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Title
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Journal
Issues in Applied Linguistics, 5(1)

ISSN
1050-4273

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Publication Date
1994-06-30

DOI
10.5070/L451005174

Peer reviewed

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What Lurks in the Margin: Use of Vocabulary Glosses as a Strategy in Second Language Reading

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There have been inconsistent findings in previous second language research on the effect of vocabulary glossing on reading comprehension (Davis, 1989; Jacobs, Dufon, & Fong, 1994; Johnson, 1982; Pak, 1986). The present study was undertaken to extend this body of research in two ways: (a) by including another set of second language learners, another text, and another set of vocabulary glosses, accompanied by rigorous experimental procedures; and, (b) by considering the possible interaction of other variables with glossing. These other variables were: psychological type, tolerance of ambiguity, proficiency, frequency of gloss use, perceived value of gloss use, and time on task.

Glossing can be situated in the context of recent work on the reading process (Eskey, 1988; Lesgold & Perfetti, 1981; Rumelhart, 1980; Stanovich, 1980) and learning strategies (Cohen, 1990; O'Malley & Chamot, 1990; Oxford, 1990; Wenden, 1991). Glossing strengthens the bottom-up component of the reading process. The use of glossing is one of several possible repair strategies that readers can use when they recognize comprehension breakdowns.

One hundred sixteen U.S. college students enrolled in a third-semester Spanish course participated in the study. They were randomly assigned to one of two conditions, with half reading an unglossed Spanish text and half reading the same text accompanied by English glosses. After reading the text, participants were asked to write as much of the text as they could recall. Results showed a significant effect for glossing but no significant interactions between the treatment and any of the other variables. Suggestions are made as to the optimal use of vocabulary glosses.

INTRODUCTION

Vocabulary glosses are common in second language (L2) instructional materials (Bernhardt, 1991; Davis, 1989; Holley & King, 1971; Jacobs, 1991). A vocabulary gloss can be defined as a

Issues in Applied Linguistics
ISSN 1050-4273
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Vol. 5 No. 1 1994 115-137

short definition (Nation, 1983) or an explanation of the meaning of a word (Pak, 1986). Often glosses are written in the L2 students' native language, but they may also be in the L2. The example below illustrates a hypothetical gloss designed to facilitate the reading of Spanish by beginning level English-speaking students. Here, the gloss appears in the margin.

Pedro **compra** dos tacos. **buys**

While vocabulary glosses are the only type of gloss examined in the current study, other types of glosses can be found in instructional materials. For example, question glosses can be an effective means of enhancing students' retention of what they read (Hamilton, 1985).

Glosses seem to be used for several purposes, the most important of which are to assist reading comprehension (Nation, 1983, 1990) and to aid vocabulary learning (Holley & King, 1971). These reasons are, of course, complementary because, as many scholars believe, comprehensible input is a necessary prerequisite of language acquisition (e.g., Krashen, 1985). Further, students appear to want glosses, as was found in two studies in which U.S. university L2 students were asked whether or not they wanted their texts to be glossed (Holley, 1970; Jacobs, Dufon, & Fong, 1994).

Nation (1983, 1990) cites four advantages of glossing which support its possible comprehension-enhancing functions. First, glossing supplies readers with instant knowledge about the meanings of words which are important to the comprehension of a particular text but which may not be important to the language as a whole (i.e., glossing provides definitions of low frequency words). As Parry (1993, p. 2) states, "Vocabulary teaching takes a good deal of time, and it is simply not economic to spend precious minutes on items whose chances of reoccurrence are only ten in a million." A second advantage presented by Nation is that glosses lessen the disruption of the reading process resulting from students looking up words in a dictionary or asking the teacher or other information sources for help. Third, glosses make students less dependent on the instructor for definitions. Thus, they are better able to read on their own and teachers are freed to help students with aspects of the reading other than vocabulary. Fourth, glossing allows for greater individualization, because different students will have problems with

different vocabulary items. Students only need to look at a gloss when they do not know a particular vocabulary item.

Holley and King (1971) hypothesize two further advantages for glossing in terms of how it may aid vocabulary acquisition. The first advantage is derived from studies reported in Anderson, Faust, Roderick, Cunningham, and Andre (1969) in which prompting increased scores in paired associate studies. From this, Holley and King surmise that by providing students with the correct meaning of unknown vocabulary, glosses help students avoid incorrect guesses which could result were they left with only context to guide them. The difficulty of deriving meaning from context has been emphasized by several researchers (e.g., Jenkins & Dixon, 1983; Nation, 1990; Parry, 1986, 1987; van Daalen-Kapteijns & Elshout-Mohr, 1981). Thus, glossing promotes more accurate understanding of vocabulary.

