

## **Consciousness-raising versus explicit grammar teaching and their impact on Iranian EFL learners' lexical inferencing**

**Mojgan Rashtchi<sup>1</sup>**

*Associate Professor, Islamic Azad University, North Branch*

**Saiideh Jalili**

*M.A. in TEFL, Islamic Azad University, North Branch*

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### **Abstract**

The present study attempted to investigate the impact of sentence-level grammar instruction, explicitly and through consciousness-raising, on Iranian EFL learners' lexical inferencing behavior and subsequent learning of inferred vocabulary. It also aimed at examining the relationship between the number of used knowledge sources and success in lexical inferencing. To address these issues, a quasi-experimental study with a mixed design involving two treatment groups and one control group was conducted. The participants were 47 adult learners at intermediate proficiency level. A counterbalanced design was utilized to eliminate the effect of the topic familiarity on the learners' performance. Retrospective data were collected from eight participants, as well. Further, the eight participants were divided into two groups (successful and less successful) in

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<sup>1</sup> Corresponding author at: Islamic Azad University, North Branch  
Email address: [mojgan.rashtchi@gmail.com](mailto:mojgan.rashtchi@gmail.com)

order to identify the differences between the two groups' lexical inferencing behavior. The findings indicated that sentence-level grammar instruction could place learners in a better position to infer the meaning of unfamiliar words more successfully and also could help them recall the inferred vocabulary better. The results are significant due to the controversy surrounding teaching grammar; moreover, they confirm the positive role of the number of knowledge sources in the lexical inferencing success.

**Keywords:** consciousness-raising, explicit teaching, lexical inferencing, lexical inferencing success, retention, retrospective data, sentence-level grammar

## 1. Introduction

The most preferable strategy among EFL learners is lexical inferencing when exposed to incomprehensible input (Dycus, 1997; Fraser, 1999; Paribakht, 2004; Paribakht & Wesche, 1999). Nevertheless, learners' lexical inferencing is not always successful and sometimes goes astray (Bensoussan & Laufer, 1984; Frantzen, 2003; Huckin & Bloch, 1993; Hulstijn, 1992; Kaivanpanah & Alavi, 2008a; Nassaji, 2003). Determining a wrong meaning for an unknown word and consequently misunderstanding the whole text is not the only inherent drawback of lexical inferencing. The worse is that learners "may learn the wrong meaning which they have to unlearn subsequently" (Hulstijn, 1992, p.114). Another problem touched upon by Hulstijn (1992) is that although the possibility of learning the meanings of inferred vocabularies is higher than learning those words which their meanings have been presented to learners, they still have a slight chance of recalling the meanings of words upon a single exposure.

With regard to these studies, the present study is an attempt to make an empirical contribution to the assumption proposed by Bengelil and Paribakht (2004) that teaching learners the knowledge

sources they use while struggling to infer the meaning of unknown words may increase the chance of more accurate guesses. Specifically, the study focuses on teaching sentence-level grammatical knowledge which is, according to Paribakht (2004), the major knowledge source used by learners. The study, also, tries to manifest whether teaching sentence-level grammar explicitly or through consciousness-raising is more beneficial in improving learners' grammatical knowledge in dealing with unfamiliar words while reading. Finally, this study aims at finding the relationship, if any, between the number of knowledge sources which learners use and their lexical inferencing success.

## **2. Background**

EFL learners have different aims for learning English such as performing better on academic tasks, learning more about subject matters, or improving language skills. Whatever their goal might be, if they want to be autonomous language learners, reading is the main means (Grabe & Stoller, 2001) and is the most important way for transmitting academic knowledge (Huckin & Bloch, 1993). Reading as a language skill used for obtaining knowledge is of high importance for students. As Richards and Renandya (2002) state, reading comprehension is the only skill that most EFL students ever need during their lives. Furthermore, most foreign students rely on it to compensate for the weaknesses in their speaking ability during a course of study (Huckin & Bloch, 1993). Lee and Krashen (as cited in Krashen, 2003) contend that the more you read, the less you have writing apprehension. One reason for such significance can be that it provides learners with various models of language and introduces new cultural issues to them. Further, through reading, learners are exposed to vocabulary, grammar, idioms, proverbs, and culture that are the essential components of language. Therefore, it is an advantageous way for bringing EFL learners into contact with language and consequently increasing the chance of learning new materials. Moreover, learners can do reading activities on their own at any time and wherever they are. However, when learners are

exposed to authentic language, incomprehensible input is inevitable (Kaivanpanah & Alavi, 2008b).

