

## **The Effects of Three Methods of Morphological Awareness on Iranian Intermediate EFL Learners' Breadth and Depth of Vocabulary Knowledge**

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### **Abstract**

Morphological awareness is currently receiving an increasing amount of attention in the literature on second language learning. This study investigated the effect of three methods of morphological awareness (i.e. Textual Enhancement (TE), Metalinguistic Explanation (ME), and Morpheme Recognition Task (MRT)) on Iranian intermediate EFL learners' depth and breadth of vocabulary knowledge. The participants of the study included 90 intermediate EFL students selected based on their scores on the Oxford Quick Placement Test (OQPT). They were divided into three groups (i.e. TE, ME, MRT), each including 30 participants. Each group was taught 60 English derivational affixes including prefixes, suffixes and roots through three different methods of morphological awareness. In order to examine the participants' depth and breadth of vocabulary knowledge, they were asked to respectively take Word Associates Test (WAT) and Vocabulary Levels Test (VLT) as both pretests and posttests. In order to examine the difference between the pretest and posttest scores of the participants' VLT and WAT, a paired-samples t-test was run for each group. In order to explore if there were any significant differences among the posttest scores of the three groups on the VLT and WAT, two separate one-way ANOVAs were conducted. Results indicated that (i) all three methods of morphological awareness have significant effects on improving EFL learners' depth and breadth of vocabulary knowledge, and (ii) that there was no significant difference among the three groups in terms of their depth of vocabulary knowledge, but there were significant differences between the ME group and the other two groups (i.e. TE and MRT) regarding their breadth of vocabulary knowledge. Considering the implications, teachers should raise students' awareness to utilize affixes. Syllabus designers and lexicographers should also take account of different techniques and tasks for raising EFL/ESL learners' morphological awareness.

**Keywords:** Metalinguistic Explanation, Morpheme Recognition Task, Morphological Awareness, Textual Enhancement

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## 1. Introduction

In recent years, there has been a surge of interest in morphological awareness as one linguistic awareness skill that influences learners' vocabulary knowledge and reading comprehension. Due to the central role of morphological awareness in learners' language development, it is essential to present a consensus definition of morphological awareness. Morphological awareness refers to the ability to identify morphemes and morphological structure of words (Carlisle, 2003; Kuo & Anderson, 2006). According to Carlisle (2003), morphological awareness takes account of the smallest units of meaning in languages, including base words and affixes, which involve prefixes, suffixes, inflectional, and derivational morphemes. Inflectional morphemes make changes in base words depending on their time, number, or aspect (e.g., *put* to *puts* or *book* to *books*). Derivational morphemes, on the other hand, make changes in base words depending on their meanings, word class, or word clusters (e.g., *happy* to *unhappy* or *sing* to *singer*).

In a bid to help learners to gain power in processing and organizing their own lexis, researchers and teachers have proposed different vocabulary learning strategies, one of which is the use of morphological awareness as one of the possible vocabulary learning strategies. It comes to support learners while they are challenged with the meanings of new words. In spite of little ink spilled on the research concerning the role of morphological awareness in L2 vocabulary development, the findings show that morphological awareness may particularly assist in vocabulary construction (Carlisle, 2000; Kuo & Anderson, 2006).

Several researchers (Qian, 1999, 2002; Read, 2000; Vermeer, 2001; Wolter, 2001, among many others) have examined *breadth* and *depth* of vocabulary knowledge as the main constituents of learners' vocabulary knowledge. Vocabulary breadth pertains to the number of words a learner has built up which is the passive recognition of the words, while vocabulary depth deals with what the learner knows about these words, including word associates, collocations, derivations, colligations or word's function. Shen (2008) argues that vocabulary breadth deals with the number of words a learner at least can recognize and some surface knowledge of their meaning. Depth of vocabulary knowledge refers to a learner's knowledge of various aspects of a word, or how well the learner knows and can use the word. Studies conducted on the relationship between morphological awareness and L2 vocabulary development suggest that knowledge of morphology is closely pertinent to vocabulary knowledge (Blachowicz, 2006; Carlisle & Fleming, 2003).