Holley and King's second hypothesis as to how glossing can assist vocabulary acquisition is that learning is aided by the rehearsal involved as students return to the text after looking at the gloss. In other words, students leave the text to check the gloss of the unknown vocabulary. They may then repeat the word or phrase to themselves in order to hold the meaning in memory until their focus is back at the place in the text where they originally encountered the previously unknown vocabulary. The rehearsal involved in this process may help students learn the vocabulary.

Twaddell (1973) provides an additional argument for the use of glossing, though he terms it "a necessary evil." Since the overwhelming majority of words in a language appear in low frequencies and, thus, remain unknown to learners until they reach high levels of proficiency, selecting comprehensible reading materials for beginning or intermediate level learners is very difficult without the use of glosses:

> Anything that such a learner could read . . . would have to be so childish as to be an insult to his maturity. Anything that would be interesting and worth reading . . . would require a much larger vocabulary than is available, so that tremendous sacrifice in either speed or comprehension would have to be made (p. 65).

Similarly, emphasis on the use of authentic texts in L2 instruction often presents learners with a daunting comprehension

challenge for which glossing may provide some assistance. However, many scholars (e.g., Rivers, 1987) believe that students must be exposed to the L2 in the same way that native speakers of that language see and hear it. For example, in the preface to one intermediate Spanish text for native speakers of English which employs glossing (Marks & Blake, 1989, p. xvii), the authors state that, "[a]uthenticity is the first pillar" of their book. These scholars assert that materials written especially for learners of a language, while attempting to make comprehension easier, often do just the opposite. Nonauthentic texts, they believe, deprive students of exposure to the language in all its richness.

The chief alternatives to authentic texts are texts which are modified syntactically, lexically, and stylistically or texts written especially for L2 learners. Modifications most often take the form of simplification of language (Tickoo, 1993); thus, simplified texts reduce or eliminate the need for vocabulary glosses. Simplified texts also provide students with the opportunity to do a lot of extensive reading (Bamford, 1984). Many reading experts believe that doing large amounts of extensive reading is the key to developing vocabulary. L1 research evidence for the contribution of reading to vocabulary acquisition is reported by Nagy, Anderson, and Herman (1987), and Nagy, Herman, and Anderson (1987). L2 research evidence is found in studies by Day, Omura, and Hiramatsu (1990), Ferris (1988, cited in Pitts, White, & Krashen, 1989), and Pitts, White, and Krashen (1989). Defenders of simplification believe that getting students "hooked on books" (Fader & McNeil, 1968) written in their L2 may be easier if the difficulty level of the texts students have available to them is more or less attuned to their proficiency level.

However, given the types of objections to simplification mentioned above, glossing remains a possible means for helping learners access more complex texts. At the same time, the limitations of glossing must also be kept in mind. The typical gloss only assists readers with L2 vocabulary. Other areas which are also crucial to comprehension are not treated by most glosses. Inadequate knowledge of L2 syntax, not of vocabulary, was found to impair reading in two studies (Berman, 1984; Cooper, 1984). Carrell (e.g., 1988) has repeatedly stressed the importance of background knowledge in L2 reading comprehension. Thus, even

if, with the help of glosses, readers understand all of the words in a text, there remain other factors which might inhibit comprehension.

Glossing's Place in Models of the Reading Process

Many students and teachers alike assume that glosses facilitate comprehension. Davis (1989, p. 41) states that, "Textbook writers maintain that glosses are necessary for fluent reading of a foreign language text." However, theoretical models of the reading process provide differing vantage points from which to assess the value of glossing. Furthermore, studies of the effects of glossing have produced contradictory results on measures of comprehension.

Various views of the reading process place glossing in different lights. According to a bottom-up view, glossing contributes to comprehension because knowledge of each word is used to construct an understanding of the overall text. From a top-down perspective (Goodman, 1967; Smith, 1971), however, glossing may interfere with comprehension. When readers disrupt their reading to look at a gloss, the focus on individual vocabulary items, rather than larger conceptions of content and rhetorical mode, may interfere with the creation of an overall mental representation of the text linked with readers' current knowledge bases.

