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The effect of lexical inference strategy instruction on Iranian EFL learners' vocabulary depth and breadth

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Abstract: The current study was an attempt to investigate the possible effects of lexical inference strategy training on Iranian upper-intermediate EFL learners' vocabulary depth and breadth. This quasi-experimental study was conducted among 45 upper-intermediate EFL learners at Simin Language Institute, in Rasht-Iran, who were selected through convenience sampling. All learners were female, aged 18 to 40, from three intact classes who were randomly assigned to one experimental group and one control group. In the experimental group, the participants were taught how to infer the meaning of new words from the context, employing lexical inference strategies. The control group received the traditional method of teaching vocabulary. The results of the t-test analysis indicated that the participants in the experimental group who received instruction on lexical inference strategies outperformed their counterparts in the control group with regard to their vocabulary depth and breadth. The findings may have implications for EFL teachers, language learners, and syllabus designers.

Subjects: Applied Linguistics; English Language; Language Teaching & Learning

Keywords: lexical inference strategy; vocabulary breadth; vocabulary depth

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PUBLIC INTEREST STATEMENT

One challenging case in learning a new language deals with comprehending the meaning of a new word in a text. This study focuses on one of the most practical strategies that help EFL learners to get the meaning of a new word in a text. This study reminds EFL learners that while reading a text when learners face an unfamiliar word, not only there is no need to stop reading but also learners can try to infer the meaning of the word from the context. In addition, this lexical inference strategy enhances the level of EFL learners' vocabulary depth and vocabulary breadth. Vocabulary breadth refers to the number of words that a learner knows and vocabulary depth means how well a learner knows a word. The findings of the study have benefits for the EFL teachers in terms of developing learners' reading comprehension through giving explicit instruction on lexical inference strategy.

1. Introduction

EFL students' vocabulary knowledge is an important factor in determining their success in different aspects of reading comprehension (Laufer & Ravenhorst-Kalovski, 2010) and foreign language proficiency (Schmitt, Jiang, & Grabe, 2011). When they confront numerous new words, they establish connections using their knowledge sources and try to interpret texts through using context cues such as interlingual, morphological, grammatical, semantic, and rhetorical cues and then make inferences of their meanings. Read (2000) defines lexical inferencing as an important strategy that includes deep manipulation of the information presented in the text that leads to better understanding of the text. Lexical inference can be considered as a qualified guessing of the meaning of lexical items in context rather than from context (Schmitt, 2010).In fact, lexical inferencing strategies are considered useful strategies to ESL/EFL readers when they encounter an unknown lexical item in a text (Wang, 2011). According to Oxford (2013), good language learners actively employ strategies to help them succeed in their learning. Consistent with Oxford's (2011) theory, Graves, Ringstaff, Li, and Flynn (2018) state that language learners need to learn word-learning strategies and employ them without help from others during reading. Nagy and Townsend (2012) also emphasize the necessity of developing language learners' lexical competence for academic success and building their linguistic capacity and communicative competence. Wessels (2011) pointed out that lexical inferencing was the only best predictor of language learners' academic success.

Wesche and Paribakht (2010) argued that learners' vocabulary knowledge was dependent on their ability in making inferences. Actually, vocabulary knowledge embraces three different dimensions including breadth, depth, and fluency. Language learners' breadth of vocabulary knowledge involves their vocabulary size, whilst on the contrary, their lexical depth and fluency are related to their ability to utilize words precisely (Daller, Milton, & Treffers-Daller, 2007). With regard to the association between vocabulary knowledge and text comprehension, Akyol and Garrison (2011) believes that expansions in the learners' vocabulary depth and breadth determine the extent to which they comprehend what they read (cited in Ilter, 2018: P.4). Graves et al. (2018) pointed out that gains in vocabulary are good indicator of the learners' text comprehension.

This study assumed that developing EFL learners' lexical inference strategy would influence their vocabulary depth and breadth. In other words, it was expected that helping language learners make appropriate contextual inferences and improving their knowledge of using strategies might affect the number of words they know and enhance the richness of their word knowledge.

1.1. Statement of the problem

While learners' vocabulary achievement is necessary for communication and understanding texts, vocabulary learning has been one of the major concerns of EFL learners (Segler, Pain, & Sorace, 2002). Iranian EFL learners are no exception of such concerns that can be partially eliminated through incidental vocabulary learning and helping learners make acceptable guessing from texts and utilize lexical inferencing strategies. Language learners need to recognize how to infer meanings of unfamiliar words through instructional strategic model by receiving direct or explicit instruction (Baumann, Edwards, Boland, & Font, 2012) and making use of cues in the text and analyzing the surrounding linguistic context (Baumann, Edwards, Boland, Olejnik, & Kame'enui, 2003). Iranian EFL learners need to know how to utilize their linguistic knowledge sources such as phonological, morphological, and syntactic knowledge for making successful inferences from the texts. While literature has inferencing studies in reading in great quantities, few studies have been done to inspect the possible effects of lexical inferencing strategies on vocabulary depth and breadth in the Iranian EFL situation. This study sought to investigate the role of awareness raising in using lexical inferencing strategies in extending the Iranian EFL learners' vocabulary size and depth.

