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The Effect of Definition, Fill-in-the-Blank, and Sentence Writing Exercises on the Acquisition, Retention, and Production of Lexical vs. Grammatical Collocations

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Abstract

It is widely acknowledged that collocations play a crucial role in second or foreign language learning by enabling learners to know more about language chunks and lexical strings. Although many studies have examined L2 learners' collocational competence, comparatively less research has been carried out to probe into the effective instruction and exercises for enhancing the acquisition, retention, and production of lexical (e.g. *make a mistake***) vs. grammatical (***on purpose***) collocations. Therefore, the present study attempted to explore the effect of L2 definitions, fill-in-the-blanks, and sentence writing exercises on the acquisition, retention, and production of lexical vs. grammatical collocations. The data were collected from 66 EFL participants who were studying English at a private language institute. First, an Oxford Placement Test (OPT) was given to homogenize the learners. Then, the participants were divided into three groups, each receiving one of the three different types of exercises including definitions, fill-in-the-blanks, and sentence writing exercises. Data analysis using multivariate ANOVA (MANOVA) indicated that**

learners who received the sentence writing treatment significantly outperformed those learners who received definition and fill-in-the-blank exercises in the acquisition, retention, and production of lexical vs. grammatical collocations. Moreover, fill-in-the-blanks could help the participants learn, retain, and remember both types of collocations significantly better than the L2 definitions. These findings have some pedagogical implications for learning and teaching lexical and grammatical collocations.

Keywords: Fill-in-the-blanks, Grammatical Collocations, L2 Definitions, Lexical Collocations, Production, Retention, Vocabulary Acquisition, Writing Exercises

Collocations have been taken into account as broad phenomena in English with a large number of definitions, the idea of which was first proposed by Firth (1957). They are used widely in spoken or written corpora having a variety of definitions; all sharing the co-occurrence as a central and inevitable element. They have been, for example, defined by Wray (2002) as one of the multifarious types of multi-word items and by Robins (2000) as "the habitual association of a word in a language with other particular words in sentences" (pt 64)e Lewis (2006) argued for the existence of a significant distinction between vocabulary and collocations. Within the field of vocabulary, words are considered single items, but in the collocational field, words are multi-word items coming together.

Moreover, Halliday and Hasan (2001) argue that collocations are multi-word units that have a strong tendency to join together and co-occur in the same lexical environments. For example, the word *teacher* implies some associated words like *student*, *school*, *classroom*, etc. Although there are various definitions for collocations, and many researchers and practitioners have not come to a fixed description of it, most researchers prefer the

definition and description proposed by Nattinger and DeCarrico (1992), who stated that "collocations are strings of words that seem to have a certain mutual expectancy or a greater-than chance likelihood that they will co-occur in any text" (p. 12). The reason for adopting such a definition is its broadness to cover all types of language chunks. Collocations are fixed structures falling into two major categories: grammatical and lexical collocations. Grammatical collocations include words such as verbs, adjectives, or nouns combined with a preposition or a grammatical structure such as *believe in, on purpose, in fact*, etc., but lexical collocations include content words and are made up of verbs, adjectives, nouns, and adverbs in various combinations like *make a mistake, set an alarm, take an oath*, etc.

Teaching collocations has been given top priority in recent years, and there have been several surveys on teaching collocations as one of the most significant aspects of language learning (e.g. Lewis, 2000; Nesselhauf, 2005; Wu, 2015). For many L2 learners, it is common to confront the difficulties of using collocations that happen even with those learners who are at advanced levels (Nesselhauf, 2003; Wray, 2000). The reason for such difficulties, as Wray (2005) maintained, is that many EFL learners are not sufficiently exposed to L2 language, so frequent exposures make learners familiar with L2 collocations and aid them to achieve collocational knowledge proficiency; therefore, the major steps in teaching collocations are consciousness-raising and frequent exposure (Lewis, 2002; Thornbury, 2002).

Numerous studies have focused on collocations as an imperative part of language acquisition (e.g. Hsu & Chiu, 2008; McCarthy, 2004a; McCarthy & O'Dell, 2005). They have not called upon the effective exercises for learning and retaining lexical and grammatical collocations together. Since such collocations are of high importance in vocabulary learning, it is crucial to

teach them due to their vast usage in language. Since a limited number of studies have been done on how to significantly learn, retain, and produce lexical and grammatical collocations (e.g., Bahns & Eldaw, 1993; Laufer & Girsai, 2008; Li & Schmitt, 2010; Webb & Kagimoto, 2009; Zahar, Cobb, & Spada, 2001), the current study is an attempt to see whether the three proposed activities including L2 definitions, fill-in-the-blanks, and sentence writing exercises facilitate learning lexical and grammatical collocations. Another rationale for conducting the current study is that the aforementioned studies mostly have focused only on lexical or grammatical collocations, the number of the studied collocations are mostly from 5 to 12 ones, and the duration of the given treatments are comparatively short (from 3 to 6 session). Moreover, those studies in the Iranian EFL context that have examined the teaching and learning of collocations have mainly focused on lexical collocations (e.g. Naseri & Khodabandeh, 2019; Naserpour, Zarei, & Esfandiari, 2020; Zarei & Tavakkol, 2012) and the teaching of grammatical collocations is rather on the researched in the Iranian EFL context. Therefore, the current study attempted to study the impact of the above-mentioned exercises on a larger number of lexical and grammatical collocations (n=40) though giving longer treatments with more sessions. Some of these shortcomings of the previous experimental studies will be reported in the third section of the literature review that in follows. Furthermore, this study seeks to determine which activity type is significantly better than others in helping EFL learners retain and produce lexical and grammatical collocations.

Literature Review

Collocations

Collocations have been categorized as one type of multi-word units (Wray, 2002) which co-occur in the same lexical associations and highly contribute to L2 fluency (Henrikson, 2013; Laufer & Waldman, 2011). The term *collocation* originates from the Latin verb *collocate*, whose denotation is *to set to arrange* (Martyńska, 2004). According to Schmitt (2000), collocation relationship means "the tendency of two or more words to co-occur in discourse" (p. 76). Generally, collocations are encompassed within the umbrella term formulaic sequences which have been identified as a central characteristic of L2 language (Schmitt, 2010; Sinclair, 1991; Wray, 2002). At their most basic, collocations are the regular and frequent co-occurrence of two or more items that semantically act as a whole (Lewis, 2000; Nesselhauf, 2005). Based on the current literature (e.g. Henrikson, 2013; Schmitt, 2010; Sonbul & El-Dakhs, 2020; Tsai, 2020; Toomer & Elgort, 2019; Wolter & Yamashita, 2018; Wray, 2002), collocations shape the bulkiest lexical structure that underpins any language, clearly indicating their prominent position and cushier role. According to Toomer and Elgort (2019), collocations are the most significant building block in the fabric of the semantic knowledge in any language and if learners, particularly L2 learners, have not an extensive repertoire of the collocations, they may confront serious problems in all other language skills. Webb and Kagimoto (2011) asserted that more extensive knowledge of L2 collocations can lead to better accuracy and fluency in the target language and highlighted the central position of developing an adequate collection of L2 collocations as a prerequisite for a more effective communicative competence.

Regarding the identification of collocations, two distinct approaches currently exist, i.e. the frequency-based approach and the phraseological approach (Moon, 1998; Sinclair, 1991; Wolter & Yamashita, 2018). The advocates of the first approach like Cowie (1994) and Howarth (1998), consider collocations as combined lexical units that co-occur at a specific distance through which frequent and non-frequent collocations are distinguished. The latter, with proponents like Sinclair (1991) and Wolter and Yamashita (2018), concerns the semantic relationship between two or more lexical items and the degree of non-compositionality that they maintain in meanings. Non-compositionality demonstrates the interconnectedness of various parts of collocation that cannot be separated because they lose their meanings if they are compartmentalized into their constituent parts (Sonbul & El-Dakhs, 2020). Nation (2013) have proffered a balanced combination of these two approaches in which collocations are viewed as "a group of words that belong together, either because they commonly occur together or because the meaning of the group is not obvious from the meaning of the parts" (p. 317).