An interactive view of reading (Eskey, 1988; Lesgold & Perfetti, 1981; Rumelhart, 1980; Stanovich, 1980) combines bottom-up and top-down perspectives, viewing both information from the text and from readers' minds as essential to comprehension. As Vaughan and Estes (1986, p. 11) propose, "Reading is thinking cued by text." While interactive models restore to glossing some of the prominence denied it by top-down perspectives, these models suggest that other, top-down sources of information may sometimes be able to substitute for glosses. For example, knowledge about the content area of particular texts can assist readers in using context to derive the meanings of unknown vocabulary items.

Glossing and Learner Strategies

Glossing can be viewed in the light of recent work on L2 learner strategies (Cohen, 1990; O'Malley & Chamot, 1990; Oxford, 1990; Wenden, 1991). While different researchers in this

area have different classification schemes, glosses are generally seen as a resource to which learners can turn when they have recognized a comprehension breakdown while reading. For example, Cohen (1990) posits four categories of reading strategies used by second language learners: support strategies, paraphrase strategies, strategies for establishing coherence in text, and strategies for supervising strategy use. Included among the latter are strategies for identifying misunderstandings. Once a misunderstanding is identified, learners can turn to support strategies, among which Cohen includes the use of a glossary. Oxford's (1990) slightly different categorization scheme labels the identification of misunderstandings as a metacognitive strategy and the use of resources, such as glosses, as a cognitive strategy. At the same time, both Cohen and Oxford list other possible strategies for overcoming misunderstandings.

Blohm (1987) puts glossing in the context of research on metacognition. He views the use of glosses as a possible fixup strategy conducted by readers when their comprehension monitoring detects a lack of understanding (Baker & Brown, 1984; Flavell, 1981). According to Blohm, good readers take four ordered steps to repair a perceived lack of understanding: (a) rereading, (b) looking ahead, (c) utilizing a study strategy which promotes deeper processing (e.g., paraphrasing), and (d) turning to outside help. Clearly, referring to a gloss would fit into the last step. Citing Collins and Smith (1980), Blohm believes that with each succeeding step, the amount of disruption to the reading process increases. While utilizing extratextual assistance such as glosses may be the most disruptive type of fixup activity, Blohm states that it may be necessary when readers lack sufficient knowledge or reading skills to implement the other steps successfully (Alessi, Anderson, & Goetz, 1979).

Glossing's impact on second language comprehension has been investigated in at least four studies involving English (Johnson, 1982; Pak, 1986), French (Davis, 1989), and Spanish (Jacobs, Dufon, & Fong, 1994). In three of these, Jacobs, Dufon, and Fong (1994), Johnson (1982), and Pak (1986) found no differences in overall comprehension between L2 students who read glossed and those who read unglossed versions of the same passages, although Jacobs, Dufon, and Fong found that students whose L2 achievement was at least 0.8 standard deviations above

the mean were able to benefit from vocabulary glosses. Perhaps they were able to do so because their higher proficiency level enabled them to make fuller use of the assistance glossing provided, whereas, even with the glosses, lower proficiency students were not able to comprehend, let alone recall much of the text. Davis (1989) found comprehension higher among L2 learners who read glossed versions of the same texts.

Research Questions

Based on the above review of relevant literature, the following questions arise:

1. Does glossing lead to greater L2 reading recall?
2. Do other variables (e.g., proficiency, psychological type, tolerance of ambiguity, time on task, frequency of gloss use, and the perceived usefulness of glosses) interact with glossing to affect reading recall?

METHODS

In order to shed further light on the impact of glossing on recall the present study examines the potential interactive effects of text variables, learner variables, and situational variables and investigates the impact on recall of variables representing each of these three general categories. The effect of the presence or absence of vocabulary glosses in a text of a given readability level was examined as a text variable. The learner variables examined are proficiency (Jacobs, Dufon, & Fong, 1994), psychological type (Ehrman & Oxford, 1988; Jung, 1923; Myers, 1962), tolerance of ambiguity (Frenkel-Brunswik, 1949; Ely, 1988; 1989), and reading strategy (Baker & Brown, 1984; Hosenfeld, 1979). The time students took to read the assigned text was recorded as a situational variable (Bernhardt, 1983; Kintsch, Kozminsky, Streby, McKoon, & Keenan, 1975).