Regarding the impact of morphological awareness on *second* language learning, very few studies have been conducted. The present study,

however, departed from the previous studies in the literature in that (i) it investigated the effect of morphological awareness on L2 learners' depth of vocabulary knowledge as well as their breadth of vocabulary knowledge, (ii) it examined the effect of morphological awareness on learning less common affixes and roots, (iii) and that three new methods (i.e. Textual Enhancement (TE), Metalinguistic Explanation (ME) and Morpheme Recognition Task (MRT)) were used to impart the learners with morphological awareness. Accordingly, the current study sought to answer the following research questions:

1. Does each of the Textual Enhancement (TE), Metalinguistic Explanation (ME), and Morpheme Recognition Task (MRT) methods significantly affect the breadth of Iranian intermediate EFL learners' vocabulary knowledge?
2. Does each of the Textual Enhancement (TE), Metalinguistic Explanation (ME), and Morpheme Recognition Task (MRT) methods significantly affect the depth of Iranian intermediate EFL learners' vocabulary knowledge?
3. Do the effects of the three types of treatments (i.e. Textual Enhancement (TE), Metalinguistic Explanation (ME), and Morpheme Recognition Task (MRT)) on the breadth of Iranian intermediate EFL learners' vocabulary knowledge differ significantly?
4. Do the effects of the three types of treatments (i.e. Textual Enhancement (TE), Metalinguistic Explanation (ME), and Morpheme Recognition Task (MRT)) on the depth of Iranian intermediate EFL learners' vocabulary knowledge differ significantly?

## 2. Literature Review

As evidenced in the literature, the contribution of morphological awareness to vocabulary knowledge is primarily based on L1 studies on monolingual children, especially English-speaking children (e.g. Kieffer & Lesaux, 2012). As for L2 learning, few studies have addressed the effect of L2 learners' morphological awareness on their vocabulary knowledge (e.g. Harraqi, 2017; Kieffer & Lesaux, 2012; Long & Rule, 2004; Nurhemida, 2007, Tabatabaei & Yakhabi, 2011; Varatharajoo, Asmawi, Abdallah, & Abedalaziz, 2015).

Long and Rule (2004) investigated the role of teaching morpheme or root word families in ESL learners' vocabulary learning. The participants learned the morphemes (eg. *oct*, *ped*, *tele*, *quad*, *cycle*, *man*, *meta*, and *dict*) in a repeated measures counterbalanced pretest/posttest design. Two groups were required to learn vocabulary items through (i) traditional worksheet and (ii) two types of object boxes with word cards. The first type of box involved word cards, definition cards, part of speech cards, and objects that indicated

the words. The learners were required to make a layout of the objects and word cards to indicate an understanding of how they are related to each other. The second type of box included word cards, each morpheme in each word had a card, and the definitions of each morpheme were also put onto separate cards. The first type of object box was completed before the second type by the learners. Students showed improvements in both conditions. This study illustrated that the learners gained better improvement in vocabulary acquisition via object boxes than traditional worksheet methods. The results disclosed that the learners could enhance their lexical knowledge by means of morphological analysis rather than traditional instruction methods.

A study by Nurhemida (2007) included 98 students (29 males and 69 females) at a public Islamic senior high school in Indonesia. Three instruments were employed to collect data, including Nation's vocabulary levels test (VLT) used to measure learners' knowledge of vocabulary as well as another tool utilized to explore two morphological awareness tasks (i.e. Morpheme Identification Task and Morphological Structure Test) among learners. Finally, a 10-item questionnaire was utilized to derive information concerning learners' perceptions of the test and their knowledge of vocabulary. The results revealed that there was a correlation between morphological awareness test scores and the scores of vocabulary knowledge.

Tabatabaei and Yakhabi (2011) examined the correlation between morphological awareness and vocabulary knowledge of Iranian high school students. Nation's Vocabulary Level Test (VLT) was administered to measure students' vocabulary knowledge drawn from the 2000, 3000 and 5000 most frequent occurring word families. Morpheme Identification Task and Morphological Structure Test were also utilized as two morphological awareness tasks to measure students' morphological awareness. The results suggested that the students performed better at the 2000-word level than the 3000- and 5000-word levels, and that there was a significant relationship between the learners' performance on the VLT and the morphological awareness tasks.

Kieffer and Lesaux (2012) conducted a study to look into the relation between the two literacy-related skills of morphological awareness and vocabulary knowledge. In their studies, they used a four-time-point longitudinal data collection procedure, following 90 Spanish-speaking language minority students from the fourth through seventh grade. Using both standardized and researcher-created tools, the results of the study showed that vocabulary growth was correlated with morphological knowledge growth.

