

SIMPLIFICATION OR ELABORATION? THE EFFECTS OF TWO TYPES OF TEXT MODIFICATIONS ON FOREIGN LANGUAGE READING COMPREHENSION

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Linguistic simplification of written texts can increase their comprehensibility for non-native speakers, but reduce their utility for language learning in other ways, e.g. through the removal of linguistic items that learners do not know but need to learn. A study was conducted to test the hypothesis that some elaborative modifications observed in oral foreigner talk discourse, where redundancy and explicitness compensate for unknown linguistic items, offer a potential alternative approach to written text modification. 13 reading passages were presented to 483 Japanese college students in one of three forms: native baseline, simplified or elaborated. Comprehension, assessed by 30 multiple-choice test items, was highest among subjects reading the simplified version, but not significantly better than among those reading the elaborated version. The type of modifications to the texts interacted significantly with the kind of task used to assess comprehension: replication, synthesis or inference, suggesting that different kinds of text modification facilitate different levels of comprehension.

Introduction

Limitations of the traditional approach to text modification are becoming more widely recognized, but the greater awareness has as yet had little impact on the design of commercially published reading materials for second and foreign language (L2) learners. In this paper, we review some of the disadvantages of the most commonly used approach, linguistic simplification, and then present the results of a study with adult foreign language learners which compared the relative effectiveness of that approach with another, elaborative modification, based upon research findings on foreigner talk discourse. Our results are consistent with those of a growing body of work: elaborative modification is as

effective in increasing non-native comprehension and has other advantages over linguistic simplification that make it worthy of attention by teachers and writers of reading and listening comprehension materials.

Approaches to text modification

Among other problems, the use of a controlled vocabulary and short, simplex sentences in children's basal readers and their L2 equivalents for adults (so-called 'structural', or 'graded', readers) often results in choppy, unnatural discourse models of the 'Paint, Rembrandt, paint' variety. Moreover, while linguistically simplified passages are usually easier to understand overall, shorter sentences do not necessarily aid comprehension (Shook, 1977; Blau, 1982). Longer sentences can be equally or more comprehensible if attention is paid to such additional features as the clarity of references to unfamiliar concepts, the removal of pronouns with unclear antecedents, the deletion of irrelevant details in distracting phrases, and the highlighting of important concepts (Davison, Wilson and Hermon, 1985; Beck, McKeown, Omanson and Pople, 1984; Anderson and Davison, 1988; Blau, 1982). Thus, despite its greater length, lower frequency vocabulary items and use of subordination, a single multi-clausal sentence which explicitly links two propositions:

- (1) Because he had to work at night to support his family, Paco often fell asleep in class.

can be easier to process, as well as a more realistic model of language use, than a series of shorter, linguistically simpler sentences that use more frequent lexical items:

- (2) Paco had to make money for his family. Paco worked at night. He often went to sleep in class.

Moreover, the idea that linguistically simplified texts constitute less realistic models of the target language is not based on impressionistic judgments alone. As part of a larger study, Parker and Chaudron (1987) found that university

ESL students' comprehension of such a passage correlated less well with independent measures of their reading proficiency than did their comprehension of an elaboratively modified passage.

In addition to their limitations as valid models of target discourse and varying helpfulness for comprehension, there are reasons to believe that the input such linguistically simplified materials provide can have a negative effect on learner output and language acquisition. For example, basal reader input that matches, and interviewer language that exceeds, the complexity of a child's current productive capacity does not affect the child's speech, but basal reader language pitched lower than the level the child can already manage may lead the child to use spoken language below his or her capacity, roughly matching the simpler input (Holloway, 1986). Worse, removal of unknown linguistic items from a text may facilitate comprehension, but will simultaneously deny learners access to the items they need to learn. Linguistic simplification, that is, can be self-defeating to the extent that the purpose of a reading lesson is not the comprehension of a particular text, which learners are unlikely ever to encounter again outside the classroom, but learning of the language in which the text is written and/or development of transferable, non-text-specific, reading skills.

A potential alternative approach to modifying written input for adult learners derives from research findings on the adjustments native speakers make to facilitate comprehension by non-native interlocutors in naturally occurring native speaker/non-native speaker (NS/NNS) conversation. A wide range of such adjustments has been identified by researchers comparing NS-NS, NS-NNS and NNS-NNS conversation in a variety of languages (for review, see Long, 1983a; Larsen-Freeman & Long, 1991). Most are not language-specific and fall into two broad categories, linguistic and conversational. Conversational adjustments are more pervasive and provide a rich source of ideas for the elaborative modification of both spoken and written texts.

Linguistic adjustments can occur in all domains and affect the forms the learner hears (or reads). Where phonology is concerned, NSs addressing NNSs use a slower rate of delivery, more careful articulation, stress of key words and pauses before and after them, more full forms and fewer contractions. Morphological and syntactic changes include use of fewer words and clauses

per utterance, preference for canonical word order, retention of usually deleted optional constituents, overt marking of grammatical relations, and higher frequencies of questions of certain types. In the semantic domain, researchers find more overt marking of semantic relations, a lower type-token ratio and fewer idiomatic expressions (occasionally resulting in marked uses of lexical items, such as to have, rather than earn money), and fewer opaque forms, e.g. a preference for full NPs over pronouns and concrete over dummy verbs, like *do*.