1.2. Significance of the study

Understanding the possible effects of lexical inference strategy instruction on EFL learners' vocabulary depth and breadth will help EFL learners and teachers to focus on factors that influence

vocabulary acquisition and improve comprehension. The findings of such studies will add to teachers' understanding of the nature of lexical inferencing strategies and their roles in foreign language vocabulary development. Verifying the importance of linguistic knowledge in making inferencing of unfamiliar words in incidental vocabulary acquisition, this study focused on lexical inferencing as a major cognitive process and tried to link it with vocabulary depth and breadth. The main goal was to help EFL learners have better comprehension of texts with the hope of filling some gaps in the current research regarding teaching English vocabulary for Iranian EFL learners. In fact, the purpose of the present study was to investigate to what degree EFL learners' vocabulary knowledge (depth and breadth of vocabulary knowledge) was affected by the lexical inferencing strategies they utilized when confronting unknown words. More specifically, the research questions were addressed as follows:

(1) Does lexical inference strategy instruction have any statistically significant effect on Iranian EFL learners' vocabulary breadth?

(2) Does lexical inference strategy instruction have any statistically significant effect on Iranian EFL learners' vocabulary depth?

2. Review of literature

A growing body of research has been focused on the benefits of having proficiency in terms of lexical items in strengthening learners' foreign language achievement and identifying the way they deal with unknown words during reading (Hu &Nassaji, 2014, 2003, 2004; Wesche & Paribakht, 2010). The findings of the previous studies reflect a positive relationship between different dimensions of foreign language proficiency and lexical inferencing success suggesting that students can enhance their understanding of the meanings of unknown words if they are taught in a way that positively supports vocabulary growth and the comprehension of texts (Beck, McKeown, & &Kucan, 2002). Some studies focus on the overall relationship between inferencing ability and language competence. On the contrary, other studies look at the lexical inferencing in reference to particular features of language knowledge, such as reading comprehension (Wesche & Paribakht, 2010).

Nassaji (2004) has suggested a comprehensive taxonomy of lexical inferencing. Nassaji's (2004) taxonomy of strategies suggests strategies such as identifying, evaluating, and monitoring as the three main lexical inferencing strategy types. Identifying strategies has been defined as strategies that learners use for unfamiliar word apprehension in the text and are divided into three subtypes of strategies including repeating, word analysis, and word-form analogy. He introduces evaluating strategies as those that learners use in order to make judgments and decisions about the accuracy of what they have inferred that involves two subtypes, namely, verifying and self-inquiry. The third type of strategy in Nassaji's (2004) classification of lexical inferencing is monitoring.

This category refers to the learners' awareness of the type of problem they need to solve by determining its ease or difficulty through making use of information available in the text. Review of related research in the area of vocabulary learning reflects that there are two different positions regarding vocabulary learning. The first position holds that explicit teaching methods such as providing EFL learners with lists of words or asking them to analyze explicitly the patterns of word formation should be used to teach vocabulary (Nation, 2001). Based on the second view that is also called incidental vocabulary acquisition that happens without conscious focus on vocabulary learning, vocabulary should be acquired in an implicit framework by simply engaging students in a variety of tasks such as reading for meaning, inferencing word meanings from contextual and knowledge-based resources, or a completing text-based vocabulary activity (Hulstijn, 2003). Nation (2006) argues that due to the demanding nature of foreign language vocabulary development, inferring word meaning from context appears to be the only possible approach that leads to the most of vocabulary learning that happens in EFL context. The challenge of learning vocabulary can be dispelled through activating some mental processing. As stated by Fraser (1999), the main assumption that underlies incidental learning hypothesis is that incidental vocabulary acquisition

mostly takes place through the process of lexical inferencing. On the other hand, Hu and Nassaji (2014) argue that inferring the meaning of a word involves some mental effort for processing a word. (Comer, 2012) pointed out that learners employ different types of knowledge sources such as contextual cues, word level knowledge, sentence level knowledge, discourse level, and background knowledge for making lexical inferences.