Nation (1996) and Hedge (2000) confirm that one of the major obstacles to comprehending new materials is unknown vocabularies. In other words, how well learners are able to read in a foreign language depends heavily on their vocabulary repertoire. In the same line of argument, Schmitt (2008), reviewing current research on second language vocabulary learning (Bonk, 2000; Schmitt & Zimmerman, 2002), concludes that “learners must learn a very large number of lexical items to be able to operate in English” (p. 332). To make it more challenging, most learners do not have such a good command of vocabulary knowledge (Schmitt, 2008).

Hence, to compensate for such lack of knowledge exposure is not sufficient; learners should be equipped with strategies to make use of learning opportunities. Thus, teachers should not only maximize the amount of exposure but also pave the way for better understanding by teaching effective strategies to their learners. Research on lexical processing strategies indicates that learners use different strategies when they face new words including ignoring unknown words, consulting a dictionary or another person, and inferring meaning from context (Fraser, 1999). Fraser (1999) and Paribakht (2004) have found that the participants in their studies use lexical inferencing in 58% and 80% of the cases respectively when they encounter unknown words while reading.

Hasstrup (1991) explains lexical inferencing as “making informed guesses as to the meaning of a word in the light of all available linguistic cues in combination with the learner’s general knowledge of the world, her awareness of the co-text and her relevant linguistic knowledge” (p. 40). She considers “inferencing as a central procedure in receptive language use as well as in language learning” (p. 16). Dunmore (1989) states that lexical inferencing is a catalyst in the dynamic and reversible relationship of vocabulary and reading; that is, reading broadens vocabulary repertoire and vocabulary, in turn, facilitates reading. Decarrico (2001) calls guessing meaning from context a “self-study strategy” for learning vocabulary and adds that lexical inferencing is necessary “as students are encouraged to make the transition to

independent learning by determining meanings of the less frequent words they read or hear” (p. 290). Similarly, Liu and Nation (1985) are in favor of lexical inferencing especially for determining the meaning of low frequency words in written texts. They state that such words “because of their narrow range and the low probability of meeting them again soon” are not worth effort and time (p. 33). Hasstrup (1991) contends that lexical inferencing in reception is comparable to strategic competence in production in the sense that as strategic competence helps learners fill gaps in their productive vocabulary, lexical inferencing, likewise, helps them fill gaps in receptive vocabulary.

Drawing on the work in cognitive psychology ( Craik & Lockart, 1972; Craik & Tulvig, 1975), Hedge (2000) suggests that the more actively learners work on words, the more likely they retain them. In other words, retention of an inferred word meaning is superior to retention of a given word meaning. In Hulstijn and Laufer’s (2001) terminology “words that are processed with higher involvement load will be retained better than words that are processed with lower involvement load” (p. 552). Their motivational-cognitive construct of involvement comprises three components: need, search, and evaluation. The higher learning stands to the reasons that depth of processing enhances the probability of transferring a word from short-term to long-term memory (Decarrico, 2001) and also increases the amount of input which becomes intake. Besides, Hu and Nassaji (in press) have discovered that there is an inverse relationship between ease of inferencing and retention.

In spite of its dominance and popularity, unfortunately, lexical inferencing is not always an effective strategy. Learners may make wrong guesses that may lead to not only failure in the comprehension of the whole text but also to learning wrong meanings. Liu and Nation (1985) believe that for inferencing strategy to apply successfully, a large proportion of words in a text (at least 95%) should be known to learners. However, Nassaji (2003) believes that despite knowing 19 out of 20 words, his participants’ rate of inferential success has still been low.

Fraser (1999) maintains that incidental vocabulary learning happens through lexical inferencing in the course of reading for

comprehension. Vocabulary expansion through incidental vocabulary learning has received widespread support in L2 literature (Hulstijn, 1992; Hunt & Beglar, 1998; Paribakht & Wesche, 1997; Schmitt, 2008). Schmitt (2000) supports incidental vocabulary learning to such an extent that he asserts “a viably-sized vocabulary cannot realistically be taught exclusively through explicit study” (p. 143). Paribakht (2005) takes a step further and states that lexical inferencing is “the first stage in learning a new word” (p. 702).

