

Multiple-Choice Glosses and Incidental Vocabulary Learning: A Case of an EFL Context

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ABSTRACT

Provision of multiple-choice (MC) glosses, which combines the advantages of glosses and inferring, has recently gained its share of supporters as a potential technique for enhancing L2 texts and increasing word gain for L2 learners. Upon taking an actual TOEFL, the participants underwent a vocabulary pretest to ensure that the target words were unfamiliar to all of them. Half of the participants received the passage which included L2 MC glosses and half of them received the same passage embedding L1 MC glosses. They were then tested through both immediate and delayed production and recognition posttests. The results indicated that both L1- and L2-gloss groups significantly outperformed in immediate than in delayed testing condition. However, in both conditions, L2 glosses produced significantly higher scores than L1 glosses did suggesting that L2 glosses far outweigh for fostering learning and retaining target words. The findings of the study, therefore, could hold appeal for materials developers, syllabus designers as well as teachers and instructors who are primarily engaged in vocabulary development courses.

Keywords: *Incidental vocabulary learning, Multiple-choice glosses, Lexical inferencing, Involvement load principle, Mental effort hypothesis, Noticing hypothesis.*

INTRODUCTION

It is generally accepted that a considerable percentage of L2 vocabulary acquisition on the part of learners occurs incidentally, i.e. as a by-product of reading (Davis, 1989; Fraser, 1999; Jenkins, Stein & Wysocki, 1984; Nation, 2001; Rieder, 2003). Text comprehension, however, would not necessarily require the kind of word processing that results in long-term retention (Rott & Williams, 2003). Therefore, if the goal is to make new words learned and retained, a variety of textual enhancement techniques such as adjunct aids (Robinson, 1994; Marefat & Ghahari, 2009), increased word frequency, or glosses (during-reading vocabulary guides), could be applied.

Incidental Vocabulary Learning

There are two main strands of vocabulary learning: deliberate vocabulary learning and incidental vocabulary learning (Day, Omura, & Hiramatsu, 1991; Ridder, 2002). The main difference between the two lies in the amount of noticing and consciousness involved: in that, deliberate learning is more focused and goal-oriented than incidental learning. Deliberate learning, however, can result in a very quick expansion of vocabulary learning which then needs to be consolidated and enriched by meaning-focused and context-based exposures (i.e., incidental learning). According to Schmitt, deliberate learning by itself may rarely "provide

the knowledge of grammar, collocation, associations, reference, and constraints on use that may be best learned through meeting items in context" (2002, p.42).

Schmitt (2002) lists a number of strategies which can be employed while deliberate learning; among them, one can refer to sound-spelling correspondences, word parts (prefixes, stems, suffixes), word form analogy, underlying concepts and extensions, collocational patterns, as well as types of associations (for a detailed discussion of vocabulary learning strategies you may refer to Kudo, 1999).

Incidental vocabulary learning is closely associated with the concept of *context*- a key concept in current studies on language learning- and is of two main types: a) Learning vocabulary from meaning-focused input (reading and listening) and, b) learning vocabulary from meaning-focused output (speaking and writing). The former approach accounts for most first language vocabulary learning (for more on the latter approach see Schmitt, 2002). For such learning to occur with non-native speakers, some conditions should be met:

- 1) Low unknown vocabulary load: Unknown words should make a very small proportion of the tokens (target words), preferably one unknown word in 50.
- 2) Large quantity of input: There needs to be a very large quantity of input, preferably one million tokens or more per year.
- 3) Deliberate attention: Effective learning also requires consciousness-raising of unknown words, for example through glossing, dictionary use, or highlighting in the text (Hu & Nation, 2000).
- 4) Large number of exposures: As incidental learning is cumulative, each word needs to be met a number of times in order to be strongly learned and retained. According to Rott and Williams (2003), sizable word gain may require eight to twelve exposures to an unknown word; however, recent L2 research has found that two encounters could suffice to lead to significant word gain.

Contextual Effects on Word Meaning

As stated above, incidental vocabulary learning and the concept of context are closely intertwined. Once one tries to grapple with the notion *the meaning of a word*, they come up against a problem, say the interpretation one may give to a particular word item can vary greatly from context to context (Cruse, 2004). This contextual variability of word meaning, which is endemic in the vocabulary of any natural language, endorses the undeniable role of context in vocabulary learning (Cai & Lee, 2010).

According to Cruse, the meaning of a word is selectively activated by contexts; "this selection operates largely through the suppression of readings which give rise to some sort of semantic clash with the context" (p. 118). If all the meanings are suppressed except one of them, then this one will be selected and the alternatives do not even enter the consciousness of reader.