In the last three decades, considerable attention has been given to the role of collocations in SLA and their importance for developing various language skills (e.g. Kennedy, 2003; Liu, 2010; Mel'cuk, 1998; Moon, 1997, 1998; Nesselhauf, 2003; Sonbul & El-Dakhs, 2020; Stubbs, 1995; Wouden, 1997). A meticulous walk-through of the earlier theories about the role of collocational knowledge have demonstrated L2 learners' poor recognition and the least use of collocations (Granger, 1998; Liu, 2010), unacceptable mastery of the required collocations for oral and written comprehension (Nation, 2013; Nesselhauf, 2003), and grave negligence of the collocation competency among both L2 teachers and learners (Toomer & Elgort, 2019). For example,

Bahns and Eldaw (1993) argued that L2 learners keep less knowledge of the form and meaning of collocations than that of single items; consequently, L2 learners' errors in language production emerge due to their lack of collocation knowledge. Nation (2013) has also maintained that most L2 learners cannot make appropriate connections between the forms and meanings of L2 collocations. These deficiencies and inadequacies of L2 collocational knowledge have been reported despite the reality that L2 learners need to use a considerable range of collocations for comprehension (Nguyen & Webb, 2017; Sonbul & El-Dakhs, 2020) and production (Cobb, 2003; Peters, 2016) of the L2 input. Furthermore, earlier conceptualizations and theoretical stances have mentioned that knowledge of L2 collocations depends on many linguistic and nonlinguistic factors such as the collocation type and structure, formality versus informality, learner variables such as L2 proficiency, and motivation, and educational setting variables (Nguyen & Webb, 2017).

Various criteria have been mentioned for categorizing L2 collocations each with its own opponents and proponents. However, these suggested criteria do not provide clear-cut divisions among various collocations rather they present a specific continuum on which collocations can be placed (Herbest, 1996; Howarth, 1998a; Wolter & Yamashita, 2018). The basic criteria according to which collocations are categorized include the degree of productivity, semantic transparency, and degree of substitutability (Howarth, 1998b; Nattinger & DeCarrico, 1992; Sonbul, S., & Schmitt, 2013). According to Howarth (1998b), the degree of productivity indicates how an L2 collocation is flexible to yield various meanings, i.e., the degree of flexibility, coverage, and actual use to express different meanings. Nguyen and Webb (2017) described semantic transparency as the clarity of the total meaning of a collocation when it equals the sum of the meanings for all the

constituent collocates. Degree of the substitutability is the possibility of replacing various collocates in the same collocation group without violating the adjacency of the words or their parts of speech (Bahns & Eldaw, 1993). In Howarth's (1998b) continuum, there are collocations with the highest degree of all the three criteria at one end. On the other hand, collocations with the least productivity, semantic transparency, and substantiality exist at the other end.

Lexical vs. Grammatical Collocations

Generally, there is widespread support for the categorization of collocations into lexical and grammatical categories among the scholars and researchers who have worked in in the area of L2 vocabulary and collocation (e.g. Benson et.al, 1997; Lewis, 2002, 2006; McCarthy, 2004; Nesselhauf, 2005). According to Milton (2009), grammatical collocations are made up of a content word plus a preposition or an infinitive; however, lexical collocations only contain content words without any proposition or infinitive. By suggesting a very similar definition, Lewis (2006) argued that lexical collocations (e.g., *make an appointment*) refer to phrases that contain dominant or central words i.e. adjectives, nouns, adverbs, and verbs. In contrast, grammatical collocations (e.g., *by chance*) typically consist of a central word and a preposition or grammatical structure. According to Toomer and Elgort (2019), lexical collocations are more common than grammatical collocations based on the results of the corpus studies for many languages. They have mentioned that the larger number of lexical collocations is partly because of the greater number of content words in any language that can be juxtaposed to develop many collocations.

Numerous typologies and classifications have been proposed for lexical and grammatical collocations over the half past century one of which is Benson et. al's (1997) typology. According to Benson et.al (1997), there are seven major kinds of lexical collocations and eight types of grammatical collocations. Lexical collocation patterns include verb + noun (*raised a question*), adjective+ noun (*a keen interest*), adverb + adjective (*highly controversial*), adverb + verb (*freely admitted*), noun + noun (*car park*), noun+ verb (*plane takes off*), and verb + adverb (*welcomed warmly*). Some common structures for grammatical collocations proposed by Benson et al. (11997) comprise noun+ preposition combinations (*fondness for*), preposition+ noun (*in advance*), noun + that-clause (*an agreement that he would pay the fine soon*), noun + to-infinitive (*attempt to pass*), predicate adjective+ to-infinitive (*excited to hear*), adjective+ that-clause (*it was necessary that all of us attend*), and adjective+ preposition combinations (*the kid was punished for her misbehavior*).

Most scholars and vocabulary experts think that learning grammatical and lexical collocations poses various degrees of cognitive difficulty among L2 learners. They have claimed that generally acquiring most lexical collocations is less laborious than internalizing grammatical collocations, arguing that lexical collocations can divulge their meanings more easily because of their inherent characteristics such as degree of productivity, semantic transparency, and substitutability. Lewis (2002), for example, commented that because a large range of lexical collocations possesses from medium to high semantic transparency that is the product of the sum of the meanings of the individual components, their recognition, comprehension, internalization, and subsequently the retention is faster than the grammatical counterparts. According to (2016), the meanings of grammatical collocations

are harder to grasp since the particle ingredient in most cases does not carry a specific conceptual meaning. However, these claims remain in the realm of theoretical speculations and they have not been adequately investigated through data-driven and empirical studies; a research void that needs serious consideration.

Unfortunately, during the past century, most of the teaching methodologies have considered single lexical items as the core of L2 vocabulary and other lexical chunks including grammatical and lexical collocations have been treated peripherally (Brown, 2014). The important role of lexical and grammatical collocations was emphasized upon in the communicative approach and particularly in the lexical approach where the learning of collocations, idioms, expressions, and other lexical chunks took priority over single vocabulary items (Richards & Rodgers, 2014). The lexical approach attempted to bring the lexical and grammatical collocations to the fore by suggesting some syllabi and instructional activities. However, teaching and learning lexical and grammatical collocations have not still been sufficiently incorporated in L2 syllabi and classroom practices as required. As mentioned by Toomer and Elgort (2019), we need extensive and rigorous research to cast light on different aspects of nature and composite structure of lexical and grammatical collocations and to tailor the best instructional activities and materials that can enhance L2 learners' knowledge in this regard.

Previous Empirical Studies

Generally speaking, empirical research on the learning and teaching of L2 collocations has a three-decade history and the conducted body of research has not answered some of the questions about how to learn and teach L2

collocations. Most of the previous studies concerning the teaching and learning of L2 collocations can be classified dichotomously as the studies that reported a more positive role for the effect of the explicit instruction on the acquisition of collocations over the implicit instruction (e.g., Laufer & Girsai, 2008; Horst, 2005; Webb & Kagimoto, 2009; Zahar, Cobb, & Spada, 2001). Conversely, some other studies have argued for the superiority of implicit or peripheral learning over explicit instruction in various EFL or ESL contexts (e.g. Bahns & Eldaw, 1993; Li & Schmitt, 2010; Nesselhauf, 2003). However, most of the previous empirical studies have targeted L2 collocations in general and research is scarce about the implicit or implicit instruction specifically employed for teaching lexical and grammatical collocations.