Furthermore, as Bengueleil and Paribakht (2004) argue, making L2 learners aware of different types of knowledge sources and contextual cues that can be used in inferring the meaning of unknown words may help them have more accurate guesses. In fact, having a good command of metalanguage can facilitate making successful inferences. That’s to say, if learners are equipped with explicit knowledge of the nonlinguistic and linguistic features used in lexical inferencing, the chance of inferring true meanings may be increased. In addition, Alavi and Kaivanpanah (2009) propose consciousness-raising as a way to increase the likelihood of learners’ lexical inferencing success, particularly that of field-dependent ones. They state that, “contextual clues can be made more salient through underlining or different type faces” (p. 4). In this way learners pay more attention to details in context which is a prerequisite for more effective guesses. In fact, according to Schmidt’s (1990) Noticing Hypothesis, implicit and explicit knowledge connect through noticing or awareness. However, as Walters (2004) points out, empirical studies in this area are sparse. Kern (1989) has investigated the effectiveness of explicit teaching of second language reading comprehension strategies on improving L2 learners’ abilities in inferring the meaning of unknown words. The results of the study have revealed that students especially less proficient ones could benefit from instruction on inferencing strategy. Additionally, Huckin and Jin (1987) have attempted to investigate the efficacy of training in using context. In their study, the experimental group receives a 15-minute training in guessing from context consisting of reading the pretest passage and explaining the context clues. The results of the posttest show that

although both experimental and control groups have improved, the experimental group outperforms the control group. Also, Fraser (1999) has made an attempt to empirically test the effects of instruction on lexical processing strategies (i.e. ignoring, consulting, and inferring) and their subsequent impact on vocabulary learning. The results of the study signify that instruction is effective in improving students' guesses and can decrease the number of times the participants ignore unknown words; instead, inferencing is used more frequently and thus vocabulary learning is enhanced. Yet, as Walters (2004) points out, since students have had other options at their disposal (i.e. ignoring or consulting); it is difficult to isolate the effects of instruction on inferencing.

Contrary to the results of the above-mentioned studies, strategy training, as Nassaji (2004) states, is not always successful (e.g., Barnett, 1988). He claims that although strategy training is necessary, it is not enough and maintains that lexical inferencing success depends on many other variables such as proper use of strategies and knowledge sources. Learners' language and comprehension abilities, types of tasks, texts, and words are also involved. Following this line of argument, the present study focused on teaching sentence-level grammatical knowledge.

Sentence-level grammatical knowledge, according to Paribakht (2004), is the major knowledge source which learners use while inferring the meaning of unfamiliar words. It seems that by teaching explicitly or through consciousness-raising sentence-level grammatical knowledge, the chance of successful meaning inference and learning vocabularies may increase, as well. Teaching grammar appears to help learners internalize grammatical knowledge easier. Paribakht (2004) using concurrent think-aloud and immediate retrospective data collection procedures demonstrates that EFL readers benefit from two sources of knowledge in their attempts to infer the meaning of unknown words, that is, linguistic and extralinguistic knowledge sources. Linguistic knowledge can be further divided into L2-based linguistic knowledge (intralingual sources) and L1-based linguistic knowledge (interlingual sources). Intralingual sources include sentence-level grammatical knowledge (SG), word morphology

(WM), punctuation (P), discourse/text (D), homonymy (H), word association (WA). It is noteworthy that this taxonomy was used as a framework in the present study. Nassaji (2003), analyzing introspective and retrospective think-aloud protocols of 21 intermediate ESL learners, distinguishes between the use of knowledge sources and strategies. He defines strategies as, “conscious cognitive or metacognitive activities that the learner use[s] to gain control over or understand the problem without any explicit appeal to any knowledge source as assistance” (p. 655).

Thus, having considered the long-standing controversy over inferencing strategy, along the aforementioned line of inquiry, the present study tried to throw light on how to possibly reduce its potential disadvantage, that is, wrong guesses and consequently learning wrong meanings of words. Examining the relationship between the number of used knowledge sources and lexical inferencing success and finding the knowledge sources used more frequently by successful learners, the study also attempted to help less successful learners. To investigate the issues at hand the following research questions were proposed:

1. Does sentence-level grammar instruction explicitly and through consciousness-raising affect Iranian EFL learners’ lexical inferencing success in seen and unseen texts?
2. Does sentence-level grammar instruction explicitly and through consciousness-raising affect the retention of inferred vocabularies by Iranian EFL learners?
3. Is there any relationship between the number of knowledge sources that Iranian EFL learners use and their success in lexical inferencing?

### **3. Method**

#### **3.1 Participants**

A total number of 47 university undergraduates (13 males and 34 females) between the ages of 19 and 24 in three intact classes were selected based on convenience sampling and randomly assigned to a



control group ( $n = 14$ ) and two experimental groups ( $n = 17$  &  $n = 16$ ). They were all Persian native speakers and their English proficiency was at the level of Interchange, book 2. The participants were selected from one single language school to control the intervening effect of contextual factors such as school atmosphere and principal leadership on students' achievement. Classes met twice a week for 11 weeks and each session lasted for 105 minutes.