Varatharajoo et al. (2015) explored the effect of morphological analysis awareness on ESL students' vocabulary acquisition. The study was a

quasi-experimental one, including 100 ESL secondary school students in three groups: two experimental groups (i.e. inflectional and derivational) and one control group. Two tests were administered to gauge the students' vocabulary learning: Morph-Analysis Test and Morph-Vocabulary Test. The results indicated that the two experimental groups gained significant improvement on the two tests after the treatment period. However, the inflectional group revealed a fairly higher score compared to the derivational group. Hence, the outcomes of the research suggest that morphological analysis awareness can be regarded as a main alternative strategy for enhancing ESL learners' vocabulary knowledge.

Harraqi (2017) investigated the relationship between knowledge of derivational morphemes and breadth of vocabulary knowledge. Two tests of X-Lex Vocabulary Size Test and Derivational Morphemes Test were administered to 130 university students. The results indicated that there was a positive significant relationship between knowledge of derivational morphemes and breadth of vocabulary knowledge.

### **3. Method**

#### **3.1. Design of the Study**

In this study, a quasi-experimental pretest/posttest design with a quantitative method was utilized to investigate the effect of three methods of morphological awareness (i.e. Textual Enhancement (TE), Metalinguistic Explanation (ME), and Morpheme Recognition Task (MRT)) on developing L2 learners' depth and breadth of vocabulary knowledge. In other words, the independent variable of the study was the type of treatment (i.e. TE, ME, and MRT) and the dependent variables were the breadth and depth of L2 learners' vocabulary knowledge.

#### **3.2. Participants**

The participants were selected based on a convenience sampling procedure from an intact cohort of undergraduate students majoring in Translation Studies at Islamic Azad University of Isfahan, Isfahan, Iran. For the sake of participant mortality, at the beginning of the study, 200 students from different classes were included as the population of the study. Since the focus of the study was on intermediate EFL learners, the Oxford Quick Placement Test (OQPT) was administered to the 200-student population in order to make sure about the students' proficiency level. Out of the 200 students, 120 students, whose scores fell between 30 and 47, turned out to be at the intermediate level. Ninety students were randomly selected from among the intermediate students and considered as the final participants of the study. After assuring that all participants were homogenized so that they

were all at the intermediate level of proficiency, 30 students were assigned to the Textual Enhancement (TE) group, 30 students to the Metalinguistic Explanation (ME) group, and another 30 students to the Morpheme Recognition Task (MRT) group.

### 3.3. Materials and Instruments

To carry out the research, the participants of the study were taught the less frequent and useful affixes, involving roots, prefixes, and suffixes embedded in the sentences via three morphological awareness methods (i.e. Textual Enhancement (TE), Metalinguistic Explanation (ME), and Morpheme Recognition Task (MRT)). The materials for this study involved sixty affixes, including 20 roots (e.g. cred, dict, temp, tract, chron, dorm, hydro, spect, cide, aud, etc.), 20 prefixes (e.g. ante-, micro-, hyper-, mal-, para-, retro-, macro-, mono-, cardi-, quadri-, etc.), and 20 suffixes (e.g. -ate, en, -esque, -ee, -let, -ish, -ics, -ery, -hood, -ary, etc.), selected from the most popular dictionaries such as Cambridge Advanced Learners' Dictionary and Longman Dictionary of Contemporary English, and the book '*Word Formation*' (Sinclair, 1991).

Each session, the whole sixty roots, prefixes, and suffixes embedded in sentences were taught to the three groups of learners. In other words, the three groups received the same affixes but with different methods of morphological awareness. Moreover, the selected affixes used in the sentences were the same in all five sessions of presenting treatments but they were used in different examples. Practically speaking, the participants in the TE group were taught the affixes embedded in the sentences via underlining and bold typing. In the ME group, the participants were given a list of the affixes with explanations and their usages which were adopted from the book '*Word Formation*' (Sinclair, 1991). Finally, in the MRT group, the participants were required to parse the same words, used in the sentences, into their constituent morphemes and infer the meaning of each affix or root without the help of the instructor.