Conversational adjustments affect both the content and interactional structure of foreigner talk discourse. Where content is concerned, conversation with NNSs tends to have more of a here-and-now orientation, to treat a more predictable, narrower range of topics, and to do so more briefly, e.g. by dealing with fewer information bits and by maintaining a lower ratio of topic-initiating to topic-continuing moves. The interactional structure of NS-NNS conversation is marked by more abrupt topic-shifts, more use of questions for topic-initiating moves, more repetition of various kinds (including semantic repetition, or paraphrase), and a higher frequency of comprehension checks, confirmation checks, clarification requests, expansions, question-and-answer strings and decomposition.

Conversational adjustments are more frequent and pervasive than linguistic adjustments and sometimes occur when the latter do not (Long, 1980, 1983b). Just the opposite state of affairs prevails in commercially published reading materials for first and second language learners, where linguistic modifications are typically the only kind made. The effect of conversational adjustments is to elaborate the input, maintaining much of the original (baseline NS) complexity in both lexis and syntax, but compensating for this by clarifying message content and structure, e.g. through greater topic saliency and use of topic-comment, rather than subject-predicate constructions, and by adding redundancy, e.g. through the use of repetition, elaborative paraphrase and the retention of full noun phrases that would be unnecessary for a competent NS reader. In Parker and Chaudron's terms (1987, p. 108), whereas linguistic modification involves "structurally simplified forms (fewer forms and less marked or less complex surface structure)", elaborative modification

produces “cognitively simplified forms achieved through redundancy and other devices”.

Applied to our example sentence, elaborative modifications might result in (3), below.

(1) NS baseline version

Because he had to work at night to support his family, Paco often fell asleep in class.

(2) Simplified version

Paco had to make money for his family. Paco worked at night. He often went to sleep in class.

(3) Elaborated version

Paco had to work at night to earn money to support his family, so he often fell asleep in class next day during his teacher’s lesson.

To produce (3), the following modifications have been made to version (1), written for NS readers. The first clause in the original has been promoted from subordinate to main clause, *Paco* has been fronted in order to facilitate early identification of the topic, *to earn money* has been added to help indicate the meaning of *support*, *next day* added to help confirm the temporal/causal relationship between the night work and Paco’s tiredness, and *during his teacher’s lesson* added to clarify *in class*. For readers of lower L2 proficiency, *Paco* might be repeated in the subordinate clause in place of the pronoun *he*. While rather “wordy”, (3), we would claim, sounds more like a natural sample of spoken or written English, and therefore provides a more useful language learning model, than (2). This is the typical result of elaborative modification, and compares favorably with the choppy, stilted version produced by linguistic simplification.

Equally typical consequences of the two approaches to text modification are the greater length, syntactic and lexical complexity of elaborated texts, compared with simplified ones, and, as is the case here (see Table 1), sometimes even compared with the baseline NS versions. The NS version, (1),

is a single sentence containing 17 words, two clauses and four s-nodes. The simplified version, (2), has three sentences, 19 words and five s-nodes. The elaborated version, (3), is a single sentence containing 26 words and five s-nodes. Thus, the average number of words (6.33) and s-nodes (1.66) per sentence in the simplified version are both much lower than in the other two, and higher in the elaborated than in the NS baseline version. The elaborated version also retains the original lexical items and their collocations, *support (his family)* and *fell asleep*, from the NS version, and provides an additional native-like model, *earn money*, in the course of paraphrasing support. The simplified version removes *support* and *fell asleep* from the input, substitutes the (in these contexts) slightly marked usages, *make money* and *went to sleep*, and models nothing else that was not in the original version. These patterns of difference among the three text types prevailed in the study to be reported below.

Table 1: Length and complexity of the Paco sentences

	NS baseline	simplified	elaborated
<u>s</u> entences	1	3	1
X wds/sentence	17	6.33	26
s-nodes/sentence	4	1.66	5

Previous research on simplification and elaboration

Twelve studies of the effects of simplified and elaborated input on NNS comprehension were reviewed by Parker and Chaudron (1987). A modified, updated version of their summary table appears in Figure 1. There have now been 16 studies in all, eleven of listening and five of reading comprehension. The general approach has been experimental. One or more lecturettes or written texts designed for NSs are adopted or written, followed by simplified or elaborated versions, or both. The two or three forms are then presented to intact or randomly formed groups of high school or university EFL and ESL students, whose comprehension is measured in some objective manner.

Subjects' perceived comprehension is occasionally also assessed via their responses on a Lickert scale to a written question, such as "What percentage of the lecture/passage do you think you understood?"

Generalizations are difficult since studies differ with respect to modality (spoken or written), approach to modification (simplification, elaboration or both), specific examples of each type of modification (sentence length, syntactic complexity, rate of delivery, topicalization, repetition, paraphrase, discourse markers, pauses, etc.), how comprehension is assessed (dictation, behavioral outcomes in a communication game, cloze recall and multiple choice), and when comprehension is assessed (either during or immediately after presentation of the stimulus tape or text). Nevertheless, some patterns have begun to emerge from the findings to date, along with some methodological insights for future work.