Vocabulary depth and breadth are two different aspects of lexical repertoire that are an important area of focus in vocabulary research (Qian, 2002). Vocabulary depth and breadth have significant roles in EFL learners' incidental vocabulary acquisition and lexical inferencing success. Nation, (2001) defines vocabulary breadth as the number of words learners know at a particular level of language proficiency. On the other hand, the vocabulary depth involves consideration of the quality of the learners' vocabulary knowledge (Read, 2000). The research findings on the relationship between lexical knowledge and incidental vocabulary development through reading reflect that there is a strong positive relationship between incidental lexical knowledge and vocabulary acquisition (Pulido, 2011). Lexical inference contributes to a better comprehension of the text as a whole (Wang, 2011).

Research findings in the area of foreign language learning have suggested that in incidental vocabulary acquisition, EFL learners guess the meaning of unknown words differently. Therefore, it is essential to train EFL learners to be able to guess lexical items appropriately (Schmitt, 2010). Moreover, the influential role of vocabulary in foreign language achievement signifies a need to look for ways to equip learners with sufficient knowledge and skill to use contextual meaning to understand the texts. Hu and Nassaji (2014) also emphasize the importance of investigating the processes involved in inferring word meaning from context. According to Paribakht (2005) in foreign language learning, the ways in which students make inferences of unknown words have been valuable subject for research in the literature on vocabulary acquisition. In the following section, the methodology used in the study is described.

3. Method

3.1. Participants

This study was conducted with 45 Iranian female students who had been enrolled in an EFL course atSimin language institute, in Rasht-Iran. The participants of the study were all female learners within the age range of 18 to 40. Due to the limitations in the institute, it seemed impossible to run a placement test. Therefore, three intact upper-intermediate classes were selected with the permission of the supervisor of the institute. The participants were tested by a sample of PET (Preliminary English Test) test to ensure their homogeneity. Having calculated the mean and the SD, the researcher selected the students who scored one SD below and above the mean as the participants of the study. Other students participated in the classes but were excluded from further analysis.

3.2. Instrumentation

a) Preliminary English Test (PET), a standardized Cambridge test: Initially, a sample of PET test was used to ensure the homogeneity of the participants in terms of language proficiency. The reading section included 70 questions, the writing section 20 items, and the listening section 20 items. In the speaking section, two professional teachers interviewed the participants. The interviewers' scores were averaged and they were considered as the final speaking scores.

b) Schmitt et al.'s test of vocabulary breadth: This test was designed by Schmitt and McCarthy (1997, 2001) according to a vocabulary test developed by Nation (1983, 1990). The test contains five parts: 2000 words family level, 3000 words family level, 5000 words family level, 10,000 words and academic vocabulary. The 2000-word and 3000-word parts include the most frequently used words, the 5000-word part represents medium-frequency words, and the 10,000-word part represents low-frequency words. Academic vocabulary was taken from Coxhead (2000). It had 570 words encompassing the most frequently and widely used words in 28 disciplines. Every part

included 10 questions and each question tested 6 target words and three meanings. In each question, the test takers had to choose three words from six words and matched the corresponding explanations. This test was used as both the pre-test and posttest.

c) Read's Word Associate Test: This test, designed by Read (2000), was used to measure the depth of vocabulary knowledge of the participants. This test included 40 target words. The test presented the examinee with a stimulus word followed by four possible synonyms and four possible collocates, from which the examinee was to choose four correct associates. The stimulus word was always an adjective and collocates were always nouns modifiable by the stimulus. The correct answer included one synonym and three collocates, two synonyms and two collocates, or three synonyms and one collocate. This uncertainty was added in an attempt to limit the effectiveness of guessing strategies (Read, 2000, p. 184).

3.3. Procedure

At the beginning of the study, both groups took three tests; a sample of the PET to be sure about the initial homogeneity of the participants, the vocabulary depth test to measure the participants' initial vocabulary depth and the vocabulary breadth test (VLT) to measure their vocabulary breadth. In this study, there was one experimental group and one control group. All the teaching materials used in these two groups were the same. They studied Top Notch series book and worked on the reading part for 10 sessions, every session for 30 minutes. However, in the experimental group, the participants received additional treatment. They were instructed how to derive the meaning of the unknown words through lexical inferencing strategies.