#### 3.3.1. Oxford Quick Placement Test (QPT)

To ensure that all participants under investigation were at the intermediate level of language proficiency, the Oxford Quick Placement Test (OQPT, version 1) was used. The participants were required to answer this 60-item test in 30 minutes. According to the rubric of the OQPT for the score bands, scores ranging from 0 to 29 represent the elementary level, scores falling between 30 and 47 are considered to be at the intermediate level, and scores between 48 and 60 are taken to be at advanced proficiency level.

### 3.3.2. *Vocabulary Levels Test (VLT)*

In this study, a validated version of the Vocabulary Levels Test (VLT) (Schmitt, Schmitt, & Clapham, 2001) was administered to measure the students' receptive vocabulary knowledge. The test was chosen because it is frequently used in other studies, and it is easy to administer and score. There is evidence available regarding the validity of the test as an instrument for measuring the breadth (size) of vocabulary knowledge (Shen, 2008). This vocabulary test has two versions with the same level of difficulty (Schmitt et al., 2001). The second version of the test was administered in the present study. Version 2 has five word levels, ranging from high-frequency to low-frequency words (i.e., 2,000-word level, 3,000-word level, 5,000-word level, 10,000-word level, and academic vocabulary level). The test items include matching words and word meanings. For instance:

- |             |     |                            |
|-------------|-----|----------------------------|
| 1. business | ___ | part of a house            |
| 2. clock    | ___ | animal with four legs      |
| 3. horse    | ___ | something used for writing |
| 4. pencil   |     |                            |
| 5. shoe     |     |                            |
| 6. wall     |     |                            |

The participants are required to match the three short definitions on the right with three of the six words on the left. As for the scoring procedure, each correctly selected word is given one point. Given that there are 5 levels, and each level comprises 30 correct choices, the maximum score is 150. However, due to the difficulty of low-frequency words for the intermediate EFL participants of the present study, the 10,000-word level and academic vocabulary level were factored out from the test. As far as the literature is concerned, the 10,000-word level is believed to be appropriate for learners with near-native proficiency, and is rarely used in EFL contexts (e.g. Laufer & Ravenhorst-Kalovski, 2010). Consequently, the vocabulary items involved in the first three levels (i.e. 2,000-word level, 3,000-word level, 5,000-word level) were used in this study; hence, the maximum possible score was 90.

### 3.3.3. *Word Associates Test (WAT)*

The Word Associates Test (WAT) (Read, 2000, 2004) was employed to measure the depth of EFL learners' vocabulary knowledge. This test is a 40-item multiple-choice test, with a reliability of .93 as reported by Read (2000, 2004). As Read (2004) puts, the target word and its associates on WAT are "paradigmatic (super-ordinates, synonyms), syntagmatic (collocates) and analytic (words representing a key element of the meaning of the target word)" (p. 221). The fourth version of this test was employed in this study in order to measure the EFL learners' ability in recognizing the

collocational, synonymous, part-whole, or whole-part relationship between a stimulus word (adjective) and eight options.

### **3.4. Procedure**

In this study, a quasi-experimental design with a quantitative procedure was taken into consideration for data collection and analysis. This study sought to investigate the impact of three methods of morphological awareness (i.e. TE, ME, MRT) on Iranian intermediate EFL learners' breadth and depth of vocabulary knowledge. Accordingly, in the current study, the following procedure was applied to address the research questions.

In order to have a homogeneous sample of participants with the same language proficiency level, a 200-student population was required to take the Oxford Quick Placement Test (OQPT). One hundred and twenty students out of 200 students, whose scores fell between 30 and 47, turned out to be at the intermediate level. Finally, 90 students were randomly selected from among the 120 intermediate students. The sample of 90 participants under investigation was divided into three groups; each group consisted of 30 EFL intermediate learners.

Before the treatment period, the participants were asked to take Vocabulary Levels Test (VLT) and Word Associates Test (WAT) as pretests. The former was used to measure the learners' breadth of L2 vocabulary knowledge and the latter was utilized to assess the depth of their vocabulary knowledge.