Two of the learner variables, psychological type and tolerance of ambiguity, deserve further explanation. In the first half of this century, Jung (1923) speculated that people fall into several distinct

categories with regard to psychological type. Inspired by Jung's theory, Myers (1962) proposed that people differ along four bi-polar dimensions: (a) extraversion-introversion (EI), (b) sensing-intuition (SN), (c) thinking-feeling (TF), and (d) judging-perceiving (JP). To measure these differences, Myers created the Myers-Briggs Type Indicator (MBTI), a self-rating scale.

According to type theory, extraverts prefer interaction with others, while introverts favor more solitary activities. Sensing types have a preference for the concrete, while an intuitor prefers the abstract. Those on the thinking end of the thinking-feeling continuum tend toward the objective and the impersonal, while those on the feeling end of the scale lean more toward the subjective and the personal. Finally, judgers prefer to live an organized, regulated life, whereas perceivers are more attracted to spontaneity and flexibility.

Budner (1962, p. 29) defines intolerance of ambiguity as, "the tendency to perceive . . . ambiguous situations as sources of threat." Ely (1989) developed a scale for measuring tolerance of ambiguity among L2 students and used it to examine the relationship between tolerance of ambiguity and learning strategies. A significant positive relationship was found between tolerance of ambiguity and (a) looking for overall meaning in reading, and (b) proofreading for spelling and accent marks. There was a significant negative relationship between tolerance of ambiguity and (a) looking for similarities between new words and L1 words, (b) looking up words in the L1 right away when reading, (c) focusing on individual language elements, and (d) asking the teacher for the right word when speaking. Ely's findings suggest that learners who are less tolerant of ambiguity would most often use and benefit from vocabulary glosses.

Participants

Participants in the current study were a convenience sample of 116 third semester students of Spanish as a Second Language enrolled in one of nine sections of Spanish 201 at the University of Hawai'i at Manoa. Seventy-eight of the participants were women, 38 were men. None of these students was a native speaker of Spanish.

The Text

Four criteria were used in selecting the text. The first was that the text be on a topic about which all of the participants in the study would have some background knowledge (Carrell, 1983). The text chosen (Cova, 1981, found in Kupferschmid & Dorwick, 1990) was about electric toys which do not work properly. The second criterion was length. A very short text would not provide sufficient data to access comprehension. Nevertheless, the passage had to be short enough so that participants would have sufficient time within a 50-minute class period for multiple readings, if they desired, in addition to time to write the recall of what they had read and complete the tolerance of ambiguity, frequency of use, and usefulness scales. The toy text contained 483 words. The third factor in selecting a text was that it be authentic (Davis, 1989).

The final criterion involved the inclusion of vocabulary items which were both relevant to the overall meaning of the text and beyond the current knowledge of many students (i.e., a text was sought for which glossing would significantly impact comprehension). At the same time, a text with too many unknown words might prove too daunting, even with the help of glosses. Pilot testing with a similar group of students revealed one text to be too difficult. When the text that was eventually selected had reached the point of being the probable choice, it was field tested with a group of students taking the same course. The field test involved asking students to read the passage and then to translate a list of vocabulary items considered difficult by the researcher and a professor of Spanish. Those items which at least one third of the students were not able to successfully translate were selected for glossing.

The text used in the present study was calculated to be at a seventh grade readability level, according to the Spanish readability formula of Gilliam, Pena, and Mountain (1980). A glossed version of the passage was constructed in which 53 vocabulary items were glossed in English, a greater than normal percentage compared to other glossing studies. The choice of which items to gloss was determined by the results of the field study and by the intuitions of a professor who teaches the course and the researcher about item difficulty and saliency. Each glossed item was boldfaced in the text.

Thus, both intratextual enhancement (i.e., boldfacing) and extratextual enhancement (i.e., glossing) were used.

Operational Definitions of the Variables Assessed

Psychological type was measured by means of the MBTI, which had been administered to all students in Spanish 101 one year earlier. Because some of the participants in the current study were not enrolled in that course, MBTI data were available for only 51 of the 116 subjects. Ely's (1989) 12-item scale was administered to measure tolerance of ambiguity in the context of the students' use of Spanish.

The final course grade for Spanish 201 was used to determine the proficiency level of participants in the study. The criterion of their course grade was chosen in order to avoid imposing on the instructors and students for the additional class time that would have been required to administer a standardized reading proficiency exam.