### 3.2 Instrumentation

To check the homogeneity of the participants, Interchange/Passages Placement Test was used. Since the focus of this study was on reading, the reading subsection of the ESOL Preliminary English Test (PET) was also run. Two texts namely 'Big City Dreams' and 'Genetic Engineering' developed at the same difficulty level by Paribakht (2005) were used as the pre and posttests to measure lexical inferencing success. Similar to Nassaji's (2004) study, in each text 10 unknown words were used to focus on EFL learners' inferencing behavior. The target words were all content words consisting of nouns, verbs, adjectives, and adverbs. To make sure that the words were unfamiliar to the participants, a list of the words was given to the participants before the pre and posttests and they were asked to write down their meanings (either in Persian or English). Subsequently, the known words were omitted for those participants.

Moreover, Vocabulary Knowledge Scale (VKS) developed by Paribakht and Wesche (1996, 1997) was used to monitor the effect of grammar instruction, both explicitly and through consciousness-raising, on the retention of inferred vocabularies by EFL learners and were given ample time to complete the task. This instrument, utilized by Wesche and Paribakht (1996), elicits self-perceived and demonstrated knowledge of the target words in written form from learners with five self-report and performance items. The scale ratings range from complete unfamiliarity, through recognition of the word and recall of its meaning, to the ability to use the word productively in a sentence with grammatical accuracy and semantic appropriateness. According to Paribakht and Wesche (1996), the strength of VKS lies in the fact that, unlike most tests of vocabulary

size, particularly YES/NO type, VKS allows verification by eliciting actual knowledge of learners' vocabulary with performance items. Elicitation of this actual knowledge makes VKS more trustworthy than other vocabulary size tests which are only based on "learners' dubious knowledge" (p. 34). Furthermore, the fact that vocabulary learning is an incremental process (De Bot, Paribakht, & Wesche, 1997) makes the VKS even a better choice for measuring incidental word learning. The reason behind this is that the VKS is sensitive enough to capture the initial development of basic knowledge of specific words (Wesche & Paribakht, 1996). It is noteworthy that the lists of target words given to the participants prior to the main passages in the pre and posttests were initially in the format of VKS. Nonetheless, since the researchers' intention was to have only those words that were completely unfamiliar to the participants, following Fraser's procedure, the five-point VKS score was collapsed to two-point score (familiar vs. unfamiliar). That is why the word 'list' was used for those tests that were given to participants before the main passages.

Another instrument utilized in this study was immediate retrospective think-aloud protocols. The data about the use of knowledge sources were derived from immediate retrospective protocols. The passage used to elicit a retrospective think-aloud protocol of used knowledge sources was the one developed by Haastrup (1991) named 'Health in the Rich and Poor'. It had 25 content words underlined as target words. First, the participants were given a list of the target words and were asked to write down the meaning of the familiar words. Second, they were given the main passage wherein they were to write down the meaning of the underlined words. They had as much time as they needed to complete the task. Finally, the participants were interviewed individually and were asked to verbalize and report on their thoughts as they were solving the lexical inferencing task.

### **3.3 Procedure**

As mentioned earlier, Interchange/Passages Placement Test was administered to three intact classes to examine whether they belonged to the same population. Since the construct of interest in

this study was reading, the reading subsection of the PET was also administered to ensure that the participants were homogeneous in their reading ability. Furthermore, to eliminate the effect of teachers' experience, teachers were chosen from novice English teachers. To this end, Tschannen-Moran and Hoy's (2007) cut-off point for distinguishing between novice and experienced teachers (i.e. three years of teaching experience) was followed. Thus, the teachers' experience ranged from nine months to two years. Besides, all the three teachers held M.A. in English-related majors. The control group was taught by one of the researchers.

The three intact classes were randomly assigned to a control group and two experimental groups. In sessions one to three all of the participants in the three groups took the placement test, were trained on lexical inferencing, and took the pretest respectively. The instruction on lexical inferencing strategy focused on developing students' awareness of the use and viability of lexical inferencing. They were taught how to use inferencing as a strategy in their reading when encountering unfamiliar words using Clarke and Nation's (1980) model:

1. identifying the part of speech of the unknown word
2. looking at the immediate context
3. looking at the wider context
4. I) inferring the meaning of unknown word
  - II) checking the guess
    - (a) checking that the guess is the same part of speech as the unknown word
    - (b) checking if the word can be analyzed into prefix, root, or suffix
    - (c) substituting the guess for the unknown word in the context and then looking it up in a dictionary

As the pretest, the participants were given two passages to read and infer the meaning of the underlined words while they were free to ask the meaning of other unfamiliar words in the passage (i.e. those not underlined). One half of each class took the passage named 'Big City Dreams' while the other half took 'Genetic Engineering'. The rationale was to eliminate the effect of the topic

familiarity on the students' performance which has been proven to affect lexical inferencing and retention of inferred vocabulary (Pulido, 2007). The reason for the inclusion of an unseen text (i.e. the counterpart of the pretest) in the posttest was to counteract any possible practice effect of having the pretest before the treatment.