In order to develop learners' morphological awareness, three methods of Textual Enhancement, Metalinguistic Explanation, and Morpheme Recognition Task were used as treatment to teach derivational morphemes to the three groups of students. For learning and teaching derivational morphology through Textual Enhancement (TE), the first group of participants was exposed to five twenty-minute sessions of teaching derivational form of words. In each session, 20 prefixes, 20 suffixes and 20 roots were taught via underlining and bold-typing. The second group of participants received instruction on the same suffixes, prefixes, and roots, as taught to the TE group, through Metalinguistic Explanation (ME) method. Five sessions were needed to teach the morphemes. Finally, the third group of participants was taught the same prefixes, suffixes, and roots through Morpheme Recognition Task (MRT), which required the learners to analyze the words into their components and infer the meaning of each affix or root on their own.

Finally, the researcher administered the WAT and VLT posttests to see if each type of treatment has been effective in improving the learners' depth and breadth of vocabulary knowledge, and to compare the development

of depth and breadth of vocabulary knowledge across the three types of treatment. In so doing, the WAT and VLT tests, utilized as the pretests, were also employed as the posttests.

## 4. Results and Discussion

### 4.1. Results

#### 4.1.1. Results of the Oxford Quick Placement Test (OQPT)

As it was stated, to ensure that all of the participants in the study had the same level of English language proficiency prior to the treatment, the Oxford Quick Placement Test (OQPT) was administered. This test includes 60 items, with a score range of 0 to 60. Based on the rubric of OQPT, 90 learners whose scores fell between 30 and 47 were considered to be at the intermediate level and were randomly assigned to three group: TE, ME and MRT. As shown in Table 1, the TE ( $X = 42.96$ ,  $SD = 2.68$ ), ME ( $X = 42.23$ ,  $SD = 2.32$ ) and MRT ( $X = 42.57$ ,  $SD = 2.71$ ) groups had nearly the same mean scores and standard deviations on the OQPT, suggesting that the three groups were homogenized before the treatment.

Table 1

*Descriptive Statistics of OQPT Scores of the Three Groups of Participants*

Group	N	Mean	Std. Deviation	Variance
Textual Enhancement (TE)	30	42.96	2.68	7.18
Metalinguistic Explanation (ME)	30	42.23	2.32	7.38
Morpheme Recognition Task (MRT)	30	42.57	2.71	7.34

#### 4.1.2. Effect of the TE, ME, and MRT Methods on Breadth of Vocabulary Knowledge

The first research question explored if each of the Textual Enhancement (TE), Metalinguistic Explanation (ME), and Morpheme Recognition Task (MRT) methods significantly affected the breadth of Iranian intermediate EFL learners' vocabulary knowledge. The descriptive statistics (i.e. mean and standard deviation) for the pretest and posttest scores of the three groups of participants on the Vocabulary Levels Test (VLT) are presented in Table 2.

As illustrated in Table 3, a series of paired-samples t-tests were conducted to compare the pretest and posttest scores of the Textual Enhancement (TE), Metalinguistic Explanation (ME), and Morpheme Recognition Task (MRT) groups in order to measure the effect of each method on Iranian intermediate EFL learners' breadth of vocabulary knowledge.

Table 2

*Descriptive Statistics of the Pretest and Posttest Scores of the Three Groups on VLT*

Group		N	Mean	Std. Deviation
Textual Enhancement (TE)	Pretest	30	58.17	17.08
	Posttest	30	70.90	13.66
Metalinguistic Explanation (ME)	Pretest	30	58.73	17.40
	Posttest	30	63.27	14.43
Morpheme Recognition Task (MRT)	Pretest	30	59.53	17.59
	Posttest	30	71.73	12.26

Table 3

*Paired-Samples T-Tests Comparing the Pretest and Posttest Scores of the TE, ME, and MRT Groups on VLT*

Group	Paired Differences						t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
TE	-12.73	9.81	1.79	-16.39	-9.07	-7.11	29	.00	
ME	-13.53	12.86	2.35	-18.33	-8.73	-5.77	29	.00	
MRT	-12.20	10.96	2.00	-16.29	-8.11	-6.09	29	.00	

The results show that the breadth of the learners' vocabulary knowledge in the TE group significantly improved from the pretest ( $M = 58.17$ ,  $SD = 17.08$ ) to posttest ( $M = 70.90$ ,  $SD = 13.66$ ),  $t(29) = -7.11$ ,  $p < .00$ . The breadth of the learners' vocabulary knowledge in the ME group also significantly improved from the pretest ( $M = 58.73$ ,  $SD = 17.40$ ) to posttest ( $M = 63.27$ ,  $SD = 14.43$ ),  $t(29) = -5.77$ ,  $p < .00$ . Similarly, the MRT method significantly improved the breadth of the learners' vocabulary knowledge from the pretest ( $M = 59.53$ ,  $SD = 17.59$ ) to posttest ( $M = 71.73$ ,  $SD = 12.26$ ),  $t(29) = -6.09$ ,  $p < .00$ . Overall, the results of all three groups suggest that Textual Enhancement (TE), Metalinguistic Explanation (ME), and Morpheme Recognition Task (MRT) developed the breadth of the learners' vocabulary knowledge as evinced by their VLT scores.