First, linguistic simplification usually improves comprehension (Johnson, 1981; Long, 1985; Mannon, 1986; Fujimoto, Lubin, Sasaki and Long, 1986; Brown, 1987; Tsang, 1987), although simple sentences alone may not help (Speidel, Tharp and Kobayashi, 1985) and can even hinder comprehension (Blau, 1982). Second, simplification is not consistently superior to elaborative modification in those studies in which their effects can be isolated (Pica, Doughty and Young, 1986; Fujimoto et al, 1986; Brown, 1987; Tsang, 1987), and there is some evidence that elaboration is more effective (Pica, Doughty and Young, 1986; Blau, 1990, two studies). Third, comprehension is consistently improved when elaborative modifications are present (Cervantes, 1983; Kelch, 1985; Chaudron and Richards, 1986; Fujimoto et al, 1986; Brown, 1987; Tsang, 1987; Blau, 1990, two studies). Fourth, as might be predicted, there is some evidence that modifications (of either type) are more useful to learners of lower L2 proficiency (Blau, 1982; Long, 1985; Brown, 1987; Tsang, 1987). Fifth, with the possible exception of rate of delivery, single adjustments of one type or another, such as shortening sentences, repetition, or making topics salient, are generally not strong enough to have an effect on the comprehensibility of whole passages or lecturettes (Blau, 1982, 1990; Kelch, 1985; Parker and Chaudron, 1987). Sixth, NNSs' perceived comprehension is higher when spoken discourse has been modified for them (Long, 1985; Kelch, 1985). Last, simplification and elaboration are combined in one or more conditions in

several studies (Johnson, 1981; Long, 1985; Fujimoto et al, 1986; Mannon, 1986), unfortunately, not necessarily due to a methodological flaw, but because the original researchers were interested in a different issue, usually the question of whether input modified naturally for non-native interlocutors (which often contains examples of both simplification and elaboration) facilitates comprehension.

Figure 1: Studies of the effect of input modification on non-native speaker comprehension

Study types	Text/modification	level/n	measure	results
LISTENING COMPREHENSION STUDIES				
Cervantes 1983	A. NS text B. Repeated text	university ESL n=16	dictation	B>A
Long 1985 2 studies	A. NS text B. FT version less complex (1.68 vs. 1.94 s/TU) slower rate (128 vs. 139 wpm) rephrasings	university ESL n=34 n=106	m. choice while listening	B>A p* B>A
Kelch 1985	A. NS text (191 wpm) B. Slower rate (124 wpm) C. FT version (200 wpm + repetition) D. FT version + slower rate (140 wpm + repetition)	university ESL n=26	dictation exact wd. scoring equiv. meaning scoring	B,D>A,C B,D>A,C D>C p* B,D>A,C
Speidel, Tharp & Kobayashi	A. Complex syntax B. Simple syntax	2nd grade SE & HCE n=120	m. choice after listening	n.s.

1985

Mannon 1986	A. Live lecture to NSs, (123 wpm, 1.99 s/TU, 16 repetitions) B. Live lecture to NNSs, (112 wpm, 1.72 s/TU, 28 repetitions)	university ESL n=28	m. choice after listening	n.s. (B>A trend)
Pica, Doughty & Young 1986	A. Modified input B. Modified inter- action	university ESL n=16	choice & location of objects in game	B>A
Fujimoto, Lubin, Sasaki & Long 1986	A. NS passage (140 wpm, 2.11 s/TU) B. Modified input (117 wpm, 1.15 s/TU) C. Modified inter- action (124 wpm, 2.15 s/TU, para- phrases, repet- itions)	university ESL n=53	m. choice after listening	B>A
Chaudron & Richards 1986	A. Normal lecture B. Micro-level dis- course markers C. Macro-level dis- course markers D. Micro- & macro- level markers	university ESL n=146	cloze re- call while listening	C>B

Blau 1990 2 studies	Study 1: 18 texts A. Complx sentnces, no surface cues (145 & 170 wpm) B. Complx sentnces + surface str. cues (145 & 170 wpm) C. Simple sentnces + surface str. cues (145 & 170 wpm) Study 2: 3 monologs A. 200 wpm B. 185 wpm C. 150 wpm with 3- sec. pauses at selected phrase/ clause/sentence boundaries	university EFL Poland n=72 university ESL Puerto Rico n=100 university EFL Poland n=36 university ESL Puerto Rico n=70	m. choice after listening Wh questions after listening	C slow> others in PR sample only C>A, B in both samples
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READING COMPREHENSION STUDIES

Johnson 1981	A. Regular B. Simple syntax & paraphrases	university ESL n=46	m. choice after reading & recall protocols	B>A on recall
Blau 1982	18 passages A. Complex sentnces with no surface structure cues B. Complex sentnces + surface str. cues C. Simple sentnces	university ESL n=85 8th grade ESL n=111 university ESL n=79 p*	m. choice after reading	n.s. (B, A>C trend) p*B>C

Brown 1987	A. NS passage (10th grd. readability	9th-11th grade n=30	m. choice during reading	B,C>A
	B. Modified input (simple syntax, 5th grd. rdbty.)			
	C. Modified inter- action (synonyms paraphrase, 9th grade readabty.)			
Tsang 1987	A. Same as	9th-13th grade n=401	m. choice during reading	B,C>A for 9th & 10th grade
	B. Brown			
	C. 1987			
Parker & Chaudron 1987	A. NS passage (red- undancy removed, thematic struct- ure reduced using canonical word order throughout)	university ESL n=43	cloze in sections after reading parts of passage (explicit mod- ification & redund- ancy alone & combined vs. NS)	n.s.
	B. Elaborative mod- ification (red- undancy, e.g. left-dislocated NPs, added; them- atic structure made explicit, e.g. by cleft sentences)			