The model that was used for teaching lexical inference was adapted from Nassaji (2006). This model included three stages namely, identifying, evaluation, and monitoring. For the first step of teaching lexical inference, repetition was used through which the learners were asked to repeat parts of the reading texts. For example, the teacher identified important passage words and asked them to repeat the words or phrases from the reading passages. Afterwards, the learners were encouraged to do word analysis and tried to grasp the meanings of unknown words by analyzing them into various components, such as roots, affixes, and suffixes. Then, they received instruction on how to do the word–form analogy. In fact, at this stage, they were encouraged to understand the meaning of unknown words based on their sound or form similarity with other words. In other words, EFL learners practiced predicting the meaning of unknown words by activating their prior knowledge or looking for existing schemas and tried to seek clarification by questioning if they did not notice the meanings. When it comes to the evaluating stage, the teacher helped learners to do verification through inspecting the appropriateness of the inferred meanings by checking them against the wider context. The learners were taught how to do self-enquiry. In fact, the teacher gave models of thinking aloud for the learners by asking relevant questions aloud and answering them herself and then encouraged the learners to activate their comprehension by asking themselves questions about the unknown words or the meaning they had already inferred. They tried to identify internal and external clues to infer word meaning and related important points in the text to one another to understand it. Monitoring was the last step through which the learners showed a conscious awareness of the problem by judging its simplicity or difficulty. Finally, they were asked to paraphrase the reading texts or write summaries of the texts.

The learners in the control group received traditional way of teaching, and there was no inference strategy instruction. It means that teaching all the strategies that might help them improve their lexical inference strategies were eliminated and they were not explicitly instructed how to infer the meaning of unknown words. In other words, a traditional teacher-centered reading approach was used for the control group in which the teacher directed the instruction, initiated the questions and students simply generated responses. The learners were just asked to go directly to the reading texts and read them for comprehension. While teaching the reading passages, first, the researcher focused on vocabulary instruction, next, the grammatical structures of the texts were made and finally, the researcher presented the translation from the passages. By the end of the study, the participants'

vocabulary depth and breadth was tested again through administration of the post-tests. The results obtained from the study were compared to check the research hypotheses.

3.4. Design

The current study was a quasi-experimental study in which the participants were selected through convenience sampling and PET test. There were randomly assigned into one experimental group and one control group in order to investigate the research question of the study. The experimental group received specific treatment on lexical inferencing strategies and then the results of the data analysis were compared and contrasted. This study had a pre-test post-test design. The dependent variables were vocabulary depth and breadth and the independent variables was lexical inference strategy.

3.5. Ethical consideration

The researcher asked the participants for their permission to make use of the test data for the study and all the learners were asked to complete a consent form. Learners were ensured that their test scores will be kept strictly confidential and never be associated with their name. In order to ensure confidentiality, the participants' test results were not shared with the institute teachers and administrators for the duration of the study.

4. Results

The pre-tests of vocabulary breadth and vocabulary depth were administered to both groups at the beginning of the study to examine their initial homogeneity with respect to vocabulary breadth and vocabulary depth. Then, the specific treatment was given to the experimental group while the control group received traditional teaching. After ten sessions, both groups took the post-test. The data collected from the vocabulary tests were summed up and the procedures of descriptive statistics (comprising frequencies, means, standard deviations, etc.) along with inferential statistics, namely independent samples t-tests and paired samples t-test, were carried out. Having ensured the normality of the distributions, the researcher ran independent samples t-tests to examine whether there was any significant difference between the two groups in terms of their vocabulary breadth and vocabulary depth before and after the completion of the specific treatment for the experimental group. On the other hand, paired samples t-test investigated the possible differences within groups from the pretest to the posttest. First, the reliability of the vocabulary breadth and vocabulary depth tests was estimated through running Cronbach's Alpha on the results of the vocabulary breadth and vocabulary depth tests obtained from a pilot study with fifteen participants.

The values of reliability (Table 1) were explained according to the reliability standards suggested by Barker, Pistrang, and Elliot (1994)

The estimated values of Cronbach's Alpha, for the vocabulary breadth and vocabulary depth tests came to .77 and .75, respectively, which both were considered "acceptable" values according to the reliability standards suggested by Barker et al.

To ensure the subjects were at the same level of language proficiency, the Preliminary English Test was administered to 67EFL students. The results of the PET test for 67 students are presented in Table 2.

The participants took the structure, vocabulary, and reading comprehension sections of the test with a maximum possible score of 100 points. Forty-five students whose score fell ± 1SD from the mean score were selected as the main sample for the present study. Next, the assumption of t-tests, namely, normality was examined before running the main statistical by computing the Skewness and kurtosis values and obtaining the trimmed means. The results of the analyses in Table 3, indicate the normality of the distributions.