How useful participants believed the glosses to be was determined by means of a single 6-point questionnaire item. The frequency with which they referred to glosses as a comprehension aid was measured in the same manner. The amount of time participants spent reading the passage was determined by having participants raise their hands when they were ready to write their recalls. At this time, the researcher collected the copy of the text they had been reading and recorded the elapsed reading time of each participant.

Data Collection

Half of the participants read the unglossed version and the other half read the glossed version. Within classes, participants were randomly assigned to conditions. Participants were requested to read the text, write the recall of what they had read, and complete Ely's (1989) Tolerance of Ambiguity scale and the 2-item questionnaire designed to assess their attitudes toward the glosses. Participants who read the unglossed version of the text responded to these latter items hypothetically in terms of their past experience with glossed texts.

Data Analysis

Data were coded by two raters for the number of ideas correctly recalled. To secure more complete data on this variable, two scores were obtained from analysis of the recall protocols. For the first score, idea units 1 (IU1), the sole criterion used was t-units. Richards, Platt, and Weber (1985) define a t-unit as:

> A measure of the linguistic complexity of sentences, defined as the shortest unit which a sentence can be reduced to, and consisting of one independent clause together with whatever dependent clauses are attached to it (pp. 299-300).

Thirty-six t-units were identified. Coding was done by the researcher and a doctoral student in the College of Education at the University of Hawai'i at Manoa who also does research on second language education.

A second score, idea units 2 (IU2), which used a smaller unit of analysis, was obtained using the following rules: (a) count all nouns, (b) count all verbs, except copulative verbs, (c) if a copulative verb is not followed by a noun, count the adverb or adjective which follows the verb, (d) count negatives, such as *not* and *never*, and (e) count appositives and proper names as one unit. Richards, Platt, and Weber (1985) define a copulative verb as one that, "links a subject to a complement" (p. 65). One hundred eighty-seven units were identified applying these criteria. For each aspect of the data analysis, interrater agreement and the kappa coefficient (Cohen, 1960, cited in Chaudron, Crookes, & Long, 1988), a measure which takes into account the probability of chance agreements, were 97% or higher.

The average scores for IU1 and IU2 of students who read the glossed text were compared with those of students who read the unglossed text with simple t-tests. Subsequently, regression models were generated to test for interaction effects between glossing and each of the other variables under study using the Proc GLM program of the SAS statistical package, version 5.18. Parallel sets of analyses were completed based on each of the two measures of the dependent variable, IU1 and IU2. The potentially interactive variables were: proficiency (Prof), course grade in Spanish 201;

tolerance of ambiguity (TOA), total score on the 12-item Ely scale; each of the four dimensions of psychological type (MBTI - EI, SN, TF, and JP scale scores); time spent reading the text (Time); an index of the frequency of gloss use, real and hypothetical (Often); and, an index of how useful glosses were felt to be, real and hypothetical (Useful).

Table 1: Descriptive Statistics of All Variables for All Participants

Variable	N	Mean	Standard Deviation
IU1	116	15.95	5.96
IU2	116	57.16	23.29
Treat	116	0.50	0.50
Time	116	13.77	3.89
Often	116	5.25	0.98
Useful	116	5.47	0.92
TOA	116	33.56	6.99
Prof	115	3.30	0.75
EI	51	102.80	25.48
SN	51	99.94	23.30
TF	51	101.35	20.83
JP	51	96.96	22.97

Note: IU1 = The first recall measure; IU2 = the second recall measure; Treat = whether or not the glossed version of the text was read; Time = time spent reading the text; Often = how often glosses were used; Useful = how useful glosses were perceived to be; TOA = tolerance of ambiguity; Prof = Spanish proficiency; EI = extravert/introvert dimension on MBTI; SN = sensing/intuition dimension on MBTI; TF = thinking/feeling dimension on MBTI; JP = judging/perceiving dimension on MBTI.

RESULTS AND DISCUSSION

The means and standard deviations for each of the variables in the study are shown in Tables 1 through 3. These data are provided for the participants overall, as well as for members of the glossed and unglossed conditions separately.