Key: s/TU = s-nodes per T-unit; wpm = words per minute
p* = perceived comprehension

These findings are encouraging, but they also reveal the need for a larger scale, more carefully controlled study of the comparative effectiveness of simplification and elaboration as approaches to text modification. It was this that motivated the present study, which sought to determine the relative

effectiveness of pure simplification and pure elaboration of written passages on the reading comprehension of foreign language learners. Given previous findings, it was hypothesized that, as shown by their scores on the same multiple-choice test, (1) readers of simplified passages would comprehend them better than readers of unmodified NS versions, (2) readers of elaborated passages would comprehend them better than readers of unmodified NS versions, and (3) there would be no statistically significant difference between the level of comprehension achieved by readers of the simplified and elaborated passages.

Method

Subjects

A total of 483 subjects took part in the study. They were recruited as members of intact classes at a variety of universities and junior colleges in western Japan and were tested at the start of the 1989 academic year. Subjects' proficiency in English as a foreign language (EFL) varied widely, from a low of 19 to a high of 70 on the 75-item grammar section of the Comprehensive English Language Test (CELT, Harris and Palmer, 1982). All had completed eight years of compulsory instruction in English, typically consisting of explicit grammar teaching and translation of texts, with lessons often conducted predominantly in Japanese. They were majoring in a variety of subjects in the humanities and social sciences.

Materials

The potential effects of content schemata on the reading task were minimized by using thirteen passages of various lengths on a range of popular and more specialized topics. Three forms of each passage - unmodified NS baseline, simplified and elaborated were prepared (a total of 39 texts). By way of illustration, the three forms of Catfish, one of the shortest passages used in the study, are shown in Appendix 1. Descriptive statistics for the readability (Flesch-Kincaide grade level), complexity (mean words per sentence) and total length in words of the 13 passages are shown in Table 2.

Table 2: Characteristics of the three forms of 13 texts used in the study

	Readability (Flesch-Kincaide grade level)	Complexity (words per sentence)	Length (total words)
Unmodified (NS)	12.8	23.7	1563
Simplified	7.5	12.2	1614
Elaborated	14.0	27.6	2458

As shown in Table 2, elaborated texts were twice as complex as simplified ones (an average of 27.6 words compared with 12.2 words per sentence), 50% longer, and 6.5 grade levels more advanced in readability (14.0 compared with 7.5). In fact, although this need not be the case, in this study elaboration produced texts which were more complex, longer, and 1.2 grade levels more advanced in readability than the NS baseline passages, as well.

Instrumentation

Foreign language proficiency

Prior to the start of the main reading study, all subjects were given the Structure Subtest Form A of the CELT (for review, see Oxford, 1987). It consists of 75 items which assess grammatical knowledge, 44% of them dealing with choice of verbs and verb forms. Each item consists of a short printed dialog, the last sentence of which has one or more words deleted. The examinee must choose one of four alternatives (one correct and three distractors) that appear below the dialog, and is allowed 45 minutes on this section of the test. The CELT manual reports internal reliabilities (KR-20) of from .88 to .96 for the Structure Subtest when it is used, as intended, with intermediate and advanced, high school and adult EFL and ESL students. Its function in the present study was to provide a covariate for the reading comprehension measures used. The CELT data permit an assessment of the randomization scheme used with the intact classes and provide a basis for examining the influence of the interaction between text type and FL proficiency on reading scores.

Reading Comprehension

From one to four comprehension questions were written for each of the 13 passages, for a total of 30 items in the whole test. The number of questions on each passage depended on its length and the amount of information it contained; longer texts with more information provided the material needed to create items with decent distractors. Items followed a multiple choice format that included one correct response and three distractors.

The questions assessed three different comprehension processes: replication, synthesis and inference (see Davey, 1988, for a discussion of reading comprehension item types). **Replication** questions require the reader to find a reproduction, or replication, of the text in the question stem, either word for word or with minor lexical changes, in order to comprehend factual material in the passage. **Synthesis** questions require the reader to connect, or synthesize, a number of different, though explicitly stated, facts in the passage. The facts may be spread across different sentences or paragraphs. **Inference** questions require the reader to make a deduction, or inference, about the implications of the text, the basis for which may be the readers' understanding of meanings conveyed across sentences throughout the text and/or their background knowledge of the topic (a combination of Davey's 'bridging', 'gist' and 'reader-based' inference). Questions 1, 2 and 3 in Appendix A are examples of replication, synthesis and inference questions, respectively, for the Catfish passage. (Question 1 was an actual test item.) The three-way classification of questions is not based upon inherent properties of questions in isolation, but is a function of the kind of information sought and the kind of information contained in the passage to which they refer.