Sentence-level grammar instruction for the experimental groups was integrated in the regular content of their course. The instruction started from the fourth session and took about 30 minutes each session. It focused on building up students' sentence-level grammatical knowledge which is one of the major knowledge sources used by learners when they try to construct the meaning of unknown words (Paribakht, 2004). The learners received instruction on the speech parts (i.e. verb, noun, adjective, adverb, preposition, determiner, pronoun, and linking word) and the syntactic relationship among the words within a sentence like word order and word class. The only difference was that the first experimental group (ETG) was taught sentence-level grammar explicitly and the second experimental group (CRG) was instructed through consciousness-raising tasks. The control group (CG), however, practiced lexical inferencing through its common method; that is, the participants were encouraged to guess the meanings of unknown words from context rather than use their dictionaries.

ETG was instructed based on Oxford Practice Grammar by Eastwood (2006). In this group, the grammatical points were taught explicitly; that is, the teacher provided the learners with metalinguistic explanations of the target grammatical points and then the learners were engaged in doing some exercises. The CRG, on the other hand, received a reading passage taken from Select Readings (Lee & Gundersen, 2002) in which a related grammatical point was underlined. Also, some other grammatical points were taught to the group through some inductive consciousness-raising tasks which were adapted from Ellis (1993, 2002). To do these exercises, the class either acted as a group or was divided into small groups. Alternatively, the CG was given a passage each session and the learners were encouraged to guess the meaning of unfamiliar words from the context not using their dictionaries.

The posttest was administered in session 18 to the groups. Followed by the list of the target words the main passages, which were the counterpart of what the participants had received before the instruction, were given to them. Afterwards, the participants were given the same passage they had as the pretest and were asked in their mother tongue to infer the meaning of unknown words while there was no time limit for task completion. Moreover, they were free to ask the meaning of any unknown words except the target ones.

Two weeks later, the VKS comprising 20 words (i.e. the target words in the posttests) was administered to the three groups to assess the effect of sentence-level grammar instruction, either explicitly or through consciousness-raising, on the retention of inferred vocabulary. To reduce the contextual clues, the listed words were presented in a scrambled order. It is worthwhile to mention that the chance of meeting the target words outside testing sessions, as Hulstijn and Laufer (2001) suggest, was low on the grounds that the target words were low frequent and English is a foreign language in Iran.

Finally, at the end of the term, immediate retrospective think aloud data collection procedure was carried out in the ETG in individual sessions. Nine students were asked to read the passage 'Health in the Rich World and in the Poor' developed by Haastrup (1991) and tried to infer the meaning of the underlined words with no time limit for completing the task. Subsequently, they were asked in individual sessions to verbalize every knowledge source they had used to guess the meaning of an unknown word. At the beginning of each session, the participants were trained in think-aloud procedures. Each individual session conducted in the participants' first language (Persian) took about an hour. All auditory evidence was recorded by the participants' permission and transcribed for further analysis. Paribakht's (2004) taxonomy of knowledge sources was used to examine think-aloud protocols for different kinds of knowledge sources and the frequency of use. It should be noted that six participants knew the meanings of nine target words altogether and three of these words were familiar for only one participant. To save more words, instead of removing the

nine words, six words and the participant with the knowledge of the three words were excluded from the study. Eventually, this stage was carried out with total number of eight participants and 19 words.

Accordingly, all the answer-sheets gathered from 47 participants were scored by one of the researchers. To measure the degree of success in lexical inferencing in the three passages (i.e. the pretest, posttest, and think-aloud task), a three-point scale (0 to 2) representing unsuccessful, partially successful, and successful inferences respectively was used. Successful inferences were defined as those that were semantically, syntactically, and contextually appropriate. They could be synonyms or definitions. Answers that were semantically appropriate but syntactically deviant, or vice versa, or were approximate were classified as partially successful. Responses were evaluated as unsuccessful when they did not meet any of these conditions or no meaning was offered at all. In this way, the maximum score possible for each participant was 20, the results of which were compared after adding them up.