The effects of context on the meaning of a word (called contextual modulation) mostly do not go beyond the bounds of a single sense and could be through either *enrichment* or *impoverishment*, according to whether the effect is to add or remove meaning. Enrichment is the most obvious effect of context through which it adds semantic content, that is, enriches a meaning or makes it more specific. The enrichments arise as a result of processes of inference (see below for a detailed discussion of lexical inferencing). The effect of context could be also through impoverishment, if it makes clear that a lexical item is being used in a vague sense (For more see Cruse, 2004).

Glossing

Glosses, in general, are vocabulary guides during reading; they offer additional information beyond text and thereby assist the learner as a mediator between learner and text (Hulstijn, Hollander, & Greidanus, 1996; Jacobs, Dufon, & Hong, 1994; Yee, 2010). However, within the scope of second language learning, glosses can be defined as information on important words through definitions or synonyms (Hee Ko, 2005). Glossing can be situated in the context of recent work on the reading process (Eskey, 1988; Rumelhart, 1980; Stanovich, 1980) and learning strategies (Cohen, 1990; O'Malley & Chamot, 1990; Wenden, 1991). "Glossing strengthens the bottom-up component of the reading process. [It] is one of several possible repair strategies that readers can use when they recognize comprehension breakdowns" (Jacobs, 1994, p. 115).

The two most important functions that glosses may serve are with reading comprehension (Nation 1982, 1990) and vocabulary learning (Holley & King, 1971). There are several advantages in using glosses: Firstly, glosses provide definitions of low-frequency words. According to Parry, "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" (1993, p. 2). Secondly, glosses can get across new words so accurately that prevent incorrect guessing which could result if they were left with only context to guide them. Several researchers have confirmed the difficulty of deriving meaning from context (e.g., Jenkins & Dixon, 1983; Nation, 1990; Parry, 1993). Thirdly, they can minimize interruptions while reading is in process resulting from students looking up words in a dictionary or asking the teacher or other information sources for help. Fourthly, glosses can make a meaningful relation between prior knowledge and new information in text. Fifthly, glosses would allow for greater autonomy and individualization on the part of learner because different students will have problems with different vocabulary items. And finally, glossing can assist vocabulary learning through the rehearsal involved in the process which thereby help students learn the vocabulary: students leave the text to check the gloss of the unknown vocabulary, repeat the word or phrase to themselves in order to hold the meaning in memory until they get back to the original unknown word (Holley & King, 1971; Nation, 1982, 1990).

Twaddell (1973) goes as far as to suggest that selecting comprehensible reading materials for beginning- or intermediate-level learners is very difficult without the use of glosses. He believes that 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; for them "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). Very recently, Hee Ko (2012) made a comparison between no gloss, L1 gloss, and L2 gloss conditions. The study showed that glossed conditions were superior over no gloss one in both immediate and delayed tests.

Glossing, however, has been roundly criticized for it disallows inferred meaning. Laufer and Hulstijn (2001), for example, argue that inferred meanings are more likely to be retained than meanings provided by glosses. Likewise, Nassaji considers *lexical inferencing* as one of the central cognitive processes involved in reading comprehension and defines it as

...making informed guesses about the meaning of unknown words based on the available linguistic and non-linguistic cues in the text...Lexical inferencing has also been found to be closely associated with incidental vocabulary learning, that is learning vocabulary through reading natural texts (2004, p. 109).

Much lexical development in both L1 and L2 appears, in effect, to occur while learners attempt to comprehend new words they hear or read in context. Nassaji (2004) further enumerates some factors which have the potential to affect success in lexical inferencing; included are the nature of the word and the text that contains the word, the extent of textual information that the text presents, the learner's ability to use extra-textual cues, the importance of the word to comprehension of the text, the degree of cognitive and mental effort the task engages, the learner's attention to the details of the text as well as the preconceptions the learner may have about the possible meaning of the word. Overall, based on *mental effort hypothesis*, inferring requires effort, and the greater the mental effort the more likely information will be recalled and retained. In this sense, single glosses would be of little use especially for long-term retention of new words.

THE STUDY

In his attempts to remove the foregoing disadvantage associated with using single glosses, Hulstijn (1992) suggested the use of multiple-choice glosses, that is, provision of several gloss (or equivalent) options for a target word. Multiple-choice (or MC) glossing, as he argues, combines the advantages of inferring and single glosses. It reduces the difficulties presented by insufficient context as well as the possibility of making incorrect inferences (Rott & Williams, 2003). It also requires some degree of mental effort and attention on the part of the learner in order to infer the correct option and thereby triggers a deeper level of processing which, in turn, could enhance word recall and retention.