Several studies have indicated learners' slow gradual development at requiring productive knowledge of L2 lexical collocations (Durrant & Schmitt, 2009; Li & Schmitt, 2010, Nekrasova, 2009). Even L2 advanced learners have shown a degree of oddness in producing collocations (e.g., *do a mistake*, *say the truth*, etc.) which indicates their lack of adroitness at L2 collocations. In this regard, L2 researchers have used some explicit teaching activities for the effective teaching of collocations. For instance, a small case study by Laufer (2011) showed that dictionary use as an efficient explicit activity is positively conducive to lexical collocation learning. In her study, learners were provided with different sentences comprising VN collocations in which verbs were omitted and learners were asked to fill the missing verbs by using the dictionary. The results revealed that collocation learning with dictionary assistance could significantly help learners enhance their collocation knowledge. Additionally, this study revealed that sometimes learners produced incorrect collocations as a result of dictionary use.

Moreover, participants did not recognize some collocations which were unfamiliar to them; therefore, they did not look up these collocations.

Another group of studies has linked the acquisition of common lexical collocations with listening and reading comprehension activities (e.g., Day, Omura, & Hiramastu, 1991; Horst, 2005). For instance, Webb et.al (2013) investigated the efficacy of the reading-listening combination for the incidental acquisition of verb-noun lexical collocations. In their study, learners concurrently read and listened to a grader reader including 18 collocations. In this phase, collocations appeared at various times, from 1 to 15 times. In a given pretest, learners were measured on the receptive knowledge of collocations. Immediately and without any time interval, learners were asked to complete four tests to be evaluated on their receptive and productive knowledge of the forms and meanings of collocations. They significantly revealed a great increase in receptive knowledge of the forms and meanings of collocations from the first test to the last one. Their productive knowledge of the forms and meanings of the collocations also indicated significant increases; nonetheless, learners obtained higher scores in the receptive tests in comparison with the productive tests. Keating (2008) investigated the effects of sentence writing and fill-in-the-blanks on the EFL Spanish learners' retention of the forms and meanings of verb-noun collocations, reporting a more significant effect for the impact of sentence writing exercises on the learners' retention of the meaning and form of the target collocations. One of the problems about this study, however, was the limited number of the target collocations (only 12 ones) and shorter treatment time that lasted only for four 80-minute sessions.

Laufer (2010) reported that form-focused instruction (FFI) could significantly increase L2 learners' knowledge of frequent lexical collocations

and suggested that combining focus-on-form (FonF) and focus-on-forms (FonFs) approaches can lead to better development of lexical knowledge in a foreign language. Li and Schmitt (2010) studied the acquisition of lexical and grammatical collocations among advanced level EFL learners in a case study and reported that explicit instruction was more effective than incidental learning. They mainly focused on the use of L2 synonyms and definitions in the explicit instruction of the target collocations. In addition to incidental and explicit teaching activities, some researchers as Alali and Schmitt (2012) acknowledged that repetition is a good technique for acquiring collocations. In this respect, they state that by repetition, learners' both productive and receptive knowledge at recall and recognition levels will increasingly enhance. Schneider, Healy, and Bourne (2002) also reported that the conditions of explicit instruction play a very significant role in the acquisition of L2 collocations among EFL learners. Their study conditions included some contextualised and decontextualised practices and classroom activities for learning common collocations irrespective of their lexical or grammatical nature. The contextualised exercises including reading short passages and exemplar sentences were significantly better than decontextualised classroom exercises such as L1 equivalents and matching exercises. Laufer (1997) claimed that more output-oriented activities such as paragraph and essay writing were very effective for teaching L2 vocabulary including both single vocabulary items and collocational chunks.

Szudarski and Carter (2016) investigated the effects of input flood alone versus input flood plus input enhancement on the acquisition of verb-noun and adjective-noun collocations among 41 Polish EFL learners. In the input flood group, the instruction was delivered only through reading some texts that included the target collocations; however, in the input flood plus enhancement

group, participants were provided with reading texts in which the target collocations were underlined. Findings of this study indicated that the input flood plus enhancement treatment could help the learners improve their form recall and form recognition of the target collocations significantly better than the input flood only treatment.

Boers, et al. (2013) studied the impact of four types of exercises on ESL students' acquisition of verb-noun lexical collocations. The four types of exercises included insert the verb, underline the verb, insert the total collocation, and match the collocation with its definition. The treatments were repeated four times, each lasting for 2 to 3 sessions followed by multiple-choice posttests. The researchers reported that treatment condition in which learners tried to do exercises by inserting the total collocation as a whole (including the noun and verb components) was more effective than exercises that demanded inserting or underlying the verb. Moreover, the students in the treatment condition that practiced exercises requiring the use of the whole collocations in the short texts or fill-in-the-blank exercises did better on the posttest than those students who practiced learning the collocations through matching exercises. However, the gains in the acquisition of verb+noun (v+n) lexical collocations from each trial to the subsequent one were not significant, indicating that learning collocations is a longitudinal process that requires chains of practice and review. One of the problems with this study was the number of treatment sessions and the duration of each phase of this study that lasted from two to three 30-minute sessions. Furthermore, the researchers only focused on the v+n lexical collocations and did not study other types of lexical or grammatical collocations. Moreover, the researchers mainly focused on teaching the verbal part of the collocation in two of the treatment conditions at the expense of the noun component.

As far as the Iranian EFL context is concerned, some studies have tried to use various explicit activities and tasks for teaching L2 collocations in general (e.g. Heidari & Rashidi, 2019; Malmir Yousof, 2019; Sadeghi & Panahifar, 2013; Sadighi & Sahragard, 2013; Sahragard, Ahmadi, & Babaie Shalmani, 2016) and L2 lexical collocations in particular (e.g. Naseri & Khodabandeh, 2019; Naserpour, Zarei, & Esfandiari, 2020; Zarei & Tavakkol, 2012). Naserpour, Zarei, and Esfandiari's (2020) research revealed that instructional tasks that have higher involvement loads (multiple-choice, short response, and sentence writing tasks) help EFL learners significantly develop their receptive and productive knowledge of English lexical collocations specifically when these instructional tasks are output-oriented (short response and sentence writing) rather than input-oriented (multiple-choice). Zarei and Tavakkol's (2012) study discovered that the interaction effect of collaborative instruction and presentation of lexical collocations could significantly enhance EFL learners' production of lexical collocations in comparison with the non-collaborative presentation of lexical collocations. Naseri and Khodabandeh (2019) reported a positive effect for the use of audio-visual input enhancement delivered through digital environments on Iranian EFL learners' acquisition of lexical collocations and the use of the learned collocations in narrative writing. Nonetheless, comparatively little research has been done on the impact of explicit instructional activities on the development of receptive and productive knowledge of grammatical collocations and a handful of studies can be mentioned in the struggle. For instance, Rahimi Domakani, Roohani, and Abdollahian Dehkordi (2010) found that indirect written corrective feedback was more effective for enhancing Iranian EFL learners' use of grammatical collocations in writing tasks in comparison with direct feedback.

As aforementioned, lexical and grammatical collocations play a very important role in L2 learners' lexical competency. As mentioned by Toomer and Elgort (2019) many EFL learners face serious problems in learning, recalling, and using L2 lexical and grammatical collocations partly due to the less application of effective instructional activities and tasks. Moreover, according to Nguyen and Webb (2017), there is a scarcity of robust empirical research on the instructional activities that can best help L2 learners develop their receptive and productive knowledge of lexical and grammatical collocations, Iranian EFL context being no exception. Therefore, because of the inadequacy of the experimental research about the issue at hand, the current study was conducted to examine the effects of L2 definitions, fill-in-the-blanks, and sentence writing exercises on how EFL learners' acquisition, retention, and production of English lexical and grammatical collocations. Specifically, the current study sought to answer three questions as follows:

1) What are the probable effects of definitions, fill-in-the-blanks, and sentence writing exercises on the acquisition of lexical vs. grammatical collocations and how do the three effects compare?

2) What are the probable effects of definitions, fill-in-the-blanks, and sentence writing exercises on the retention of lexical vs. grammatical collocations and how do the three effects compare?