In order to determine the reliability of the item classification, four EFL reading experts were trained in the system by being given a definition and two example texts and questions for each category (neither texts nor questions were from the main study), and were then asked independently to classify each of the thirty items as to the process required: replication, synthesis or inference. Only the 14 items on which either three or all four experts concurred were retained for the subsequent analyses of relationships between text types and

item types: 8 replication, 4 synthesis, and 2 inference items. This approach to defining the dependent variables, although costly in terms of the number of deleted items, provided the most reliable data for this part of the analysis.

Procedures

The study was conducted at various sites in Japan during two regular 90-minute class sessions. Subjects first completed a bio-data questionnaire consisting of 15 items. They were then given 45 minutes to complete the structure section of the CELT. At the next class meeting, test booklets, each containing one of the three versions of the thirteen texts, were randomly distributed within each intact class. This procedure provided the most feasible alternative to true randomization in that the three text versions were distributed equally within classes. Subjects were given 70 minutes to complete the test, a period judged as reasonable after an earlier pilot run of the procedure.

Analysis

The test and survey data were collated into a relational database and sorted by codings for the main independent variable, text type. The effects of the quasi-random, in-class text distribution procedure were first assessed through an analysis of variance (ANOVA) on the CELT scores. Alpha was set at .05 for these and all subsequent analyses. Since there were no statistically significant differences among the three groups' CELT scores, the next stage of the analysis, a comparison of reading comprehension scores for the three groups, could also have been accomplished through ANOVA. However, in order to consider the potential interaction of even small differences in proficiency and differential comprehension of the three types of texts, the subsequent analysis was conducted on means adjusted for starting proficiency, using analysis of covariance (ANCOVA).

To test for possible relationships among text type and the type of question used measure comprehension, the total scores for each item type, replicative, synthesis and inference, were entered separately into analyses of covariance, with CELT Structure scores serving as the covariate. Prior to these ANCOVAs, tests of the homogeneity of the regression slopes showed that all treatment

groupings maintained nearly equivalent slopes. Listwise deletion of cases was necessary to guarantee that the sum of item types contained no missing responses. For this reason the n-size in the analyses reported below varied for each test.

Results

Reliability of measures and dependability of item classifications

Internal consistency estimates (KR-20) for the CELT Structure Test and reading comprehension test are shown in Table 3. The coefficient for the CELT (.85) is acceptably high. That for the reading comprehension test (.70) suggests that the degree of homogeneity for the whole test is relatively low, providing support for the idea that the various item types require different text comprehension processes. The Cohen's Kappa coefficient (.62) in Table 3 is a measure of the reliability of the four experts' three-way classification of the 14 items which survived the "three-out-of-four-or-better" criterion. Kappa is always lower than simple percent agreement indices of inter-rater reliability since, unlike those measures, it corrects for chance agreement. The observed coefficient of .62 falls within the acceptable range for this conservative measure, which is usually put at .60 - .80 (for discussion, see Cohen, 1960; Hartmann, 1977; Chaudron, Crookes and Long, 1988).

Table 3: Reliability of measures and dependability of item classifications

CELT Structure Test	Reading Comprehension	Experts
.85	.70	.62
Kuder-Richardson-20	Kuder-Richardson-20	Kappa
75 Items	30 Items	4x14 Matrix

English proficiency

Table 4a shows means and standard deviations for CELT scores for the three groups. All three scored within half of a point of each other on the 70-item test, suggesting that the quasi-random text distribution procedure had

been successful in producing groups that were of comparable FL proficiency. Results of the ANOVA of those scores are shown in Table 4b. As expected, there were no statistically significant differences among the three groups ($F = .563$, $df = 2$, $p < .57$).

Table 4a: Means and standard deviations for CELT scores

	n	\bar{x}	s
Unmodified (NS)	158	48.4494	7.9909
Simplified	163	47.4969	7.9647
Elaborated	162	47.9630	8.1689
Entire sample	483	47.9648	8.0350

Table 4b:
ANOVA of CELT scores

EFFECT	SS	df	MS	F	p
Between groups	72.78	2	36.39	.563	.57
Within groups	31045.62	480	64.68		
Total	31118.40	482			

Effect of text type on reading comprehension

Observed mean scores for the 30-item reading comprehension test and the same mean scores adjusted for English proficiency, as measured by the CELT Structure Test, are shown in Table 5a.

Table 5a: Observed and adjusted means for reading scores

	n	\bar{X}	s	Adjusted \bar{X}
Unmodified (NS)	158	18.4367	4.4298	18.3278
Simplified	163	19.3742	4.2121	19.4794
Elaborated	162	18.8765	4.5160	18.8770
Entire sample	483	18.9006	4.3947	

Table 5b: ANCOVA and LSD test for relationship between text-type and adjusted reading scores

EFFECT	SS	df	MS	F	p
Covariate (CELT)	1569.3000	1	1569.3000	98.014	.0000
Text	106.2990	2	52.1494	3.320	.0358
Within	7669.2800	479	16.0110		

- LSD: 1. NS x simplified $t = 2.58$, $p < .01$, 2-tailed
 2. NS x elaborated: $t = 1.23$, n.s.
 3. simplified x elaborated: $t = 1.36$, n.s.