To score VKS items, Paribakht and Wesche's (1997) guidelines for scoring VKS were followed. The minimum and maximum scores possible for any participant were 20 and 100. It is noteworthy that more or less all students inferred the meaning of some target words approximately or even wrongly but they remembered exactly those inferred meanings in the vocabulary test. In scoring VKS, all inferred meanings which students could recall successfully were considered correct even if they were approximate or incorrect meanings since what counted was the retention of inferred meanings no matter whether they were right or wrong. The logic behind is that of Fraser's (1999) framework, who asserted that vocabulary learning from inferred vocabulary happened to the extent that learners could recall those meanings which they assigned to unknown words in reading before. However, in scoring students' answer-sheets in the pretest, posttests, and VKS those target words which participants had indicated as known were deleted for those participants.

## 4. Results

The data obtained from Interchange/Passages placement test, reading component of the PET, and the pretest to three separate one-way ANOVAs confirmed the homogeneity of the three groups with respect to their general proficiency, reading ability, and lexical inferencing prior to the instruction. Table 1 displays the mean scores and standard deviations for the three groups' performance on the pretest, posttests, and the VKS.

**Table 1:** Descriptive statistics of the groups' performance on the pretest, posttests, and VKS

Groups	Test	Text	M	SD	N
ETG	Pretest		6.74	1.71	17
		Seen	12.33	2.76	17
	Posttest	Unseen	9.04	3	17
		Total	10.68	3.30	34
	VKS		39.06	6.22	17
CRG	Pretest		6.78	1.81	16
		Seen	10.35	3.17	16
	Posttest	Unseen	8.60	2.07	16
		Total	9.47	2.78	32
	VKS		37.94	4.69	16
CG	Pretest		5.50	1.79	
		Seen	5.97	1.95	14
	Posttest	Unseen	4.98	1.99	14
		Total	5.47	2	28
	VKS		32.14	7.09	14

Furthermore, to address the first research question a two-way between-groups analysis of variance was carried out. As it is apparent from Table 3 below, the interaction effect between sentence-level grammar instruction and text type was not statistically significant,  $F(2, 88) = 1.62, p = 0.204$ . There was a statistically significant main effect for sentence-level grammar instruction,  $F(2, 88) = 333.53, p = 0.001$ . The effect size, using eta squared was 0.432, indicating a relatively large effect size, which means that teaching grammar by itself accounted for 43.2% of the overall variance. In order to see which mean differences were

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significant the Scheffe test was performed. The results revealed that the mean scores for the ETG and CRG were significantly different from the CG. The ETG and CRG did not differ significantly from each other. The main effect for text type [ $F(2, 88) = 14.22, p = 0.0005$ ] was also significant. The obtained  $\eta^2$  value was 0.139 which can be said to be a large value. According to post-hoc comparisons of the three groups the CG was significantly different from both ETG and CRG although ETG and CRG did not differ significantly from each other.

**Table 2:** One-way analysis of variance of the groups' performance on the retest

		SS	df	MS	F	Sig.
Pretest	Between Groups	15.61	2	7.80	2.5	.09
	Within Groups	137.48	44	3.12		
	Total	153.1	46			

**Table 3:** Tests of between-subjects effects

Dependent variable: Lexical inferencing success

Source	SS	df	MS	F	Sig.	Partial Eta Squared
Corrected Model	567.44 <sup>a</sup>	5	113.49	17.13	.000	.493
Intercept	6814.90	1	6814.90	1028.415	.000	.921
Group	444.37	2	222.18	33.529	.000	.432
Text	94.23	1	94.27	14.219	.000	.139
Group*Text	21.468	2	10.73	1.620	.204	.036
Error	583.140	88	6.63			
Total	8296.27	94				
Corrected Total	1150.58	93				

a. R Squared = .493 (Adjusted R Squared = .464)

To address the second research question, that is, whether teaching sentence-level grammar explicitly and through consciousness-raising affect the retention of inferred vocabularies, the data from the students' performance on the VKS were submitted to a one-way ANOVA. The results presented in Table 4 show that the mean performance of the three groups was different, [ $F(2, 44) = 5.63, p =$



0.007,  $\eta^2 = 0.203$ ]. As a result, it may be concluded that grammar instruction promoted the retention of inferred vocabulary. The Scheffe test, again, was run to trace where the significant differences laid. The results revealed that there was a significant difference, on the one hand, between the ETG and the CG, and on the other hand, between the CRG and the CG; though, there was no significant difference between ETG and CRG.

**Table 4:** One-way analysis of variance of the groups' performance on the VKS

		SS	df	MS	F	Sig.
VKS	Between Groups	409.63	2	204.814	5.63	.007
	Within Groups	1601.95	44	36.408		
	Total	2011.58	46			

Finally, to address the third research question, all the immediate retrospective think-aloud protocols were transcribed and examined qualitatively for any knowledge source. To code knowledge sources, Paribakht's (2004) taxonomy was used as a framework. Successively, the number of knowledge sources which learners drew upon and their scores on the third passage were calculated. Then, the scores on lexical inferencing and the numbers of used knowledge sources were correlated using Spearman correlation. The results revealed that there was a strong, positive correlation between the two variables  $r = 0.93$ ,  $p = 0.001$  with greater numbers of used knowledge sources associated with greater success of lexical inferencing.