3) What are the probable effects of definitions, fill-in-the-blanks, and sentence writing exercises on the production of lexical vs. grammatical collocations and how do the three effects compare?

Method

Participants

A sample of 66 intermediate-level Iranian EFL learners studying at a private language institute in Qazvin participated in this study. These 66 learners were selected based on the results of an Oxford Quick Placement Test (OPT) that was given to seven intermediate classes (n= 78) at Kish-e-Mehr private language institute in Qazvin. The participants were both males (n=16) and females (n=50). The institute administered this Oxford Quick Placement Test (OPT) to the learners from seven classes who had passed six semesters through the Top-Notch series from Fundamentals to Top Notch 3 to place those who were qualified at Top Notch 3A classes. Sixty-six learners who scored from 28 to 47 were chosen. This range has been proposed by the test publisher for intermediate learners. This cutoff score was set by the institute authorities and the researcher did not have any say about that. Then, the selected learners were randomly assigned into three equal-sized groups of 22 that were randomly labeled as Groups A, B, and C, respectively. These learners mostly shared the same first language (Persian) and some of them were Turkish, Kurdish, and Tat speakers. Their age ranged between 14 and 22 (M=16.5, SD= 2.1). Some of these learners had been studying English in this language institute and other private language centers for three to more than five years. Additionally, these learners had different socio-cultural backgrounds.

Instruments

Oxford Quick Placement Test (OPT)

To homogenize the study participants regarding their general English language proficiency, the Oxford Quick Placement Test (OPT) was given to

the 78 learners who were initially selected through convenience sampling and based on availability from seven intact classes. Those students whose performance was within the range of 28 to 47 were selected for the study. The OPT had 60 items designed to measure English proficiency in grammar (20 items), vocabulary (20 items), and cloze test (20 items). The allotted time for completing this section was 50 minutes. The test has shown reliability indices of more than .75 in some earlier studies (e.g. De La Colina & Mayo, 2009; Lemhöfer & Broersma, 2012), and in the current study, its reliability was .81.

Collocation Pre-test

A bilingual matching collocation test (BMCT) comprising 60 items was developed and used as a pretest to examine the participants' knowledge of the lexical vs. grammatical collocations for intermediate EFL learners before any treatment. This test was developed based on the collocations in the Top Notch 3A and 3B (2nd ed.) books written by Saslow and Ascher (2011). It should be noted that the book included 164 lexical and grammatical collocations, sixty-one of which were included in the units that were covered during the educational semester. This pretest included 31 items for the lexical and 29 items for the grammatical collocations. The purpose of this pretest was to check participants' knowledge of the target grammatical and lexical collocations before the treatments and to exclude those collocations that were known by more than 10% of the learners from the intended instructions. Based on this test, 20 lexical and 20 grammatical collocations whose meanings were known by less than 10 percent of the learners were selected for the treatments. It should be noted that because the treatment must have been based on the conversation book taught at the institute (Top Notch 3A and 3B), the researchers chose those lexical and grammatical collocations unknown to the

majority of the students irrespective of the special subcategories for each type. Therefore, there were noun+noun, verb+noun, adverb+adjective, and adjective+noun lexical collocations and various types of grammatical collocations including preposition+noun, verb+preposition, noun/adjective+preposition (see appendix A).

Collocation Post-test

A multiple-choice collocation posttest was developed from Top Notch 3A and 3B (2nd ed.) books including 40 collocations of those that were taught during the treatments. It included two parts each with 20 items. The first part of the collocation test assessed lexical collocation knowledge, but the second section assessed the grammatical collocation knowledge of the learners. The test was piloted to a group of 28 intermediate learners comparable to the participants who participated in the study. They were comparable in that they were intermediate EFL students based on the OPT test as a placement test administered by the institute, their age range was between 14 and 23, and they were studying the same books at another branch of Kish-e-Mehr private language institute. The reliability of the test in this pilot study was .78. Required statistics and indexes like item facility (IF), item discrimination (ID), choice distribution (CD), and item reliability (IR) were acceptable for most of the items. Those items that had some problems were modified. The reliability of this posttest in the main study turned to be .81. The purpose of this collocation posttest was to check learners' knowledge of lexical vs. grammatical collocations after the special treatments were given to the study groups.

Collocation Production Test

This test also included 40 items in two parts; part one for testing productive knowledge of lexical collocations and part two for grammatical collocations. The participants were required to produce the whole collocation or some part of it to complete 40 contextualized sentences. The reliability of this collocation production test was determined before its administration in a pilot study with a similar group to the ones participating in the current study (this pilot group was briefly introduced in the previous section) as aforementioned (Cronbach's alpha= .78). The purpose of this collocation production test was to check learners' productive knowledge of lexical vs. grammatical collocations after receiving the special treatments.

Delayed Post-test of Collocations

This collocation delayed post-test was the same test used as the collocation posttest. The only difference was that the items were rearranged in the two sections of the test. It included the same number of items (40 items) in two parts; part one for testing lexical collocations and part two for grammatical collocations. The purpose of this collocation post-test was to evaluate learners' collocation knowledge retention of lexical and grammatical ones 14 days after its first administration as the posttest to determine learners' collocation retention. This 14-day retrieval interval (RI) was set based on the criteria suggested by the existing literature.

The researcher chose the retention interval based on the criterion for the time distance for the available intersession intervals (ISI). According to Serrano and Huang (2018), ISI is the average of the time interval (in days) between or among the sessions during which special treatment is given. This criterion has been proposed by Rohrer and Pashler (2007). Other studies (e.g.

Serrano & Huang, 2018; Suzuki, 2017; Toppino & Gerbier, 2014) have also mentioned the appropriacy of this RI. According to the existing literature, the optimal and frequent norm for the ratio of intersession interval to retention interval is 25% (ISI/RI ratio =25%). In this study, the two ISIs lasted for 3 and 4 days. The first was from Sunday to Wednesday and the latter continued from Wednesday to Sunday through Friday. Serrano and Huang (2018) assert that the risk of either overestimating or underestimating the true effect of the given treatments increases if any delayed posttest is administered before or after this optimal time.

Data Collection Procedure

Seventy-eight EFL learners participated in this study who were selected based on convenience sampling from seven intact classes at a private language institute. Afterward, the Oxford Quick Placement Test (OPT) was administered to homogenize the learners concerning their general language proficiency. Sixty-six of the students whose scores fell within the range of 28 to 47 were selected. In the next step, a pretest of collocations was given to the learners to check their collocation knowledge regarding the target lexical and grammatical collocations before the treatments. After that, the 66 selected EFL learners were randomly assigned three equal-sized groups of 22 including both males and females, and then the classes were randomly labeled as Groups A, B, and C. There were 16 females and 6 males in Group A, 15 females and 7 males in Group B, and 17 females and 5 males in Group C. This unequal gender heterogeneity was due to the disproportionate ratio of female to male learners in the target language institute.