Table 2: Descriptive Statistics of All Variables for Control Group

Variable	N	Mean	Standard Deviation
IU1	58	13.74	5.44
IU2	58	48.33	19.17
Treat	58	-	-
Time	58	14.31	4.01
Often	58	5.31	0.98
Useful	58	5.50	0.94
TOA	58	34.00	6.82
Prof	58	3.33	0.78
EI	23	102.48	23.05
SN	23	96.57	23.92
TF	23	104.13	19.57
JP	23	92.83	19.22

Table 3: Descriptive Statistics of All Variables for Experimental Group

Variable	N	Mean	Standard Deviation
IU1	58	18.16	5.68
IU2	58	66.00	23.84
Treat	58	-	-
Time	58	13.23	3.73
Often	58	5.19	0.98
Useful	58	5.43	0.90
TOA	58	33.13	7.20
Prof	57	3.28	0.73
EI	28	103.07	27.31
SN	28	102.71	22.83
TF	28	99.07	21.91
JP	28	100.36	25.49

The first research question asked if there was a significant difference between the amount of the text recalled by members of the two treatment groups. A t-test of the means on both measures of recall showed a significant effect for glossing. T-tests yielded the following results: IU1, $t(114) = 4.37$, $p<.05$; IU2, $t(114) = 4.40$, $p<.05$. As the mean recall scores indicate, students who read the glossed text recalled approximately 30% more idea units.

The second research question asked if any of the other independent variables interacted with glossing to significantly affect recall. No interactions were found at a significance level of .05 between any one of these variables and glossing. However, the interaction between glossing and time spent reading approached significance at the .07 level for IU2.

Given that glossing substantially increased recall in this study, a key question arises as to how to explain those studies in which glossing did not seem to enhance comprehension. Perhaps, the

answer lies in viewing glossing as only one factor which can affect comprehension. This view relates to the more general point that in the sphere of human cognition and behavior, no single variable alone can be guaranteed to produce a particular effect. Instead, the effect of any one factor depends on the context provided by other relevant variables. In the specific case of glossing, as stated previously, the difficulty of the text, the readers' proficiency, the number and choice of items glossed, and many other factors determine whether glossing will actually improve comprehension in a particular situation. One reason why glossing appeared effective in this study may have been that a much higher than average percentage of vocabulary items was glossed. Perhaps other researchers underestimated the amount of help students needed. Only Johnson (1982) used a similar percentage of glossed items. Also, with the exception of the present investigation and those of Jacobs, Dufon, and Fong (1994) and Johnson (1982), none of the other glossing studies reported using empirical procedures to determine which words to gloss.

This idea of the proper use of glosses is consistent with Eskey's (1988) concept of the need to "hold in the bottom" of the reading process. Eskey supports an interactive view of reading and cautions against too much faith in exclusively top-down routes to comprehension. He believes that vocabulary knowledge provides an essential base for top-down processing to occur. Thus, information from the printed page (the bottom) interacts with readers' previous knowledge and reading strategies (the top) to enable readers to derive their own meanings from texts.

To fit efficient use of glossing into the context of learner strategies, one can assume that readers must first be aware of a comprehension breakdown. Second, they must be proficient in fix-up strategies and should know in which order to use them. The point here is that the use of glosses should not be the readers' first choice when faced with a comprehension breakdown, because this would deny students practice in strategies they will need to use with unglossed texts. Third, if rereading, looking ahead, guessing from context, paraphrasing, and other strategies fail, and readers turn to outside resources, such as glosses, they should be aware of how to use these resources without losing sight of the overall meaning of the text.

The second major finding from the present study is the absence of any significant interaction between glossing and any of the other selected variables. Of course, such a finding does not indicate that these other variables do not affect recall; that was not tested in this study and the obtained correlations suggest otherwise. The interaction between glossing and time spent reading approached significance for one of the two measures of recall. Perhaps this finding may be explained by surmising that participants who read the glossed version of the text found that the added time spent reading was worthwhile, because the glosses provided them with the information necessary to make additional time on task a fruitful activity. On the other hand, those who read the unglossed version may not have been able to make as good use of time spent reading and rereading. How students actually process glossed texts is an important topic for future investigations.

Although the interactions between glossing and the four MBTI dimensions were not significant, the correlations (see Table 4) between recall and introversion, intuition, and thinking suggest that psychological type is an important variable to consider in future studies of reading comprehension.

Although tolerance of ambiguity did not interact with glossing to affect recall, the correlations between tolerance of ambiguity and the scales measuring how useful students found glosses to be and how often they used them were significant and in the expected direction. This finding provides some evidence for the concurrent validity of these three measures.