Likewise, MC glossing is in line with *Involvement Load Principle*, proposed by Hulstijn and Laufer (2001). The principle, which is claimed to be at the core of lexical acquisition and retention, entails two central components: *search* and *evaluation*. When processing multiple-choice glosses, learners first have to search for meaning by consulting the gloss options. Next, they will evaluate the different meanings and make a decision as to, considering the context, which one fits the target word best. Therefore, the use of MC glosses has the potential to establish form-meaning connections much stronger than single glosses or normal unenhanced reading may do (Rott & Williams, 2003).

Pishghadam and Ghahari (2011) carried out a study where single and MC glosses in L1 and L2 were cross-compared. They found that whereas single L1 glosses were more effective in the immediate tests, it was MC L1 and L2 gloss types which yielded a more durable retention of TWs as measured through a delayed test.

To date, it is well revealed that glosses in general are effective for enhancing incidental vocabulary learning. Therefore, the question has shifted from whether glosses are useful for vocabulary learning to which gloss type or gloss condition is most effective (Yoshi, 2006). To this end, a number of studies have been conducted comparing different formats of text glosses. Watanabe (1997), for example, has compared single L2 glosses with MC L2 glosses. Later in 1999, Nagata replicated his study comparing single L1 glosses with MC L1 glosses. Single glosses in L1 and L2 also have been comparatively studied by, among the many, Bell and Le Blanc (2000, as cited in Hee Ko, 2005), Chen (2002), and Jacobs (1994).

Still other researchers have investigated the effect of other variables, along with the use of glosses, on vocabulary development. Jacobs (1994), for instance, has examined the recall advantage of glossing by practicing different test conditions (immediate vs. delayed). Holley and King (1971) also compared different gloss positions in text, i.e., side-of-page, bottom-of-page, vs. glosses on an attached sheet. Having used printed versus computerized materials Nagata tested the impact of different material formats. Miyasako (2002) too conducted a comprehensive study on the use of glosses and included level of language proficiency as a variable under study.

All the above studies, however, have brought up mixed and inconclusive results and, therefore, leave some room for further analysis of glossing under different conditions. Pursuant to the above observations, therefore, two research questions were posed and addressed in the current study:

- 1)Is there any difference between the effect of L1 and L2 MC glosses on short-term vocabulary learning by EFL learners of intermediate proficiency level?
- 2)Is there any difference between the effect of L1 and L2 MC glosses on long-term vocabulary learning by EFL learners of intermediate proficiency level?

METHOD

Participants

The EFL learners at a language school in Iran constituted the population of the study. In order to control for their language proficiency level and picking up only those of intermediate level, they took an actual TOEFL (ETS, 2004) prior to the main test. Thirty of them (both male and female) aging between 21 and 26 were then purposively selected on the basis of their proficiency scores. The study was managed to be replacing for them one of the quizzes normally administered during the semester.

Materials

The materials consisted of an actual paper-based TOEFL, a vocabulary pre-test, an English text followed by MC L1 (Persian) and L2 (English) glosses, and finally a production as well as a recognition post-test.

Vocabulary pre-test

In order to ensure that the target words (TWs) were new and unfamiliar to all the participants, a vocabulary pre-test was administered to them. It included 20 lexical items, including the 10 TWs and 10 distracters. The distracters were selected from the same source as the TWs in order to ensure that both were of approximately the same difficulty level.

Text and glosses

A passage of 516 words from an intermediate student's book (O'Dell, 1998) was selected and modified in a way that 10 of its TWs were each repeated twice. This increase in word exposure frequency is consistent with the current belief, e.g. Ellis (2006) and Yongqi Gu (2003), that a single exposure is quite unlikely to lead to word knowledge gain (see the above discussion on incidental vocabulary learning).

The TWs were of three lexical categories: four of them were nouns, three of them verbs and three were adjectives. Each TW was bolded only in its first occurrence in the text. Below, an extract of the passage, in which the word 'renowned' is used twice, is provided:

... An old Irish proverb says, 'Laughter is brightest where food is best'. Good food makes people happier and brings them closer together. This simple truth has inspired many of the world's greatest chefs. One such **renowned** chef was Julia Child... Julia's pots and pans hang in this renowned museum exactly as they did in her kitchen... (p. 34)

The text was then enhanced and followed by multiple-choice (MC) glosses, in the sense that for each TW there appeared, in a separate sheet of paper, three glosses in English (L2) and three glosses in Persian (L1). The three L1 glosses were the exact equivalents (or translations) of the three ones in L2. Two examples (one for a noun and one for a verb) of MC glosses in L2 used in this study are provided below:

Legacy (n.):
 a) gift b) good situation c) idea

Contend (v.):
 a) disagree b) prove c) believe

Post-tests

Production: In this test, all the 10 TWs were listed, and the participants were required firstly to check those words they knew their meanings and then to supply synonyms or explanations to them.

