     |
| 10 scalding ( )    | 23 adverse ( )      |
| 11 windfall ( )    | 24 havoc ( )        |
| 12 indignation ( ) | 25 litigation ( )   |
| 13 gash ( )        | 26 lambaste ( )     |

보기							
1	모욕		19	헛되이 쓰다		37	면밀한 조사
2	징수하다		20	기상천외의		38	예기치 않았던 횡재
3	복원하다		21	잔해		39	때, 무리
4	유출		22	소송		40	급격히 감소하다
5	경쟁하다		23	해로운		41	남아 있는 것
6	배상하다		24	환경친화적인		42	수면에 뜬 기름
7	일으키다		25	대황폐		43	견적
8	일체의 경비		26	달래다		44	유독물질
9	염기성의		27	살포하다		45	망쳐놓다
10	협조하다		28	말다툼		46	판결

11	수익성있는	29	심하게 비난하다	47	분해하다
12	일시 중지하다	30	투자하다	48	강제로 빼앗다
13	사려없는	31	땀 것 같이 뜨거운	49	고소하다
14	자연 그대로의	32	깊이 갈라진 틈	50	피해보상금
15	접내지 않는	33	사건	51	가라앉다
16	장기적인	34	출혈하다	52	건설하다
17	기만적인	35	예상밖 비용		
18	분개	36	영향받지 않는		

APPENDIX K: RETROSPECTIVE VOCABULARY “PRETEST”

Test 3

소속: \_\_\_\_\_ 학번: \_\_\_\_\_ 이름: \_\_\_\_\_

다음의 단어들은 방금 전에 읽었던 지문에서 나왔던 단어입니다. 각 단어는 지문에서 나왔던 형태와 동일하게 제시되어 있습니다. 다음의 단어들 중 **글을 읽기 전부터 그 의미를 이미 알고 있었다고 생각되는 단어들만**을 골라 괄호안에 **체크표시(√)**를 하세요.

- |    |              |            |    |             |            |
|----|--------------|------------|----|-------------|------------|
| 1  | adverse      | (        ) | 14 | bizarre     | (        ) |
| 2  | indignation  | (        ) | 15 | windfall    | (        ) |
| 3  | levied       | (        ) | 16 | squandered  | (        ) |
| 4  | vying        | (        ) | 17 | havoc       | (        ) |
| 5  | impervious   | (        ) | 18 | mollify     | (        ) |
| 6  | hemorrhaging | (        ) | 19 | overhead    | (        ) |
| 7  | residue      | (        ) | 20 | sullied     | (        ) |
| 8  | squabbles    | (        ) | 21 | lambaste    | (        ) |
| 9  | scalding     | (        ) | 22 | pristine    | (        ) |
| 10 | gash         | (        ) | 23 | appraisal   | (        ) |
| 11 | enkindled    | (        ) | 24 | undaunted   | (        ) |
| 12 | plummeted    | (        ) | 25 | slick       | (        ) |
| 13 | litigation   | (        ) | 26 | dismantling | (        ) |

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