*4.1.3. Effect of the TE, ME, and MRT Methods on Depth of Vocabulary Knowledge*

The second research question examined if each of the Textual Enhancement (TE), Metalinguistic Explanation (ME), and Morpheme Recognition Task (MRT) methods had significant impacts on the depth of Iranian intermediate EFL learners' vocabulary knowledge. Prior to conducting the relevant inferential statistics, the descriptive statistics (i.e. mean and standard deviation) for the pretest and posttest scores of the three groups of participants on the Word Associates Test (WAT) are presented in Table 4 in the following:

Table 4

*Descriptive Statistics of the Pretest and Posttest Scores of the Three Groups of Participants on WAT*

Group		N	Mean	Std. Deviation
Textual Enhancement (TE)	Pretest	30	74.20	27.43
	Posttest	30	92.00	26.87
Metalinguistic Explanation (ME)	Pretest	30	73.33	26.78
	Posttest	30	91.40	25.93
Morpheme Recognition Task (MRT)	Pretest	30	72.93	25.94
	Posttest	30	92.43	24.67

As shown in Table 5, a series of paired-samples t-tests were run to compare the pretest and posttest scores of each of the three groups in order to measure the impact of each method on the learners' depth of vocabulary knowledge.

Table 5

*Paired-Samples T-Tests Comparing the Pretest and Posttest Scores of the TE, ME, and MRT Groups on WAT*

Group	Paired Differences						t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
TE	-17.80	20.88	3.81	-25.57	-10.00	-4.67	29	.00	
ME	-21.57	17.25	3.15	-28.00	-15.12	-6.85	29	.00	
MRT	-26.50	19.02	3.47	-33.60	-19.39	-7.63	29	.00	

The results show that the TE method significantly improved the depth of the learners' vocabulary knowledge from the pretest (M = 74.20, SD = 27.43) to posttest (M = 92.00, SD = 26.87),  $t(29) = -4.67$ ,  $p < .00$ . The ME method also significantly improved the depth of the learners' vocabulary knowledge, as shown by the increase in learners' scores from the pretest (M = 73.33, SD = 26.78) to posttest (M = 91.40, SD = 25.93),  $t(29) = -6.85$ ,  $p < .00$ . Similarly, the MRT method significantly affected the learners' depth of vocabulary knowledge, as evinced by the increase from pretest scores (M = 72.93, SD = 25.94) to posttest scores (M = 92.43, SD = 24.67),  $t(29) = -7.63$ ,  $p < .00$ .

#### *4.1.4. Comparative Effect of the TE, ME, and MRT Methods on Breadth of Vocabulary Knowledge*

The third research question addressed if there was a significant difference among the effects of the three methods of morphological awareness (i.e. TE, ME, MRT) on the breadth of Iranian intermediate EFL learners' vocabulary knowledge. Therefore, a one-way between-groups analysis of variance (ANOVA) was employed to compare the impact of the

three methods of morphological awareness on the learners' breadth of vocabulary knowledge. As illustrated in Table 6, there is a statistically significant difference at the  $p < .05$  level among the TE, ME, and MRT methods:  $F(2, 87) = 7.17, p = .00$ .

Table 6

*One-way Between-Groups ANOVA Comparing the Posttest VLT Scores of the Three Groups*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3416.47	2	1708.23	7.17	.00
Within Groups	20726.43	87	238.23		
Total	24142.90	89			

Since a significant difference was found in the one-way between-groups ANOVA results, a post-hoc Scheffe test was run to show exactly where the differences among the posttest VLT scores of the three groups occur:

Table 7

*Post-Hoc Scheffe Test Indicating the Point of Difference among the Posttest VLT Scores of the Three Groups*

		Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
TE	ME	12.63*	3.98	.00	2.71	22.56
	MRT	-.83	3.98	.98	-10.76	9.09
ME	TE	-12.63*	3.98	.01	-22.56	-2.71
	MRT	-13.47*	3.98	.00	-23.39	-3.54
MRT	TE	.83	3.98	.98	-9.09	10.76
	ME	13.47*	3.98	.00	3.54	23.39

\*. The mean difference is significant at the 0.05 level.