As shown by the adjusted means, students reading the simplified version of the texts scored highest ($\bar{X} = 19.48$), followed by those reading the elaborated texts ($\bar{X} = 18.88$), with those reading the NS baseline versions doing poorest ($\bar{X} = 18.33$). The results of the ANCOVA on the adjusted reading scores are presented in Table 5b. There was a strong relationship between subjects' English proficiency and their reading comprehension scores ($F = 98.01$, $df = 1$, $p < .0000$). With the differences in proficiency statistically controlled via the ANCOVA, there was a significant effect for text type ($F = 3.32$, $df = 2$, $p < .036$). Results of a post hoc Least Significant Difference (LSD) test showed that the primary source of this effect for was the statistically significantly higher test scores of subjects who had read the simplified texts compared with scores of those who had read the unmodified NS baseline texts ($t = 2.58$, $p < .01$). While the elaborated group failed to perform statistically significantly better than the

NS baseline group, there was a trend in the data in that direction in the data ($t = 1.23, p > .05$), and no statistically significant difference between the performance of the simplified and elaborated groups ($t = 1.36, p > .05$).

Interaction of text type and item type

Observed and (CELT) adjusted mean scores for the three groups' performance on replicative items ($k = 8$) are shown in Table 6a, where it can be seen that readers of the simplified did best ($\bar{X} = 5.49$), followed by the elaborated text group ($\bar{X} = 5.28$), with the unmodified NS baseline text group doing poorest ($\bar{X} = 4.80$). Results of the ANCOVA for replicative items are shown in Table 6b. There was a statistically significant relationship between

Table 6a: Observed and adjusted means for replication items

	n	Observed Mean	s.d.	Adjusted Mean
Unmodified (NS)	135	4.82	1.49	4.80
Simplified	148	5.46	1.40	5.49
Elaborated	138	5.29	1.60	5.28

Table 6b: ANCOVA and LSD test for relationship between test-type and scores on replication items

EFFECT	SS	df	MS	F	P
CELT	110.46	1	110.46	55.34	.0000
Text	35.53	2	17.76	8.90	.0004
Within	832.26	417	1.99		

LSD: 1. NS x simplified: $t = 4.14, p < .001$, 2-tailed

2. NS x elaborated: $t = 2.86, p < .01$, 2-tailed

3. simplified x elaborated: $t = 1.26, n.s.$

subjects' English proficiency and their scores on replicative items ($F = 55.34, df = 1, p < .0000$). When this factor was statistically controlled for via the ANCOVA procedure, there was a significant effect for text-type on those scores

($F = 8.90$, $df = 2$, $p < .0004$). A post hoc LSD test showed that readers of the simplified text scored significantly higher than readers of the NS baseline text ($t = 4.14$, $p < .001$), as did readers of the elaborated texts ($t = 2.86$, $p < .01$). There was no significant difference between the performance on replication items by readers of simplified and elaborated texts ($t = 1.26$, $p > .05$).

Table 7a: Observed and adjusted means for synthesis items

	n	Observed Mean	s.d.	Adjusted Mean
Unmodified (NS)	144	3.18	.89	3.16
Simplified	152	3.28	.74	3.29
Elaborated	155	3.10	.92	3.10

Observed and (CELT) adjusted mean scores for the three groups' performance on synthesis items ($k = 4$) are shown in Table 7a. Readers of all three text-types scored within one fifth of a point of each other. As expected, therefore, as shown in Table 7b, the ANCOVA found a statistically significant relationship between English proficiency and scores on the synthesis items ($F = 12.52$, $df = 1$, $p < .0008$), but no such relationship between text-type and those scores ($F = 1.94$, $df = 2$, $p < .142$).

Table 7b: ANCOVA for synthesis items

EFFECT	SS	df	MS	F	p
CELT	9.00	1	9.00	12.52	.0008
Text	2.80	2	1.76	1.94	.1417
Within	321.48	447	.71		

Observed and (CELT) adjusted mean scores for the three groups' performance on inference items ($k = 2$) are shown in Table 8a. Readers of elaborated texts scored highest, followed by readers of simplified texts, with readers of unmodified NS baseline texts bringing up the rear.

Table 8a: Observed and adjusted means for inference items

	n	Observed Mean	s.d.	Adjusted Mean
Unmodified (NS)	136	.492	.63	.479
Simplified	137	.496	.58	.513
Elaborated	120	.666	.66	.662

Table 8b: ANCOVA and LSD test for relationship between text-type and scores on inference items

EFFECT	SS	df	MS	F	p
CELT	13.04	1	13.04	36.28	.0000
Text	2.37	2	1.18	3.30	.0365
Within	139.86	389	.35		

- LSD: 1. NS x simplified: $t = .47$, n.s.
 2. NS x elaborated: $t = 2.44$, $p < .02$, 2-tailed
 3. simplified x elaborated: $t = 1.99$, $p < .05$,
 2-tailed

Results of the ANCOVA, presented in Table 8b, showed statistically significant relationships between English proficiency and scores on inference items ($F = 36.28$, $df = 1$, $p < .0000$), and, with that relationship controlled for by the ANCOVA, between text-type and those scores ($F = 3.30$, $df = 2$, $p < .037$). A post hoc LSD test showed that readers of elaborated texts significantly outperformed both readers of unmodified NS texts ($t = 2.44$, $p < .02$) and readers of simplified texts ($t = 1.99$, $p < .05$). There was no statistically significant difference between readers of unmodified and simplified texts ($t = .47$, $p > .05$).