In Group A, the main way of instruction for teaching lexical and grammatical collocations was their definitions. In this group, lexical and

grammatical collocations were defined through English definitions and examples. First, learners were asked to guess and provide English definitions for the presented lexical and grammatical collocations and if their definitions were not accurate, the teacher would help with better definitions or he asked the students to look up the more difficult collocations in the dictionary. If the short definitions did not suffice, the teacher would circumlocute the target items with longer descriptions. Afterward, some examples were provided, and if necessary Persian equivalents and explanations were added. In Group B, learners practiced lexical vs. grammatical collocations through fill-in-the-blank exercises after getting familiarized with the meanings of the target collocations either through English synonyms or short Persian equivalents. The instructor made some exercises from online, supplementary books, and the book itself containing the lexical or grammatical collocations. The instructor tried to include at least four exercise sentences for each of the target collocations to depict their significant meanings in contextualized sentences. In Group C, the learners learned the collocations through sentence writing exercises after introducing the collocations and providing their meanings. The students learned the meanings of the collocations through L1 or L2 synonyms and equivalents and then they were asked to write them into sentences. These are sentence writing exercises varied from completing sentences to writing whole sentences for various meanings of the target collocations. Furthermore, participants in Class C were asked to creatively use the words in a chain of related sentences for those collocations that had semantic relationships. As aforementioned, the first phase of instruction in all of the three study groups had an overlap with each other since, in all of the classes, the meanings of the target lexical and grammatical collocations were presented through L2 synonyms or L1 equivalents; nonetheless, in the second stage of instruction,

learners received longer definitions and metalinguistic explanations and descriptions about the target collocations in Class A, various forms of fill-in-the-blank exercises with chains of review sections in Class B, and various sentence writing activities that were periodically repeated in the third class. After the sessions finished, students in Group C were required to use them in four sentences for the next session. This procedure continued for ten sessions. This treatment lasted for seven weeks each with two 90-minute (one and half an hour) sessions (14 sessions). It should be noted that the treatment for the current study was incorporated into the institute's instructional program and learners received the target treatment for two grammatical and two lexical collocations each session.

In the first session after the treatments (after three days), the collocation post-test was given to learners in the three groups to assess their knowledge of lexical vs. grammatical collocations. In the subsequent session (four days after the administration of the posttest), the test of productive knowledge of the lexical vs. grammatical collocations was conducted to determine the participants' ability to use these collocations. Fourteen days later, the collocation post-test was given again (as the delayed posttest of collocations) this time to check the retention of lexical vs. grammatical collocations.

Data Analysis

First, descriptive statistics including mean, standard deviation, skewness, and kurtosis were calculated using the SPSS program (version 25). Then, the Kolmogorov-Smirnov test was employed to check the normality of the distributions for scores obtained by study groups on different tests. Required plots and graphs were utilized to describe the data as well. As there were three groups, and two dependent variables (lexical vs. grammatical) in each of the

three questions, one-way multivariate analysis of variance (MANOVA) was employed three times to check the differences among groups in the acquisition (Question 1), retention (Question 2), and production (Question 3) of lexical vs. grammatical collocations.

Results

The absolute values of skewness and kurtosis indices and their ratios over the standard errors of these ratios were lower than 1.96, hence the normality of the data was supported. The normality of the data was also verified using the Kolmogorov-Smirnov test ($n> 50$) ($p> .05$). The Cronbach's alpha reliability indices for subsections of the three major tests ranged from a low value of .72 for the production of the grammatical collocations to a high value of .77 for the posttest of grammatical collocations. The Cronbach's alpha reliability values for the whole (total) posttest, production test, and the delayed-posttest were .81, .77, and .80, respectively. According to Pallant (2016), these values are acceptable indices.

Answering the First Research Question

As witnessed in Table 1, Group C learners who received sentence writing (SW) treatment obtained the highest mean scores on the posttest of lexical ($M= 16.18$) and grammatical ($M=14.55$) collocations. Learners in group B who received the treatment in the form of fill-in-the-blank exercises gained the second-highest mean scores and the lowest performances were those of group C in which the treatment was given using definitions. Furthermore, the mean scores on the grammatical posttest were lower than the lexical posttest.

Table 1.

Descriptive Statistics for Learners' Scores on the Posttest

Posttest	Groups	N	Mean	Std. Deviation	Min	Max
Lexical	Group A: Definitions	22	12.95	1.55	11	16
	Group B: Fill-Ins	22	14.59	1.33	12	17
	Group C: Sentence Writing (SW)	22	16.18	1.65	13	19
	Total	66	14.58	2.00	11	19
Grammatical	Group A: Definitions	22	11.59	1.36	9	15
	Group B: Fill-Ins	22	13.32	1.58	9	16
	Group C: Sentence Writing (SW)	22	14.55	1.62	11	17
	Total	66	13.15	1.93	9	17

The following figure illustrates the performances of the learners in the study groups on the posttests:
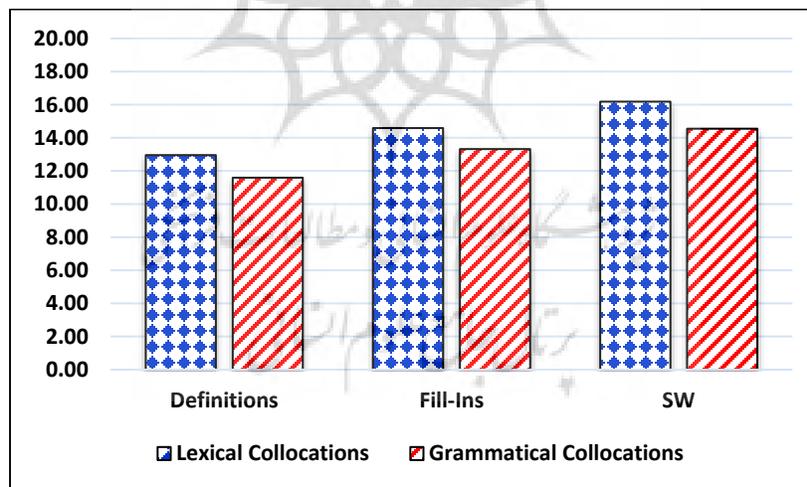

Figure 1.

Means for Three Study Groups' Scores on the Posttest

Before running the MANOVA, the non-significant results of Box's test (*Box' M* (6, 98919.692) = 5.93, *F*= .940, *p*= .460> .001) indicated that the assumption of homogeneity of covariance matrices was retained. Additionally, based on the results of the Levene's Test, the assumption of homogeneity of variances was met on the posttest of lexical (F (2, 63) = .351, p = .706), and grammatical (F (2, 63) = .273, p = .762) collocations. Due to the availability of the requirements, the MANOVA test was run.

Table 2.

Multivariate Tests for Study Groups' Scores on the Collocation Posttest

Effects	Wilks' Lambda	F	Hypothesis df	Error df	P	$\eta^2 p$
Intercept	.010	3226.959	2	62	.000	.990
Main Effect (Group)	.533	11.474	4	124	.000	.270

Based on the results of the MANOVA test in Table 2 (F (4, 126) = 11.474, *Wilk's* Λ = 0.533, p = .000, $p\eta^2$ = .270), it can be concluded that there were significant differences among the three groups' overall means on the posttest of lexical and grammatical collocations.

Table 3.

Tests of Between-Subjects Effects for Study Groups' Scores on the Collocation Posttest

Source	Dependent Variable	SS	df	MS	F	P	$\eta^2 p$
Groups	Posttest Lexical	114.57	2	57.28	24.79	.000	.44
	Posttest Grammatical	96.93	2	48.47	20.69	.000	.39
Error	Posttest Lexical	145.54	63	2.31			
	Posttest Grammatical	147.54	63	2.34			

There were significant differences among the effects of the treatments on three groups' means on the posttest of lexical (F (2, 63) = 24.79, p = .000, $\eta^2 p$ = .440, representing a large effect size) and grammatical collocations (F (2, 63) = 20.69, p = .000, $\eta^2 p$ = .397, with a moderate effect size). To determine how the precise locations of such differences, post hoc comparisons were made. Table 4 displays the results of the post-hoc Scheffe test that was applied to detect the exact place of the differences.

Table 4.