Looking down Table 7, the column labeled *Mean Difference*, we could see asterisks (\*) next to some of the values listed. This means that the two groups being compared are significantly different from one another at the  $p < .05$  level. The exact significance value is given in the column labeled *Sig.* Post-hoc comparisons using the Scheffe test indicated that there was a significant difference between the TE and ME groups as well as the ME and MRT groups. The only groups which were not significantly different in terms of the development of their breadth of vocabulary knowledge were the TE and MRT groups ( $p > 0.05$ ).

#### 4.1.5. Comparative Effect of the TE, ME, and MRT Methods on Depth of Vocabulary Knowledge

The fourth research question explored if there was a significant difference among the effects of the three methods of morphological awareness (i.e. TE, ME, and MRT) on the depth of Iranian intermediate EFL learners' vocabulary knowledge. Accordingly, a one-way between-groups analysis of variance (ANOVA) was used to compare the effect of three methods on the learners' depth of vocabulary knowledge. As seen in Table 8, there is no statistically significant difference among the three methods in terms of the development of the learners' depth of vocabulary knowledge:  $F(2, 87) = .86, p = .43$ .

Table 8

*One-way Between-Groups ANOVA Comparing the Posttest WAT Scores of the Three Groups*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1201.49	2	600.74	.86	.43
Within Groups	60804.57	87	698.90		
Total	62006.06	89			

## 4.2. Discussion

The main concern of this study was to figure out the effect of three methods of morphological awareness (i.e. Textual Enhancement, Metalinguistic Explanation, and Morpheme Recognition Task) on Iranian intermediate EFL learners' breadth and depth of vocabulary knowledge. Due to the significance of derivational morphology, the center of attention of treatments was on derivational morphology.

Regarding the findings of the first research question, it turned out that the use of textual enhancement (TE) method, including underlining and bold typing, was effective in enhancing the learners' breadth of vocabulary knowledge. Additionally, by utilizing the metalinguistic explanation (ME) method, the learners could delve into different affixes and roots. As a result, via explaining how to construct the words by means of affixes/roots, they were enabled to learn different vocabulary items and their parts of speech through analyzing each word into its constituents. The most remarkable finding of the first research question pertain to the effect of morpheme recognition task (MRT) method through which the learners were required to recognize different affixes/roots and underline them. It was the most unexpected finding of the first research question because the learners developed the breadth of their vocabulary knowledge independent of the instructor. Overall, both implicit (i.e. TE and MRT) and explicit (i.e. ME) types of treatment developed EFL learners' breadth of vocabulary knowledge.

The findings of the first research question are consistent with the results of the study conducted by Long and Rule (2004), in which ESL

learners could enhance their lexical knowledge through morphological analysis rather than traditional instruction methods. The results also match the studies conducted by Nurhemida (2007), Tabatabaei and Yakhabi (2011) and Harraqi (2017), in which there is a positive correlation between morphological awareness and breadth of vocabulary knowledge. The findings are also in agreement with that of Kieffer and Lesaux (2012), who concluded that vocabulary growth was correlated with morphological knowledge growth.

Although in the current study only the effect of derivational morphology was considered, in one study conducted by Varatharajoo et al. (2015), both inflectional and derivational morphology were employed in two groups. In their study, it was endeavored to explore the effect of morphological analysis awareness on ESL secondary school students' vocabulary acquisition. The results indicated that the two groups under investigation had remarkable improvement on the test related to derivational morphology. Yet, the inflectional group showed higher score compared to the derivational group. But all in all, similar to the results of the present study, it was found that morphological awareness can be considered as a central strategy for boosting ESL secondary school students' English vocabulary.