Discussion

Effect of text type on reading comprehension

There were three main hypotheses as to the effect of text-type on FL reading comprehension. As shown in Tables 5a and 5b, hypothesis (1) was supported: students who read the linguistically simplified passages scored statistically significantly higher on the 30-item multiple-choice comprehension test than students who read the unmodified (NS) versions of the same passages. Hypothesis (2) was not supported: students who read the elaborated versions of the passages scored higher than the those who read the unmodified (NS) versions, but not statistically significantly so. Hypothesis (3) was supported: there was no statistically significant difference between the reading scores of students who read the simplified and the elaborated versions of the passages.

These results are broadly consistent with those of previous studies. Simplification and elaboration were again both shown to improve comprehension. Simplification was more effective than elaboration when scores of readers of simplified and elaborated passages were compared with those of readers of unmodified (NS) passages, but it was not statistically significantly superior to elaboration, as shown by the lack of a statistically significant difference between scores of readers of simplified and elaborated texts.

Consistent with previous findings, elaboration improved comprehension, but not as much as in some earlier studies. As shown in Table 2, the reason for this almost certainly lies in the fact that, as an accidental by-product of the elaboration process, elaborated passages in this study were an average of one grade level harder in readability, 16% more complex in words per sentence, and nearly 60% longer than the unmodified (NS) passages. Each of these qualities must have worked against students reading the elaborated texts, their greater length potentially being especially problematic given that the same amount of time was allowed subjects in all three groups. Subjects in the elaborated condition had to read more material and answer the comprehension questions faster than subjects in the other two groups. The fact that the

elaborated texts were more difficult than the unmodified (NS) texts by all three of these traditional criteria makes it surprising that subjects reading them did as well as they did, and means that hypothesis (2) was tested under very unfavorable conditions.

The predicted lack of a statistically significant difference between the groups reading the elaborated and simplified texts on the general reading measure provides even more remarkable evidence of the power of elaboration for non-native readers, given that the elaborated texts were an average of six grade levels harder in readability, 125% more complex in words per sentence, and 50% longer than the simplified ones. Elaboration of the input made it possible for one group of FL readers to perform at a level comparable to that of another group despite the fact that the second group's reading task was much easier as assessed by traditional criteria. They did this, moreover, while being exposed to more authentic target language models and to more unknown vocabulary and syntax. This is important when one remembers that one function of their classes was to improve their comprehension of passages like these, but that another was to teach them new vocabulary and grammar.

Interaction of text type and item type

There is some evidence from the findings of this study of an interaction between the kind of modifications made to a text and the depth of processing non-native readers can achieve. The trend is for both simplification and elaboration to assist readers in extracting low level, surface information from a passage, but for elaboration to become more useful as the depth of processing required by a reading task increases.

As shown in Tables 6a and 6b, the effect of text type on reader performance on replication items remained strong after the effects of the covariate were considered. Facilitating identification of surface factual information - processing at the level of replication - appears not to be a matter of textual simplification per se if simplification is thought of in terms of traditional indices of readability. Nor does it appear to be a matter of schematic knowledge (cf Carrell, 1990), since the replication items in this study related to different passages, some sampling familiar content domains, some unfamiliar ones. Rather, as Table 6b suggests, simplified and elaborated texts appear to

provide equally adequate sources from which readers can extract factual information. Unmodified texts, on the other hand, appear not to lend themselves as well to factual replication, at least not for students in the FL proficiency range sampled. A possible explanation for this may be that unmodified texts do not provide lexical simplification, nor enhance parenthetical detail about complex and unknown words, both of which can serve to draw less proficient readers' attention to key forms in the input for handling replication tasks.

Textual manipulation, either in the form of simplification or elaboration, did not appear to have any direct effect on the level of processing needed for synthesis items, as shown in Tables 7a and 7b. After the effects of the covariate, a general measure of fairly low level L2 grammatical knowledge, were removed, little of the remaining variance was accounted for by differences in textual structure. Several factors may make textual variation ineffectual in making such items more comprehensible. In order to synthesize disparate bits of information, often coded in synonyms and anaphoric referents across sentence boundaries, readers must recognise that different lexical items refer to the same entity. Textual simplification conceivably eases the burden on lexical knowledge if complex and esoteric words are replaced with more common ones. Yet in this study there appears to be little evidence that such simplification, along with simpler syntactic structure, makes cross-sentence linking of concepts referred to by different lexical items any more understandable. Likewise, the elaboration of less common words simultaneously increases the mean clause length of the whole passage and perhaps obfuscates the cross-sentence referencing necessary for dealing with synthesis tasks.

Comprehension of inference items requires the reader to link the written text and pragmatic knowledge. Information from the text, if comprehended accurately, implies that some other consequence will follow. It is possibly for this reason that elaboration of textual information, although increasing the general processing burden because of greater clause length, appears to increase the accuracy of responses to items requiring inferencing, as shown in Tables 8a and 8b. The technique of elaboration, including parenthetical expansion of key

terms and concepts in the original text, provides the reader with a "second look" at those terms and concepts and consequently increases the chance that inferencing about them can be stimulated in the reading process.