Can the significant main effect for glossing found in this study be taken to support the belief that the practice of glossing is a pedagogically sound one? The answer to this question depends, in part, on the answer to another question: Should L2 students be asked to read texts which are far above their proficiency level? If the answer is yes, then some means must be found to make up for the great gap that will often exist between the difficulty level of the passage and learners' proficiency. At the same time, there are many means besides glossing of dealing with the vocabulary component of this gap, such as preteaching relevant vocabulary, training students in guessing from context, and using elaboration within the text (Larsen-Freeman & Long, 1991). When elaboration is used,

Table 4: Degrees of Freedom, F Values, and Probabilities for the Interactions with the Two Dependent Variables

Variables	Degrees of Freedom	F Values	p
Time - IU1	(1, 113)	1.48	0.23
Time - IU2	(1, 113)	3.34	0.07
Often - IU1	(1, 113)	0.14	0.71
Often - IU2	(1, 113)	0.66	0.42
Useful - IU1	(1, 113)	0.97	0.33
Useful - IU2	(1, 113)	0.87	0.35
TOA - IU1	(1, 113)	0.59	0.44
TOA - IU2	(1, 113)	0.02	0.88
Prof - IU1	(1, 112)	1.66	0.20
Prof - IU2	(1, 112)	1.27	0.26
EI - IU1	(1,47)	0.45	0.51
EI - IU2	(1,47)	1.32	0.26
SN - IU1	(1,47)	2.23	0.14
SN - IU2	(1,47)	1.93	0.17
TF - IU1	(1,47)	0.30	0.59
TF - IU2	(1,47)	1.37	0.25
JP - IU1	(1,47)	0.45	0.51
JP- IU2	(1,47)	1.01	0.32

nothing is deleted from the text. Instead, text paraphrasing and other means are used to help readers with difficult vocabulary and syntax.

Other approaches for helping students with difficult vocabulary include encouraging them to use outside resources, such as the teacher, classmates, or dictionaries, and focusing on one content area. With this latter strategy, students build up a base of vocabulary knowledge in that specific area, which is one rationale

for content-based instruction (Brinton, Snow, & Wesche, 1989). Parry (1993), in a case study of one student studying anthropology in a second language, found that the student was able to guess from context with a much greater degree of general correctness than had been found in previous studies. Parry hypothesizes that this relative success was due to the fact that the student was reading in a rich context. In other words, she was an anthropology student attending lectures and reading books and articles in her own field of specialization. Thus, she had much more context to draw on than is usually the case in most studies, or in most L2 classrooms, where students tend to read fairly short, unrelated passages.

Certainly, glossing can be used in tandem with any and all of the other options, as well as alone. To paraphrase Nation's (1990) list of the reasons for choosing glossing: (1) glosses are quick to find and easy to use, (2) they can be used by people reading without assistance, and (3) individual readers only need to refer to the glosses of the words which they do not know.

Computers can be an effective tool for both glossing use and research on glossing (e.g., Blohm, 1987). In computer assisted instruction, students who encounter unknown vocabulary items could access a gloss and a list could be kept of the glosses which students accessed (Bland, Noblitt, Armington, & Gay, 1990). Such a list would provide educators and students with valuable information; for example, it might provide clues about students' reading strategies.

Researchers may also wish to examine the many possible ways that glossing could be integrated into cooperative and collaborative learning methodologies (Johnson, Johnson, & Holubec, 1993). For example, two versions of a glossed text could be created, each having only half of the glosses. These two versions would be given to different members of student pairs. Thus, readers would have to ask their partners if they needed to know the meaning of a specific glossed item. This procedure could be incorporated in dyadic reading scripts (e.g., Hythecker, Dansereau, & Rocklin, 1988).

CONCLUSION

In this study, glossing was associated with increased text recall by L2 readers. Two possible explanations for the effect of glossing on text recall are the relative number of glosses and the fact that empirical means were used to ascertain which vocabulary items students did not know. Especially in cases where authentic texts are used, L2 learners often need the assistance that vocabulary glosses provide. Students' use of glosses can be facilitated by providing specialized training in reading strategies. At the same time, additional means, as mentioned above, also help readers cope with difficult lexis. Educators will need to consider whether these strategies might not actually be more effective than vocabulary glossing for the enhancement of reading proficiency and language acquisition.

ACKNOWLEDGMENTS

I would like to thank David Sherrill, Fong Cheng Hong, Raymond Moody, Thalia Dorwick, Carol Freimanis, Pat Harpstrite, Shuquiang Zhang, Andy Jacobs, and anonymous referees for their valuable assistance in conducting this research and preparing this article.

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