In order to get additional information, the eight participants were divided into two successful and less successful groups according to their percentile rank on lexical inferencing scores obtained from the think-aloud task. There were four participants in each group. Therefore with 19 target words and four participants in each group there were 76 cases to guess in each group. Table 5 displays the type, frequency, and percentage of knowledge sources which the participants in each group called upon when inferred the unfamiliar words. Counting the number of the used knowledge sources by each group, it is clearly evident that the successful group

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used more knowledge sources than the less successful group (139 vs. 93).

**Table 5:** Relative frequencies of knowledge sources used by successful and less successful learners

Type of knowledge sources	Successful vs. less successful	Frequency of knowledge sources	% of knowledge sources
Sentence-level grammatical knowledge	Successful	71	50.08
	Less successful	56	60.22
Word morphology	Successful	21	15.11
	Less successful	10	10.75
Punctuation	Successful	0	0
	Less successful	0	0
Discourse	Successful	26	18.71
	Less successful	17	18.28
Homonymy	Successful	10	7.20
	Less successful	3	3.22
Word association	Successful	2	1.44
	Less successful	0	0
Cognate	Successful	0	0
	Less successful	0	0
World knowledge	Successful	9	6.47
	Less successful	7	7.53
Total	Successful	139	100
	Less successful	93	100

As it is apparent from Table 6 both groups used an almost similar sequence of relative knowledge source frequency while deriving the meaning of unknown words (with the exceptions of WK and P).

**Table 6:** The order of relative frequency of knowledge sources use

Groups	Knowledge sources
Successful	SG > D > WM > H > WK > WA > P = C
Less successful	SG > D > WM > WK > H > WA = P = C
Total	SG > D > WM > WK > H > WA > P = C

As stated before, a list of target words was given to the participants to write down the meanings of known words (if any) to ensure that

the target words used in the think-aloud were unfamiliar to them. In data analysis, the known words were excluded for all of the participants. However, some learners provided wrong meanings for some words in the decontextualized list. A more detailed analysis of these wrong responses to the target words in the decontextualized list and the main passage revealed two patterns in their responses. One pattern was that they mistook the words for other similar-looking but semantically irrelevant words for example squalor for solar and scholar, precipitating for perception, and permeate for permit which is called synophone/synograph by Bensoussan and Laufer (1984) and mistaken ID by Huckin and Bloch (1993). Another pattern was that sometimes learners misanalyzed a word to its morphological components for instance translating waver as the sum of *wave* and *er* called morphological troublemaker by Bensoussan and Laufer (1984).

**Table 7:** The comparison between responses to the decontextualized list and the think-aloud task

		Restructuring lexical knowledge							
		Successful		Partially successful		Unsuccessful		Total	
		Frequency	%	Frequency	%	Frequency	%	Frequency	%
Groups	Successful	7	9.21	5	6.58	1	1.32	13	17.11
	Less successful	1	1.32	2	2.63	0	0	3	3.95

## 5. Discussion

The findings of the present study revealed that teaching sentence-level grammar both explicitly and through consciousness-raising result in learners' significant success in applying lexical inferencing. These findings lend support to Paribakht (2004) and Kaivanpanah and Alavi's (2008b) findings that grammatical knowledge contributes to lexical inferencing success. Paribakht (2004) in her study discussed the possible effect that grammatical

knowledge might have on vocabulary learning; however, she did not directly address it. Therefore, this study provides valid grounds that sentence-level grammatical knowledge may influence the retention of inferred vocabulary. All in all, these findings add support to Schmitt's (2000) suggestion that "lexical knowledge and grammatical knowledge are inextricably interrelated in a kind of lexicogrammar" (p. 58). The findings also provide evidence for Bengeleil and Paribakht's (2004) assumption that teaching learners the knowledge sources which are called upon in lexical inferencing while reading increase the likelihood of an efficient and accurate guess. The result that CRG outperformed the CG expands upon Alavi and Kaivanpanah's (2009) speculation that through consciousness-raising activities it is likely that learners pay more attention to details that consequently lead to more successful lexical inferences. The finding that ETG and CRG performed equally is in line with Fotos and Ellis's (1991) and Fotos' (1994) studies that both metalinguistic descriptions of the target features and consciousness-raising tasks are effective methods to enhance learners' grammatical knowledge. Although the effect sizes of 0.432 and 0.139 for the posttests attested that teaching sentence-level grammar is effective for increasing the likelihood of a correct guess, a glance at the mean scores in the posttests of both ETG (seen and unseen texts 12.32 and 9.04 respectively) and CRG (seen and unseen texts 10.35 and 8.60 respectively) reveals that the mean scores are not high. It can be concluded that desirable results are achieved when teaching sentence-level grammatical knowledge is coupled with instruction on other knowledge sources. Likewise, although, the effect size of 0.203 for VKS testified the significant effect that sentence-level grammar instruction can have on promoting the retention of inferred vocabulary, the mean scores of the ETG and CRG are not high. Bearing in mind that learners in this study were exposed to the target vocabulary only two times, the medium mean scores (39.06 and 37.94 for ETG and CRG respectively) seem to reflect Schmitt's (2008) conclusion drawn from reviewing the related literature (e.g., de Groot, 2006; Nation, 2001) about the importance of recycling and repeated exposure in vocabulary learning. Therefore, teachers should take repeated