In Table 3, the descriptive statistics for the variables were presented. The 5% Trimmed Mean was calculated. Then, the original means and the new trimmed means were compared to find the possible differences for all the tests. Since the trimmed means and the original mean values were

Table 1. Reliability statistics for the vocabulary breadth and vocabulary depth test

Cronbach's Alpha	N of Items	N of sample
Vocabulary breadth Test .77	40	15
Vocabulary depth Test .75	40	15

Table 2. Statistics for the PET

N	Valid	67
	Missing	0
Mean		39.9701
Median		36.0000
Mode		26.00[a]
Std. Deviation		18.39,052
Variance		338.211
Skewness		.462
Std. Error of Skewness		.293
Kurtosis		−.944
Std. Error of Kurtosis		.578
Range		64.00
Minimum		12.00
Maximum		76.00
Sum		2678.00

a. Multiple modes exist. The smallest value is shown.

not very different for both groups, the values were not too different from the remaining distribution. Furthermore, The Skewness and Kurtosis values reported in Table 3 were all within the range of ±2, confirming that the distributions were normal. Having established the normality assumption, the researcher ran the t-test to answer the research questions. The control group was coded as (1) and the experimental group was coded as (2). The T-Test was run to investigate if there were statistically significant differences in the mean scores of the vocabulary breadth and vocabulary depth test for the two groups in the pretest and the posttest. Table4 displays the results of the descriptive statistics for the pretest and post-test of vocabulary breadth and vocabulary depth.

As it was shown in Table 4, for the vocabulary breadth and vocabulary depth tests that were administered at the beginning of the study, the mean scores for the control and experimental groups were 22.85 ($M_{\text{breadth-control}}$), 20.95($M_{\text{depth- control}}$), 22.54($M_{\text{breadth—experimental}}$), and 21.25($M_{\text{depth—experimental}}$) respectively. Figure 1, displays the comparison between the means of the two groups in the pre-tests of vocabulary breadth and vocabulary depth at the beginning of the study.

As it is illustrated in Figure 1, the means of the both groups in the vocabulary depth and breadth were nearly similar at the beginning of the study. Figure 2, depicts the comparison between the means of the two groups on the post-tests of vocabulary breadth and vocabulary depth at the end of the study.

As it is shown in Figure 2, there seems to be improvement in the vocabulary depth and breadth of both experimental and control groups. However, to check whether the differences between the pre and post-test scores were statistically significant or not, T-Test analyses were run.

Table 3. Descriptive statistics for the vocabulary breadth and vocabulary depth tests

			Experimental	Control
Pretest scores breadth	Mean		22.54	22.85
	95% Confidence Interval for Mean	Lower Bound	20.77	20.75
		Upper Bound	24.30	24.95
	5% Trimmed Mean		22.32	22.61
	Skewness		.94	1.07
	Kurtosis		−.49	−.24
Posttest scores breadth	Mean		26.37	23.09
	95% Confidence Interval for Mean	Lower Bound	24.40	20.81
		Upper Bound	28.34	25.37
	5% Trimmed Mean		26.14	22.77
	Skewness		.92	1.18
	Kurtosis		−.40	.13
Pretest scores depth	Mean		21.25	20.95
	95% Confidence Interval for Mean	Lower Bound	19.51	18.98
		Upper Bound	22.98	22.91
	5% Trimmed Mean		21.10	20.72
	Skewness		.88	1.09
	Kurtosis		−.52	−.13
Posttest scores depth	Mean		24.87	21.23
	95% Confidence Interval for Mean	Lower Bound	23.01	19.23
		Upper Bound	26.73	23.23
	5% Trimmed Mean		24.70	20.98
	Skewness		.92	1.06
	Kurtosis		−.15	−.28

Table 4. Group statistics for the pre and post-test scores of the vocabulary breadth and vocabulary depth test

	Groups	N	Mean	Std. Deviation	Std. Error Mean
Pretest scores breadth	Experimental	24	22.541	4.18	.853
	Control	21	22.857	4.607	1.005
Posttest scores breadth	Experimental	24	26.375	4.670	.953
	Control	21	23.095	5.009	1.093
Pretest scores depth	Experimental	24	21.250	4.099	.836
	Control	21	20.952	4.318	.942
Posttest scores depth	Experimental	24	24.875	4.396	.897
	Control	21	21.238	4.392	.958

To answer the research questions and to investigate the participants' possible progress within groups, paired samples t-tests were run, which showed the subjects' progress from pre-test to the post-test of vocabulary breadth and vocabulary depth that are shown in Tables 5 and 6.

As shown in Table 5, the mean score of the control group for the vocabulary breadth test improved from 22.85 in the pre-test to 23.09 in the post-test; that for the experimental group

Figure 1. The comparison between the two groups (pre-test of vocabulary breadth and depth).