Post-Hoc Scheffe's Tests for Study Groups' Scores on the Collocation Posttest

Posttest	(I) Groups	(J) Groups	MD	95% CI	p
Lexical	Group C: Sentence Writing (SW)	Group A: Definitions	3.23*	[-2.08, 4.38]	.000
		Group B: Fill-Ins	1.59*	[.44, 2.74]	.004
	Group B: Fill-Ins	Group A: Definitions	1.64*	[.49, 2.79]	.003
Grammatical	Group C: Sentence Writing (SW)	Group A: Definitions	2.95*	[1.80, 4.11]	.000
		Group B: Fill-Ins	1.23*	[.07, 2.38]	.035
	Group B: Fill-Ins	Group A: Definitions	1.73*	[.57, 2.88]	.002

The results indicated that Group C (SW) significantly outperformed Group A (Definitions) (MD = 3.23, p < .05) and Group B (Fill-Ins) (MD = 1.59, p= .004 < .05) on the posttest of lexical collocations. Moreover, Group B (Fil-Ins) significantly outperformed Group A (Definitions) on posttest of lexical collocations (MD = 1.64, p = .003 < .05). Furthermore, Group C (SW) significantly outperformed Group A (Definitions) (MD = 2.95, p = .000< .05)

and Group B (Fil-Ins) *(MD = 1.23, p = .035< .05)* on the posttest of grammatical collocations. Group B also did better than Group A on this test *(MD = 1.73, p = .002< .05).*

Answering the Second Research Question

As shown in Table 5, the same pattern found for learners' performances on the two posttests can be seen here for the delayed post-test.

Table 5

Descriptive Statistics for Study Groups' Scores on the Delayed Posttest

Delayed Test	Groups	N	Mean	Std. Deviation	Min	Max
Lexical	Group A: Definitions	22	12.00	1.512	10	15
	Group B: Fill-Ins	22	13.59	1.501	11	16
	Group C: Sentence Writing (SW)	22	14.91	1.509	12	17
	Total	66	13.50	1.907	10	17
Grammatical	Group A: Definitions	22	11.23	1.378	9	14
	Group B: Fill-Ins	22	13.18	2.039	10	17
	Group C: Sentence Writing (SW)	22	14.41	1.141	12	16
	Total	66	12.94	2.030	9	17

Learners in group C had the highest mean score followed by participants in group B and group A for both lexical and grammatical delayed posttests. Figure 2 provides a clear picture of the differences among the three groups on the two delayed posttests.
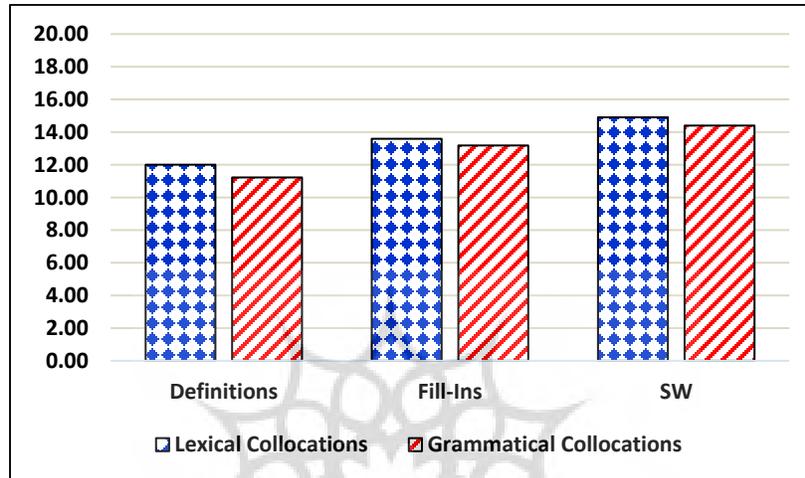
Figure 2.

Means for study groups' scores on the delayed posttest

The non-significant results of the Box's test (*Box' M* (6, 98919.692) = 18.78, *F*= 2.987, *p*=.066 > .001) demonstrated the availability for the assumption of homogeneity of covariance matrices before running the second MANOVA. Based on the results of Levene's Test, the assumption of homogeneity of variances was also met on the delayed posttests of lexical ($F_{(2, 63)}$ = .020, p = .981) and grammatical ($F_{(2, 63)}$ = 2.34, p = .104) collocations.

The results of the MANOVA test ($F_{(4, 126)}$ = 11.343, *Wilk's Λ* = .536, p = .000, *Partial η²* = .268) showed significant differences among the three groups' means on the delayed posttests of lexical and grammatical collocations.

Table 6.

Multivariate Tests for Study Groups' Scores on the Delayed Posttest

Effects	Wilks' Lambda	F	Hypothesis df	Error df	p	$\eta^2 p$
Intercept	.010	2989.602	2	62	.000	.990
Main Effect (Group)	.536	11.343	4	124	.000	.268

The results of the tests of between-subjects effects that show the significance of the differences among the three groups in Table 7:

Table 7.

Tests of Between-Subjects Effects for Study Groups' Scores on the Delayed Posttest

Source	Dependent Variable	SS	df	MS	F	p	$\eta^2 p$
Groups	Delayed Lexical	93.364	2	46.682	20.547	.000	.395
	Delayed Grammatical	113.303	2	56.652	23.107	.000	.423
Error	Delayed Lexical	143.136	63	2.272			
	Delayed Grammatical	154.455	63	2.452			

As shown in Table 7, there lay significant differences between the effects of definitions, fill-in-the-blanks, and sentence writing treatments on groups' means on the delayed posttests of lexical ($F (2, 63) = 20.547$, $p = .000$, $\eta^2 p = .398$) and grammatical collocations ($F (2, 63) = 23.107$, $p = .000$, $\eta^2 p = .423$ representing a moderate effect size). Afterward, to specify the exact point of such differences between the study groups, post-hoc Scheffe's tests were run. As presented in Table 8, the statistics indicated that Group C significantly outdid Group A ($MD = 2.91$, $p < .05$) and Group B ($MD = 1.32$, $p = .019 <$ .05) on the delayed posttest of lexical collocations. In addition, Group B (fill-

in-the-blanks group) significantly outpaced Group A (the definitions group) on this test ($MD = 1.59$, $p = .004 < .05$).

Table 8.

Post-Hoc Scheffe's Tests for Study Groups' Scores on the Delayed Posttest

Posttest	*(I) Groups*	*(J) Groups*	*MD*	*95% CI*	*p*
Lexical	Group C: Sentence Writing (SW)	Group A: Definitions	2.91*	[1.77, 4.05]	.000
		Group B: Fill-Ins	1.32*	[.18, 2.46]	.019
	Group B: Fill-Ins	Group A: Definitions	1.59*	[.45, 2.73]	.004
Grammatical	Group C: Sentence Writing (SW)	Group A: Definitions	3.18*	[2.00, 4.37]	.000
		Group B: Fill-Ins	1.23*	[.04, 2.41]	.040
	Group B: Fill-Ins	Group A: Definitions	1.95*	[.77, 2.14]	.001

Regarding the performances of the study groups on the delayed posttest of collocations, group C significantly exceeded group B ($MD = 1.23$, $p = .040$) and group A ($MD = 3.18$, $p = .000$). Learners in group B were also significantly better than their counterparts in group A ($MD = 1.95$, $p = .001$).

Answering the Third Research Question

The data for the performances of learners on the productive test of collocations are depicted in Table 9:

Table 9.