exposure into consideration while practicing incidental vocabulary learning in their classrooms. This implies that better results are achieved if instruction on knowledge sources is combined with recycling previously learned words.

Using more knowledge sources by the successful group can be attributed to two reasons; first, the successful group attempted to infer 72 vocabularies while the less successful group managed to infer 64 words. Second, the successful group in their attempts to infer unknown vocabulary used multiple (more than one) knowledge sources rather than a single one for a word more frequently while the less successful group used single knowledge sources more frequently. To be more precise, the successful group used single knowledge sources and multiple knowledge sources 24 and 48 times respectively while the less successful group used multiple and single knowledge sources 28 and 30 times respectively. Attempting to infer more words and using more multiple knowledge sources by the successful group are consistent with Fraser's (1999) and Kaivanpanah and Alavi's (2008b) findings respectively in which more proficient learners tried to infer more words and used more multiple knowledge sources than limited proficient learners respectively.

Table 6 echoes Paribakht's (1985) finding that proficient and less proficient learners used largely similar sequences of knowledge sources in oral communication. A quick look at Table 5 shows that the less successful group used sentence-level grammatical knowledge and world knowledge more than the successful group. A justification can be that because the less successful group had less knowledge sources at their disposal (as is apparent from not using word association and using less proportion of other knowledge sources) they resorted more frequently to their background knowledge as well as sentence-level grammatical knowledge for which they received instruction. Considering that both groups received sentence-level grammar instruction explicitly, it seems that the less successful learners benefited more from the instruction; thus, they seemed to compensate for the unavailability of other knowledge sources by the knowledge source they received instruction on. The pattern of used knowledge sources for all

participants as a group concurs with that of Paribakht (2004) except for discourse, cognate, and punctuation. That is, whereas discourse was a minor knowledge source in Paribakht's (2004) study, it was a major one in this study. The other differences were that participants in this study did not use cognate and punctuation knowledge sources at all. Since using cognate knowledge source was also missing in Kaivanpanah and Alavi's (2008b) study wherein their participants were Iranian, it seems reasonable to conclude that the first language of the participants in both studies (i.e. Persian) could be the source of difference. The finding that participants in this study did not use punctuation knowledge source may reflect the fact that Iranian teachers are seriously negligent in providing EFL learners with punctuation instruction; unquestionably, an exception could be those who are majoring in English, with formal instruction on punctuation. It should be recalled that participants in this study were undergraduate students from various majors other than English. For pedagogical purposes, teachers should focus on those knowledge sources which learners did not use very much as a total group and also those knowledge sources which learners in successful group used more frequently than those in less successful one. Confusing a word with an unrelated but similar-looking word (Table 7) provides support for the importance that Schmitt (2008) attaches to the form of words in vocabulary learning. However, the promising point was that when learners saw these words in context, contextual cues in some cases helped them to restructure their lexical knowledge which happened more frequently in the successful group than the less successful one. This confirms the role of context in assessing inferences posited by Huckin and Bloch (1993) and Bensoussan and Laufer (1984). More restructuring in successful group reflects McLaughlin's (1990) claim that more successful learners are more flexible in restructuring than less successful ones.

## **6. Conclusion**

The present study supports the findings of the previous studies that sentence-level grammatical knowledge contributes to lexical

inferencing success and retention of inferred vocabulary. It also verifies that both explicit teaching and consciousness-raising are effective. Additionally, the findings indicate that in teaching lexical inferencing emphasis should be placed on those knowledge sources which less successful learners fail to use whatsoever or use less than successful learners. Further study can be carried out to discern the results of teaching other knowledge sources, which learners use to infer the meaning of unknown words, on lexical inferencing behavior of learners.

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