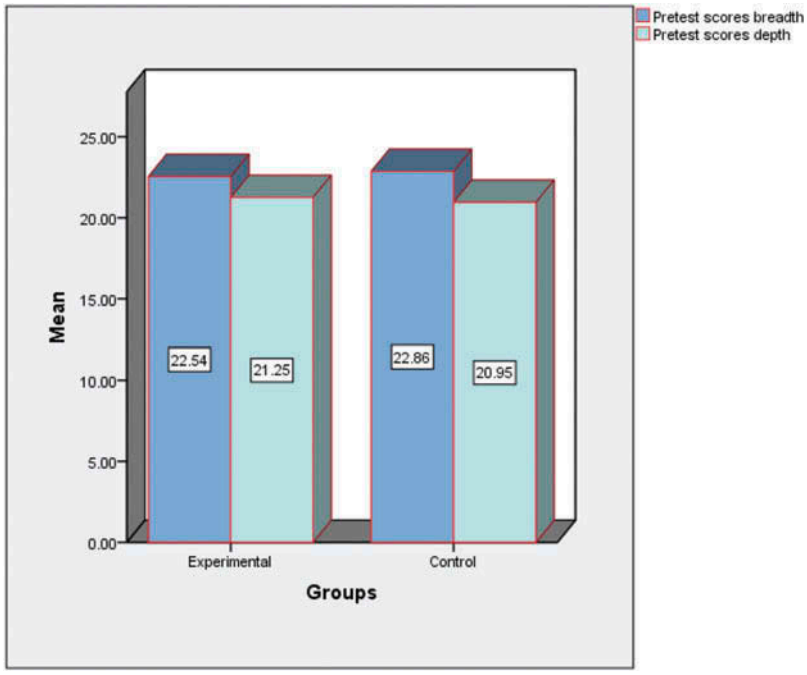
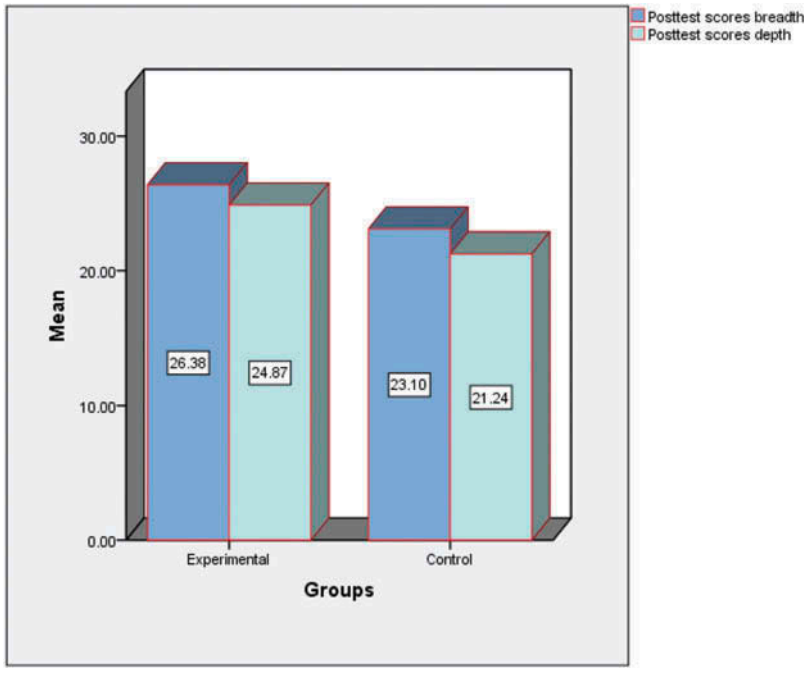


Figure 2. The comparison between the two groups (post-test of vocabulary breadth and depth).



progressed from 22.54 in pre-test to 26.37 in post-test. In addition, the mean score of the control group for the vocabulary depth test improved from 20.95 in pre-test to 21.23 in post-test; that for the experimental group progressed from 21.25 in the pre-test to 24.87 in the post-test. In order to find out if these differences between pre and posttest scores of vocabulary breadth and vocabulary depth were statistically significant, paired samples t-tests were run to the results of the pre and the posttests for both groups. The results are represented in Table 6. Based on the results of the

Table 5. Paired samples statistics for the pre and posttest of vocabulary breadth and vocabulary depth

Groups			Mean	N	SD	Std. Error Mean
Experimental	Pair 1	Pretest scores breadth	22.54	24	4.18	.85
		Posttest scores breadth	26.37	24	4.67	.95
	Pair 2	Pretest scores depth	21.25	24	4.09	.83
		Posttest scores depth	24.87	24	4.39	.89
Control	Pair 1	Pretest scores breadth	22.85	21	4.60	1.00
		Posttest scores breadth	23.09	21	5.00	1.09
	Pair 2	Pretest scores depth	20.95	21	4.31	.94
		Posttest scores depth	21.23	21	4.39	.95

paired samples t-tests, the improvement in terms of vocabulary depth and breadth was statistically significant simply for the experimental group (P ≤ .05).