In contrast to the elaborated texts, unmodified and simplified texts provide less context for stimulating the deeper pragmatic linkage necessary for inferring the consequences of passage meanings. Unmodified texts probably fail because concepts are obscured by the structural and lexical detail. Simplified texts probably fail because they strip away the richness of detail helpful for a reader to perceive a text's implications.

Conclusion

Readers of 13 simplified texts performed slightly better, although not statistically so, than readers of 13 elaborated texts when both groups were tested on their comprehension of passage content, despite the fact that the elaborated texts were considerably more difficult by traditional linguistic criteria. In the process, however, readers of the simplified texts were denied access to more authentic models of target language use and to some of the vocabulary and grammatical items they eventually needed to learn, whereas readers of elaborated texts experienced both. The results suggest that the time has come for teachers and materials writers to take such findings into account and adopt elaboration as an approach to modifying reading comprehension materials for foreign and second language learners. Elaboration would seem to serve the twin purposes of most FL and SL reading lessons, namely, (1) improving comprehension and (2) providing learners with the raw data they need for language development in the form of access to unknown linguistic items in classroom input. Given earlier similar findings on listening comprehension, elaboration would seem to constitute as viable an alternative to simplification for the presentation of both spoken and written discourse to foreign and second language learners.

As was the case here, elaboration can sometimes result in texts which on the surface are linguistically more complex, although cognitively simpler, than the original versions, since some changes, such as rephrasing, repetition and clefting to highlight thematic structure, inevitably produce greater sentence

length, for example. There is no obvious reason to confront students with texts that are more complex than those they will encounter outside the classroom. When there is a danger of this happening during the preparation of classroom materials, the situation is easily remediable. One obvious solution is to break up the occasional overly long or syntactically complex sentence after elaboration has been completed, in other words, ironically, to apply one of the most traditional text simplification strategies - but to elaborate, rather than unmodified, texts.

If a simple extraction of explicitly stated factual information is called for by a reading task, it is possible that syntactic and lexical simplification will be sufficient aids for non-native readers. In the 1990's many students are being prepared for more than this in their English classes, however, especially, but not only, in content-based, sheltered subject-matter, task-based, and immersion programs. If the purpose of pedagogical materials in these and other more conventional FL and SL programs is to provide opportunities for more effective learning strategies to be implemented, including the ability to process texts at a deeper level, elaboration should again be considered. The study's findings suggest that elaborative modification serves to provide semantic detail foreign language readers find helpful when making inferences from texts. Second language learners need listening and reading materials that stimulate them intellectually, that jointly trigger the processes of understanding language from context and content from language.

The study reported here was not without limitations. The excessive linguistic difficulty of the elaborated texts has already been commented on. The interaction of text-type and item type was conducted on a limited number of items due to the need to discard those from the full test whose category membership experienced coders found ambiguous. Both parts of the study clearly need replication, with elaborated texts matched for linguistic complexity with the unmodified (NS baseline) versions, and with higher numbers of replication, synthesis and inference test items, clearly specified and classified in advance of the main a reading study.

There are several directions in which this line of research could be extended. To begin with, the same variables could usefully be examined in a

listening comprehension study. The range of subjects sampled in both listening and reading studies needs to be extended to include cohorts of younger learners, who have been conspicuously absent from all but one study of text modification to date, and learners from a range of linguistic and, especially, educational backgrounds. Is it the case, for example, that the kinds of text modifications learners find beneficial depends to some extent on the level of literacy and study skills they have achieved in their first language? Finally, those interested in first language development may be interested in extending the research on elaboration to the preparation of basal readers. The traditional direction for borrowing ideas in applied language studies has been from first to second language work. It would be appropriate for the SL research community to begin to repay the debt.

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Appendix 1

Three versions of a text, and accompanying comprehension questions.

Catfish

3A Unmodified (NS)

Catfish have both gills for use under water and lungs for use on land, where they can breathe for twelve hours or more. The hot daytime sun would dry them out, but they can slip out of their ponds at night and still stay cool while they hunt for food. They are meat eaters, so they search for worms, insects and other fish, and can often be seen crossing roads at night while on these hunting expeditions.

3B Simplified

Catfish have both gills and lungs. The gills are used for breathing under water. The lungs are for use on land. The fish can breathe on land for twelve hours or more. At night these fish can slip out of ponds. They move at night so they can stay cool. The hot sun would dry them out. They hunt for food at night, too. They are meat eaters. They search for worms, insects and other fish. People often observe them crossing roads at night when the fish are hunting.

3C Elaborated

Catfish have two systems for breathing: gills, like other fish, for use under water, and lungs, like people, for use on land, where they can breathe for twelve hours or more. Catfish would dry out and die from the heat of the sun, so they stay in water during the daytime. At night, on the other hand, they can slip out of their ponds and still stay cool while they hunt for food. They are meat eaters, so they hunt for worms, insects and other fish. People travelling at

night often see catfish crossing roads when the fish are out on these hunting expeditions.

Questions

1. (Replication)

Catfish breathe through

- a) gills in and out of water
- b) gills in water only
- c) lungs in and out of water
- d) gills for 12 hours only

2. (Synthesis)

Catfish eat

- a) only at night
- b) different kinds of food
- c) only when it is cool
- d) mostly insects

3. (Inference)

Catfish

- a) prefer meat to fish
- b) are a threat to motorists
- c) are adaptable predators
- d) can live on land for as long as in water