Descriptive Statistics for Study Groups' Scores on the Productive Collocation Test

Productive		Groups	N	Mean	Std. Deviation	Min	Max
	Lexical	Group A: Definitions	22	10.86	1.521	8	14
		Group B: Fill-Ins	22	11.27	1.638	8	13
		Group C: Sentence Writing (SW)	22	13.86	1.552	11	16
		Total	66	12.00	2.046	8	16
	Grammatical	Group A: Definitions	22	10.36	1.706	7	15
		Group B: Fill-Ins	22	10.41	1.652	7	13
		Group C: Sentence Writing (SW)	22	12.45	1.845	7	15
		Total	66	11.08	1.971	7	15

Like the previous tests, the highest mean scores were obtained by Group C, followed by Groups B and A. The following figure depicts the mean differences quite visibly:
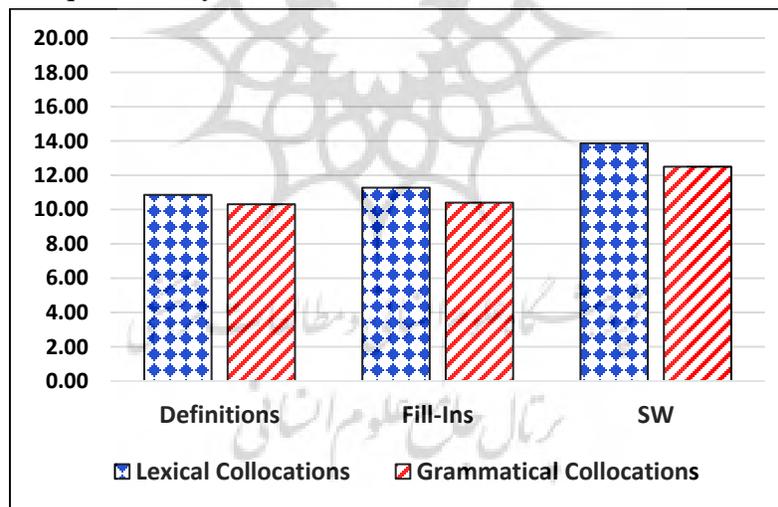

Figure 3.
Means for Study Groups' Scores on the Productive Collocation Test

Similarly, the comparison of the three groups' means on the productive knowledge of the lexical and grammatical collocations was carried out

through a multivariate ANOVA (MANOVA) after verifying the assumption of homogeneity of covariance matrices (*Box' M* (6, 98919.692) = 12.79, *F*= 2.35, *p*= .057 > .001), and homogeneity of the variances for study groups scores on the productive tests of lexical (*F* (2, 63) = .094, *p* = .910) and grammatical (*F* (2, 63) = .386, *p* = .681) collocations as employing Levene's Test.

The existence of significant differences between the three groups' overall means on the production of lexical and grammatical collocations can be justified based on the results of the MANOVA test (*F* (4, 126) = 9.30, *p* = .000, *Partial η^2* = .228) presented in Table 10.

Table 10.

Multivariate Tests for Study Groups' Scores on the Productive Collocation Test

Effects	Wilks' Lambda	F	Hypothesis df	Error df	p	$\eta^2 p$
Intercept	.013	2364.566	2	62	.000	.987
Main Effect (Group)	.546	10.970	4	124	.000	.261

To see if the differences among the study group's scores on the two productive tests of collocations were significant or not, the test of between-subjects effects should be referred to. See Table 11 below.

Table 11.

Tests of Between-Subjects Effects for Study Groups' Scores on the Productive Collocation Test

Source	Productive Knowledge	SS	df	MS	F	p	$\eta^2 p$
Groups	Lexical	116.455	2	58.227	23.584	.000	.428
	Grammatical	67.030	2	33.515	12.305	.000	.281
Error	Lexical	155.545	63	2.469			
	Grammatical	171.591	63	2.724			

Based on the results displayed in Table 11, there were significant differences among the effects of the three types of treatments on groups' means on the production of lexical (F (2, 63) = 23.58, p = .000, $\eta^2 p$ = .728 representing a large effect size) and grammatical (F (2, 63) = 12.30, p = .000, $\eta^2 p$ = .281) collocations. In the next step, Scheffe's test as a post-doc test was employed to find where differences exactly existed (Table 12).

Table 12.

Post-Hoc Scheffe's Tests for Study Groups' Scores on the Productive Collocation Test

Posttest	(I) Groups	(J) Groups	MD	95% CI	p
Lexical	Group C: Sentence Writing (SW)	Group A: Definitions	3.00*	[1.81, 4.19]	.000
		Group B: Fill-Ins	2.59*	[1.40, 3.78]	.000
	Group B: Fill-Ins	Group A: Definitions	.41	[-.78, 1.60]	.690
Grammatical	Group C: Sentence Writing (SW)	Group A: Definitions	2.18*	[.93, 3.43]	.000
		Group B: Fill-Ins	2.09*	[.84, 3.34]	.000
	Group B: Fill-Ins	Group A: Definitions	.09	[-1.16, 1.34]	.983

As the results suggest, Group C significantly outpaced Group A (*MD* = 3.00, *p* = .000) and Group B (*MD* = 2.59 *p* = .000) on the productive test of lexical collocations; however, there was not any significant difference between Groups B and A on the same test (*MD* = .41, *p* = .690 > .05). Group C also significantly surpassed Groups A (*MD* = 2.18, *p* = .000) and B (*MD* = 2.09, *p* = .000) on the production of grammatical collocations; nonetheless, there was not any significant difference between means of Groups A and B on this test (*MD* = .09, *p* = .983> .05).

Discussion

The focus of this study was to determine the effectiveness of three different activity types involving L2 definitions, fill-in-the-blanks, and sentence writing on the acquisition, retention, and production of both lexical and grammatical collocations among Iranian EFL learners. Based on the results of data analysis, this study came to some important findings as follows. First, sentence writing treatment turned out to be more effective than both fill-in-the-blanks and definitions for developing and acquiring both lexical and grammatical collocations. The first finding is in agreement with Schneider, Healy, and Bourne (2002), who pointed out the strength of learning conditions in engraving words in learners' memories. As they highlight, more difficult conditions under which foreign words are learned will be advantageous and helpful to have new words stamped on learners' memories. In composition writing or productive exercises, learners have to deal with numerous aspects such as lexical and grammatical collocations, grammatical rules, cohesion and coherence, structural patterns, etc. Consequently, the frequently used words in a piece of writing will be hard to forget.

This first finding can be justified by Laufer's (1997) claim that facilitating memorization of words is impressively achievable through sentence writing. By the same token, having employed either grammatical or lexical collocations in some statements, learners need to notice the word and attempt to hypothesize how it can be utilized in a sentence in conjunction with other words. Accordingly, L2 learners need more semantic knowledge, knowledge about syntax, or grammatical behavior, and even some socio-pragmatic knowledge about how to appropriately use a target collocation in a sentence. As signaled by Schmitt (2014), when learners contextualize a target lexical item including both single words and collocations, they pay more attention to the word and, therefore, they can learn it better. The first finding of the study can also be accounted for by Schmitt's (1990) Noticing Hypothesis based on which, when learners give attention to a word or an item, they acquire that item effortlessly. In other words, the higher the degree of noticing, the better the acquisition. Besides the noticing hypothesis, Folse (2006) maintains that sentence writing exercises require a higher degree of processing, so they facilitate the acquisition of new words.

This finding is in line with some of the earlier studies on the efficacy of sentence writing exercise on L2 vocabulary in general (e.g. Browne, 2003; Huang & Chen, 2011; Keating, 2008; Webb, 2005; Li & Schmitt, 2010). Huang and Chen (2011), for example, investigated EFL learners' vocabulary acquisition and retention by integrating new words into composition activities and reported that in comparison to the fill-in-the-blank group, learners in the sentence writing group were able to acquire more new words incidentally. By composing an essay or writing new statements, the sentence writing group perfectly outdid the fill-in-the-blank one. Sung (2013) highlights that fill-in-the-blank activities are much more effective than sentence writing exercises

in vocabulary learning. In his study, the available evidence indicated that the performance of learners in the sentence writing group was not as satisfactory as that of the fill-in-the-blank group who were expected to fill the gaps with the given target words and this result contradicts the first finding of the current investigation. The best guess to account for this discrepancy is that participants were pre-intermediate level learners in Sung's (2013) study whereas the current study included intermediate level students. Pre-intermediate EFL learners might have not developed basic competencies to engage in writing sentences with grammatical and lexical acceptability; therefore, they might have learned more from fill-in-the-blank exercises rather than the sentence writing activities, because fill-in-the-blank exercises provide the lexico-grammatical context that, in turn, relieve learners' cognitive and psychological assessment with writing L2 sentences using the target collocations.