The mean difference between the pre and posttests (Table 6) for the control group was .23 for the vocabulary breadth test and .28 for the vocabulary depth test. In contrast, the mean difference between the pre and posttests for the experimental group in the vocabulary breadth test amounted to 3.83 and that for the vocabulary depth test came to be 3.62. This implied that the experimental group outperformed the control group in the posttests of vocabulary breadth and vocabulary depth and the progress within the group for the experimental group was higher than that of the control group. This suggested that lexical inference strategy instruction had statistically significant effect on Iranian upper-intermediate EFL learners' vocabulary breadth and vocabulary depth. Besides, the lexical inference strategy instruction had been more effective and successful in developing EFL learners' vocabulary breadth compared to vocabulary depth. Following the paired samples t-test, an independent-samples t-test was run to compare the mean scores, on the continuous variable namely "posttest of vocabulary breadth and vocabulary depth" for the two different groups of participants (control and experimental groups). There was one categorical, independent variable (groups of study) and one continuous dependent variable (posttest scores of the vocabulary breadth and vocabulary depth). The independent-samples t-test explored whether there was a statistically significant difference in the mean scores for the two groups in the pre and posttests. Table 7 presents the results.

In Table 7, for the pretest scores of vocabulary breadth, the findings showed that there was no significant difference in the scores for the *control group* (M = 22.85, SD = 4.60) and the *experimental group* (M = 22.54, SD = 4.18; t (43) = −.24, p = .811, two-tailed). The magnitude of the differences in the means (mean difference = .31, 95% CI: −2.95 to 2.32) was small (Eta squared = .0013). Moreover, for the pretest scores of vocabulary depth, there was no significant difference in the scores for the *control group* (M = 20.95, SD = 4.31) and the *experimental group* (M = 21.25, SD = 4.09; t (43) = .23, p= .814, two-tailed). The magnitude of the differences in the means (mean difference = .29, 95% CI: −2.23 to 2.83) was small (Eta squared = .0012).In other words, the two groups were approximately at the same level of proficiency in terms of their vocabulary breadth and vocabulary depth in the administered tests at the beginning of the study.

Table 6. Paired samples test for the pre and posttest of vocabulary breadth and vocabulary depth

				95% Confidence Interval of the Difference				
Groups	**Paired Differences**	**Mean difference**	**SD**	**Lower**	**Upper**	**t**	**df**	**Sig. (2-tailed)**
Experimental	Pretest breadth – Posttest breadth	-3.83	1.55	-4.48	-3.17	-12.10	23	.000
	Pretest depth – Posttest depth	-3.62	1.17	-4.12	-3.12	-15.14	23	.000
Control	Pretest breadth – Posttest breadth	-.23	.76	-.58	.11	-1.42	20	.171
	Pretest depth – Posttest depth	-.28	.64	-.57	.00	-2.03	20	.055

Table 7. Independent samples test for the two groups on pre and posttest of vocabulary breadth and depth

	Levene's Test for Equality of Variances		*t*-test for Equality of Means					
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Pretest breadth	.21	.64	−.24	43	.811	−.31	−2.95	2.32
Posttest breadth	.06	.79	2.27	43	.028	3.27	.36	6.19
Pretest depth	.04	.84	.23	43	.814	.29	−2.23	2.83
Posttest depth	.03	.84	2.77	43	.008	3.63	.98	6.28

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For the posttests scores, since the P-value in (2-tailed) column was less than .05, there was a significant difference in the mean scores on the dependent variable (posttest scores) for each of the two groups. In this study, the P (2-tailed) value was .028 for the vocabulary breadth and .008 for the vocabulary depth tests. As these values were lower than the required cut-off of .05, it could be concluded that there were statistically significant differences in the mean of the posttest of vocabulary breadth and vocabulary depth for the control group and experimental group at the end of the study. Based on Table 7, ($t_{\text{vocabulary breadth}}$ (43) = 2.27, p = .028, two-tailed; $t_{\text{vocabulary depth}}$ (43) = 2.77, p = .008, two-tailed), the magnitude of the differences in the means (mean difference $_{\text{breadth}}$ = 3.27, 95% CI: .36 to 6.19; mean difference $_{\text{depth}}$ = 3.63, 95% CI: .98 to 6.28) were small (Eta squared $_{\text{breadth}}$ = .1070; Eta squared $_{\text{depth}}$ = .14.81). The guidelines (proposed by Cohen 1988, pp. 284–7) for interpreting this value are . 1 = small effect, .3 = medium effect, .5large effect. Expressed as a percentage, 10.70 percent of the variance in the posttest scores of vocabulary breadth and 14.81 percent of vocabulary depth could be explained by types of instruction. The results showed that the experimental group who received lexical inference strategy instruction outperformed the control group who worked on traditional vocabulary learning in terms of vocabulary breadth and depth. Thus, the findings provided answers to the research questions and implied that lexical inference strategy instruction had a statistically significant effect on Iranian upper-intermediate EFL learners' vocabulary breadth and vocabulary depth.