Recognition: Each one of the TWs was followed by its gloss options and the participants were required to match the word with its correct meaning.

Procedure

The current study was conducted in three separate class sessions. In the first session, the participants received the TOEFL and were given 90 minutes to do it. The vocabulary pre-test was also administered in the same session; the participants were asked to check any of the 20 words they knew and then provide synonyms or explanations for them either in L2 or in their L1. Fortunately, all the TWs turned out to be new (or unknown) to all the participants.

In the second session, the participants were given the text and were briefed that they were required not only to comprehend the text but also to infer (or guess) the meanings of the bolded (target) words from among the given options and learn them. They were then divided into two groups (called gloss groups): 16 of them received the L2 (English) glosses and 14 received the L1 (Persian) glosses. After they got through with reading of the text, they returned it and received the production post-test. The reason why the production test preceded the recognition one was that, given the other way around, the recognition test would be very likely to give hints for the production test. These two tests which were administered shortly after the participants studied the materials were called *immediate tests*.

In order to examine the potential retrieval and saving effect of glossing, the same production and recognition tests were administered after a span of one week and, this time, were called *delayed tests*. Note that those who had received texts followed by L1 glosses at the first place received, in both testing conditions, the recognition tests which included L1 options. The same was also true about L2 gloss group. Note that the L1 gloss group was tested with L1 glosses for both tests, and the same was true for the L2 gloss group.

RESULTS

Several t-tests and ANOVAs were conducted for the data collected in this study.

a) Gloss groups in the immediate testing condition

The descriptive statistics in Table 1 below show that L2-gloss group ($M = 15.75$) outperformed L1-gloss group ($M = 11.57$) in the immediate test.

Table 1. The L1 and L2 Gloss Groups in the Immediate Posttest

Gloss groups	N	Mean	Std. Deviation
L1	14	11.57	3.155
L2	16	15.75	2.145

In order to see if this difference is significant, a t-test was run, the results of which are depicted in Table 2. As the table displays, the gloss group factor shows a significant main effect on the test performance in the immediate condition ($p < .05$). That is, L2 glosses seem to be significantly more effective for short-term lexical retention than L1 glosses are.

Table 2. Results for Gloss Groups in the Immediate Posttest

Gloss groups	Df	t	Std. Error Difference	Sig.
L1	28	-4.28	.97	.000
L2	22.45	-4.18	.99	

b) Gloss groups in the delayed testing condition

The descriptive statistics for the performance of the two gloss groups in the delayed test are provided in Table 3. The mean value for the L2-gloss group, as the table suggests, is higher than that of the L1 group ($M = 10.81$).

Table 3. Descriptive Statistics of L1 and L2 Gloss Groups in the Delayed Posttest

Gloss groups	n	Mean	Std. Deviation
L1	14	8.36	2.70
L2	16	10.81	2.07

The results of the t-test also confirmed that L2 glosses were significantly more effective than L1 glosses when the testing was delayed ($p < .05$) (Table 4).

Table 4. Results for Gloss Groups in the Delayed Posttest

Gloss groups	df	t	Std. Error Difference	Sig.
L1	28	-2.81	.87	.009
L2	24.23	-2.76	.89	

c) Gloss groups and testing conditions

In order to compare the total performance of the two gloss groups in both testing conditions, a two-way ANOVA was conducted, the results of which are summarized in Table 5 below. It revealed a significant main effect for the gloss type factor ($F(1,57) = 25.36, p < .05$) as well as the testing condition factor ($F(1,57) = 39.56, p < .05$). The main effect for the interaction of the two variables was also significant ($F(1,57) = 1245.91, p < .05$).

Table 5. Two-Way ANOVA Results for the Effect of Gloss Type and Testing Condition

Source	Type III Sum of Squares	df	F	Sig.
Testing Condition	256.267	1	39.568	.000
Gloss Type	164.300	1	25.368	.000
Tests*Glosses	8069.300	1	1245.916	.000
Error	369.166	57		
Total	9050.000	60		

In sum,

1. Measured in either testing condition, L2 MC glosses proved more useful than L1 glosses for vocabulary development.
2. Both types of MC glosses had better short-term than long-term effects.