Concerning the results of the second research question, it turned out that the employment of TE method involving highlighting, underlining and also bolding typing was effective in developing the learners' depth of vocabulary knowledge. More specifically put, TE enabled learners to expand their vocabulary knowledge, including the knowledge of collocational, synonymous, part-whole, or whole-part relationships as evinced by the Word Associates Tests (WAT). Additionally, by employing the ME method, the EFL learners could get familiar with different affixes and roots. Therefore, they were capable of learning collocational, synonymous, part-whole, or whole-part relationships. The most interesting finding of the second research question pertained to the effect of MRT, by which the participants were asked to identify and underline different affixes/roots independent of the teacher. MRT proved to affect the depth of Iranian intermediate EFL learners' vocabulary knowledge. As evidenced in the literature, the effect of morphological awareness on depth of vocabulary knowledge is not taken into account. As a result, to fill the gap in the literature, in one part of the current study it was endeavored to discover the effect of three methods of morphological awareness on EFL learners' depth of vocabulary knowledge.

The third research question examined if there was a significant difference among the three groups in terms of the breadth of their vocabulary knowledge. Based on the results, it was found that there was a significant difference between the ME and TE groups as well as the ME and MRT

groups. Contrary to our expectation, TE and MRT groups were the only groups which were not significantly different, suggesting that the implicit methods (i.e. TE and MRT) exceeded the explicit method (i.e. ME) in developing the learners breadth of vocabulary knowledge (i.e. TE = MRT > ME).

The fourth research question investigated if there was a significant difference among the three groups in terms of the depth of their vocabulary knowledge. According to the results, it was shown that there was no significant difference among the posttest scores of WAT of the three groups of TE, ME, and MRT. In other words, none of the methods was superior to the other one regarding the improvement of EFL learners' depth of vocabulary knowledge.

## 5. Conclusion and Implications

The present study added to the body of literature by examining the effect of three different methods of morphological awareness (i.e. Textual Enhancement (TE), Metalinguistic Explanation (ME), and Morpheme Recognition Task (MRT)) on Iranian intermediate EFL learners' breadth and depth of vocabulary knowledge. The results indicated that (i) all three methods of morphological awareness have significant effects on improving EFL learners' depth and breadth of vocabulary knowledge, and (ii) that there was no significant difference among the three groups in terms of their depth of vocabulary knowledge, but there were significant differences between the ME group and the other two groups (i.e. TE and MRT) regarding their breadth of vocabulary knowledge. The study departed from the literature by including three methods of morphological evidence which were not found in previous studies in the literature. Moreover, the study focused on less common affixes in order to increase the internal validity of the study and see the real effect of the three methods on the learners' morphological awareness.

Overall, the results revealed the contributory role of morphological knowledge to vocabulary learning, which implies that the teachers should introduce morphological knowledge to the learners in order to increase their lexical knowledge. At the outset, teachers could provide explicit instruction or textual enhancement, and then ask the learners to apply morpheme recognition when faced with new vocabulary items.

In light of the findings of the present study, there are some pedagogical implications for teachers, syllabus designers, and lexicographers. By using implicit and explicit methods of teaching different morphemes, teachers should raise students' awareness to utilize less common affixes and roots in order to enhance their vocabulary knowledge. In a similar vein, syllabus designers should take account of different techniques and tasks for

raising EFL/ESL learners' morphological awareness. Moreover, lexicographers should also provide different examples for less common affixes embedded in relevant dictionary entries.

Although the findings of the present study illuminated the significance of morphological awareness on EFL learners' vocabulary knowledge, there were some limitations in this regard. First, applying all 20 prefixes, 20 suffixes, and 20 roots in each session was time-consuming so that sometimes due to the lack of time and abundant material to cover, the process was tedious and slow. Secondly, since it was endeavoured to cover less common affixes and roots, finding a number of authentic context-based examples for some of the affixes and roots was demanding. Thirdly, the convenience sampling procedure used for choosing the initial cohort of participants of the study somehow jeopardized the generalizability of the results. Fourthly, as the study was conducted in an academic setting, there were some limitations in terms of the number of the treatment sessions.

Future studies should assess the impact of morphological awareness on the development of different language skills such as listening, reading, speaking and writing. Moreover, other techniques and methods for teaching derivational morphemes could be examined and compared and contrasted with the ones investigated in the present study. Further research is also needed to better understand the influence of morphological awareness on EFL learners' inflectional morphology. Future studies could concentrate on how the L1 knowledge of derivational and inflectional morphology affects the process of learning English morphology.

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