5. Discussion

This part presents the interpretations of the findings that focus on the importance of developing word knowledge through successful lexical inferencing in an incidental vocabulary learning. This study focused on the question of whether lexical inferencing and guessing the meanings of the unfamiliar words by using context cues affected the students' vocabulary depth and breadth. The analyses of the data revealed that lexical inferencing strategies contributed significantly to enhancing the learners' vocabulary knowledge and that the breadth of vocabulary knowledge was more related to the inferencing success and incidental vocabulary acquisition. In other words, when they tried to make use of contextual clues to infer the meanings of the target words in a text, their vocabulary knowledge progressed in both depth and breadth dimensions but the improvement in vocabulary breadth was higher than the degree of progress in vocabulary depth. This might be related to the fact that teaching vocabulary to foreign language learners in Iranian EFL situation is often limited to expanding learners' vocabulary that is vocabulary breadth. However, depth of vocabulary knowledge should also be established by helping language learners to accumulate vocabulary knowledge through encountering and using words in a variety of different contexts in order to learn the forms, meanings, and uses of words (Nation, I.S.P, 2001).

Therefore, the results of the present study emphasized the fact that learners' use of lexical inferencing strategies affected their vocabulary knowledge. The empirical evidence obtained from the results of the analysis revealed that EFL students who enjoyed instruction on lexical inferencing strategies had higher achievement in terms of their vocabulary depth and breadth than the students did in the control group. These findings are in line with the findings of Nation, I.S.P (2001) study that emphasized the central role of lexical inferencing strategies in improving EFL learners' vocabulary knowledge and thus established the importance of employing appropriate lexical inferencing strategies to derive the meanings of unfamiliar words in improving language learners' vocabulary depth and breadth. Çetinavcı (2013) also reported similar findings suggesting that more successful inferencing took place in the presence of unknown words in a rich-clue context. The findings were also consistent with the findings of AhmadiSafa and Yghobi (2017) who reported that lexical inferencing instruction had a statistically significant effect on EFL learners' reading comprehension development.

Based on the findings of this study, it could be argued that the difference between successful and less successful readers might be related to the degree to which they make use of lexical inferencing strategies when confronting new words. Schmitt and Schmitt (2014) point out the significance of measuring vocabulary in predicting EFL learners' reading comprehension. Therefore,

it is recommended that EFL teachers should increase language learners' awareness of the lexical inference strategies through systematic teaching of strategies and communicate the importance of word knowledge to their students. Yueh Shen and Shi (2009) suggest that a systematic training with a strong vocabulary knowledge for foreign language vocabulary development in both depth and breadth might help EFL learners benefit more. In this regard, explicit teaching of lexical inferencing strategy can be effective in strengthening learners' ability to infer the meaning (Davoudi & Chavosh, 2016). Learning activities that require deep processing of the target vocabulary items can be introduced in language classes so that language learners can acquire different aspects of word knowledge.

6. Conclusion

The current study examined the influence of lexical inference strategies instruction on both vocabulary depth and breadth. The results showed that those students in the experimental group who used different lexical inference strategies to guess the meaning of unfamiliar words excel in covering more vocabulary size. In addition, they were better in deep comprehension of vocabularies. In fact, according to Roskams (1998), advancing guessing strategies can help EFL learners to overcome most of the problems coming from their lack of vocabulary knowledge. Inferential strategies are mostly stressed in academic reading classes for EFL learners since they are challenged all the time with the unknown words in their extensive readings. The main limitation of the study that might affect the generalization of the findings was related to the time allotted to practice inferencing activities before the learners were given vocabulary depth and breadth tests. In other words, due to time restriction and observing the schedule time suggested by the institute to cover the learning materials, the preparatory practice simply lasted ten sessions (30 minutes each session). Consequently, the learners did not have enough opportunity to practice the lexical inferencing strategies. Another limitation of the study concerns with the sample size. The relatively small sample size might negatively affect the results of eth study. Besides, the small sample size limited the study by not allowing investigating some other independent variables such as gender or experiences with the target language out of the class. The pedagogical implication of encouraging lexical inferencing among foreign language learners concerns the importance of the inferencing strategies in involving cognitive and mental effort in language learning. During this cognitive process, the readers try to figure out the meaning of unknown words (Hu & Nassaji, 2014). A further implication is the applicability of top-down reading models (Smith, 1978) and deep levels of processing (Craik & Lockhart, 1972) for the foreign language learners' vocabulary development in which the importance of lexical inferencing and roles played by the reader have been highlighted and emphasized. Finally, further investigation is needed to decide which dimension of vocabulary knowledge has a more prominent role in lexical inferencing and vocabulary development.

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