DISCUSSION

In this study, MC glosses were incorporated into a text to raise EFL learners' consciousness of the TWs, to encourage them to make informed guesses about the best matching option, and thereby to improve their vocabulary learning and retention. Comparisons were then made between L1 and L2 MC glosses to detect which would serve these purposes best. The results displayed that for both purposes of vocabulary acquisition and retention L2 glosses were more advantageous.

There are several factors that can account for this effectiveness: One possibility is that the use of glosses arouses learners' noticing to the TWs (Schmidt, 1992). Glosses successfully draw learners' attention and create an ideal word-learning condition of consciousness-raising and input-enhancement (Hee Ko, 2012; Lin & Huang 2008; Pishghadam & Ghahari, 2011). Moreover, glosses can assist learners to immediately connect the word form to its meaning and, thereby, consolidate the form-meaning association, which is a vital component of retrieving a word (Rott & William, 2003).

This finding is in line with Miasako (2002) which concluded that L2 glosses were better than L1 glosses. Yet, it contradicts with those of Pishghadam and Ghahari (2011) and Yee (2010) that showed a better performance by L1-gloss groups. Similarly, it is in contrast to Chen (2002), Hee Ko (2012), Jacobs et al. (1994), and Yoshi (2006) which found a non-significant difference between L1 and L2 glosses.

In a similar vein, the superiority of L2 glosses may lend support to *involvement load principle* (Hulstijn & Laufer, 2001), *mental effort hypothesis* (Salomon, 1984), *levels of processing hypothesis* (Craik & Lockhart, 1972), *noticing hypothesis* (Schmidt, 1990, 2010), and *multiple resources theory of attention* (Wickens, 1984) while invalidating *information processing* (Miller, 2011) and *cognitive load theories* (Sweller, 1994). Involvement load and mental effort hypotheses, which operationally define involvement and effort as consisting of need, search, and evaluation, are positively correlated with the depth of processing and length of retention. That is to say, the more an item is externally or internally in need of decoding (i.e. need), the longer it takes to arrive at its meaning from expressing a concept (i.e. search);

and the more it is compared and assessed against a number of words or meanings in order to find the most fitting one (i.e. evaluation), the more it is likely of being learned (Yaghubi, Rayati, & Allemzade, 2010). This, therefore, justifies the effectiveness of L2 glosses on the grounds that the additional mental load they impose on learners will serve them well when vocabulary acquisition and retention are pursued. Such a deep processing, asserted by Craik and Lockhart (1972), which moves the attention beyond the phonemic level of a word (i.e. no-gloss condition) into a semantic processing (i.e. evaluating the gloss options to arrive at the best one) does result in a more durable memory trace. It also implies that learners are equipped with different capacities of resources; this quality enables them to process multiple sets of information, including noticing the TW, searching for the meaning, and evaluating the options, at a time.

Cognitive load and information processing models, however, claim the opposite to be true considering memory as having a limited capacity and attention as being short spanned. This is in contrast with our finding since L1 gloss types which imposed less demand on learners' cognitive system was less favorable as far as vocabulary acquisition was concerned. One can conclude, then, that the superiority of L2 glosses over L1 approves the role that consciousness raising, attention, and mental effort serve on the acquisition and retrieval of information, in general, and TWs, as a case in point.

Besides, the study concluded that the effect of MC glossing drops from immediate to delayed testing conditions. In this study an input-based approach was adopted towards lexical development so as to investigate the usefulness of a textual enhancement technique for improving what Nassaji (2004) refers to as *breadth of vocabulary knowledge*, that is, the quantity or number of vocabulary items learners at a particular language proficiency level know. Further studies could be carried out to add an out-put based dimension (through, for example, incorporating reconstruction tasks) and to test if MC glossing could enhance *depth of vocabulary knowledge* (i.e. the quality of lexical knowledge or how well learners know a word) too. It is predicted that in this way the long-term effect of glossing could also be enhanced to a considerable degree.

Another area which seems to merit further investigation is to explore if the effect of this technique varies among learners of different language proficiency levels. Moreover, interested researchers are invited to investigate the advantage of glosses, in general, and multiple-choice glosses, in particular, for improving reading comprehension of texts as claimed by Nation (1982, 1990). To fulfill this purpose, what is required is to provide to different gloss groups structured as well as unstructured reading comprehension test items along with vocabulary posttests and observe the potential variations in their performances.

Overall, the results of the study support the use of L2 multiple-choice glosses and imply that teachers, materials developers, and texts designers can take advantage of them particularly when the goal is for them to trigger and promote incidental vocabulary learning through reading.

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