Second, it turned out that fill-in-the-blanks could help learners learn better than definitions. One explanation for such a significant difference is because fill-in-the-blank sentences are partially contextualized and provide stronger clues for collocation learning, but definitions only provide the meaning of a new word. Moreover, the second reason for the efficacy of fill-in-the-blank exercises is the popularity of such tasks in EFL classrooms and, therefore, learners are more familiar with this type. The third finding showed that sentence writing exercises yielded better retention for both lexical and grammatical collocations. In the same vein, similar to the findings for the first research question, fill-in-the-blanks proved to be more effective in helping EFL learners remember collocations for a longer period. One source of justification for the efficacy and significance of sentence writing exercises on the retention of collocations is that they induce higher cognitive involvement

load as supported by Laufer and Hulstijn's (2001) Involvement Load Hypothesis based on which retention in long-term memory highly depends on the deep processing of information during learning. Therefore, composition and writing activities let learners take notice of words, and when it happens, deep processing occurs during writing a new sentence. This deep processing gets more robust when learners have to pay more attention to the semantic aspect of words during the writing activity; hence, the deeper processing obtained by composing a new sentence, the stronger and longer the retention.

One of the earlier findings which are consistent with the finding in this research was that of Keating (2008), who examined the effects of two exercises, i.e. sentence writing and fill-in-the-blanks on the Spanish learners' retention of meaning and form of verb-noun collocations. The result of his study indicated that learners achieved better retention of meaning and form of the given words by completing sentence writing exercises than fill-in-the-blanks. Along the same line, Laufer and Hulstijn's (2001) research confirms the significance of sentence writing tasks in better retention of words. The findings of their study indicated that much better retention is achieved through composition-writing with target words. Moreover, the above finding is also consistent with Pichette, De Serres, and Lafontaine's (2012) study in which the effect of reading and sentence writing activities on lexical learning and recall was probed. Regarding the retention of target words, the findings proved learners' outstanding performance in the writing group in comparison to the first group (Toomer & Elgort, 2019). Boers, et al.'s (2013) study also showed that fill-in-the-blank exercises that require the use of the whole collocation including its components are more affecting than matching exercises.

The final finding of the current study showed that like the two main previous findings, sentence writing could significantly assist learners to

produce both lexical and grammatical collocations; however, there was no significant difference between the effects of fill-in-the-blanks and definitions on the production of both types of collocations. The justification for such a finding is that when learners write a new word in a sentence, they need both semantic knowledge and socio-pragmatic knowledge to map out the output. To use a word in a sentence, learners need to retrieve the meaning of that word and since sentence writing requires production and semantic elaboration, it facilitates learning new words. Additionally, writing helps learners practice the words and store them in their long-term memory. When learners write something, they utilize their higher-level cognitive functions which, based on the existing literature, set the stage for stable and robust learning. The other possible explanation corroborates with Bloom's taxonomy (Driscoll, 2000). In Bloom's taxonomy, the complexity of learning tasks ranges from low to high according to which complex activities such as writing exercises that require a sort of creativity have a high ranking; therefore, as they involve synthesis and creativity, they are assumed to be much more effective in learning and retention of new words. Furthermore, some researchers (e.g. Hulstijn & Laufer, 2001; Kim, 2008; Laufer, 2003) hold that writing activities have a higher learning task load based on the Involvement Load Hypothesis, thus they seem to be more helpful in learning new words. The non-significant difference between the effects of fill-in-the-blanks and definitions on the production of both types of collocations can be justified by the more comprehensive knowledge of the semantic and grammatical behavior of the collocations that are indispensable to the productive knowledge of collocations. Moreover, although fill-in-the-blank exercises provide partial contextualization as mentioned by Lee and Muncie (2006), they cannot help learners enhance productive knowledge unless some other noticing and

attention-raising activities are incorporated. Definitions, by their nature, can only provide the first meanings of the target collocations and do not yield too much information about the grammatical, semantic, and syntactic behavior of the collocations. Therefore, although the students who received treatments in the form of fill-in-the-blank exercises had a higher mean score on the productive test than the definitions treatment, such difference was not statistically significant.

A similar research study that has revealed the significance of sentence writing on the production of collocations was done by Webb (2005), who examined two groups of learners on reading and writing tasks. The results indicated the writing tasks to be superior in all recall measures. Along the same line, on the importance of structured productive practice on enhancing learners' ability to produce acquired words, Lee and Muncie (2006) exposed adult ESL learners to lexical items and found that learners used only 18.4-20.87% of those lexical items in free compositions. Afterward, they were directed and requested to practice the items and produce another composition. This time their writings included 67.5-68.7% of the items and two weeks later, they produced 50.5-63% of the items with only a very small and non-significant drop off on the third composition. Accordingly, guided sentence writings were proved to be significantly effective in producing lexical items. In the same study, Lee (2003) found that secondary ESL students produced 63.62% of the taught words in comparison to only 13.19% before the given treatment. After twenty-three days, they were given another composition to write. This time the percentage of 55.46% was an indicator of long-lasting gains. In general, what can be inferred from these two studies is that structured productive practice is highly influential on reaching higher levels of mastery, along with better retention of acquired words.

Conclusion

The current study drew some noteworthy conclusions. Firstly, sentence writing exercises turned out to be the most significant in the acquisition of lexical and grammatical collocations. Secondly, the gap-filling exercises influenced the learning of both lexical and grammatical collocations more than definitions. In other words, fill-in-the-blanks were of the second rank in acquiring and retaining both collocation types. The third significant result revealed the superiority of sentence writing exercises over the other two conditions, i.e. fill-in-the-blanks and definitions, in the retention of lexical and grammatical collocations. Moreover, it was determined that fill-in-the-blank exercises were much more influential in recalling lexical and grammatical collocations than definitions. Finally, EFL learners could perfectly produce the lexical and grammatical collocations through sentence writing exercises. Put it another way, sentence writing activity seemed much more helpful in the production of both collocation types. Additionally, no significant difference between fill-in-the-blank exercises and definitions in the production of both lexical and grammatical collocations was reported. By and large, among the three different conditions including definitions, fill-in-the-blanks, and sentence writing activities, the third group outperformed in the acquisition, retention, and production of both lexical and grammatical collocations.

The results reported in this study have pedagogical implications for three groups of people. First, EFL teachers can improve learners' collocation proficiency by applying sentence writing exercises in the classroom. EFL learners can build up their collocational knowledge by making use of such tasks. Syllabus designers can include valuable writing exercises in the development of English coursebooks in EFL contexts. No research study in SLA is perfect and, like any other study in applied linguistics, the current one

suffers from some limitations. First, due to the regulations of the target language institute where the study was conducted, the participants were selected non-randomly and through convenience sampling from seven intact classes. Besides, the data was collected from a relatively small number of participants and the selection of more than 66 learners was impossible. Furthermore, the implementation of this research took place only in one language institute, which could decrease the external validity of the study.

In this research study, several areas for further research could be taken into account. The first suggestion for further research is choosing a broader range of collocations and a larger sample of participants. Second, as there was no control group in this study, further research on lexical and grammatical collocations can be done by involving a control group. Third, as the pretest in this study was a bilingual matching test, similar research can be done by employing more valid and reliable monolingual tests to check the learner's initial knowledge of lexical and grammatical collocations before any treatments.

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Appendix A
List of the Target Lexical and Grammatical Collocations

Lexical Collocations	Grammatical Collocations
come to a compromise	accustomed to
commit a crime	associated with
conduct an investigation	brilliant at
deeply rooted in	by means of
do business with	contrary to
draw a conclusion	cross out
enthusiastic interest	delighted with
gender inequality	fascinated by
give an impression	figure out
have sympathy	for instance
highly controversial	furious about
keep track of	in essence
make progress	in line with
security forces	keep up with
speak one's mind	on the brink of
take responsibility	out of despair
take someone's advice	proud of
take turns	reputation for
utterly shocked	to excess
utterly stupid	under suspicion