

# The Role of Concordancing and Output in Developing the Collocational Competence<sup>1</sup>

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## Abstract

The present study explored the role of concordancing in learning lexical and grammatical collocations under two conditions, with and without output. It also set out to rank lexical and grammatical collocations in terms of the degree of the challenge they might impose on L2 learners. A total of 45 Iranian intermediate learners of English were randomly divided into an output, a non-output, and a control group. Learners received a six-session treatment in three different conditions; the output group was required to perform a story-writing task by searching for the collocations in concordancing. The non-output group only searched for collocations in concordancing without performing the tasks. The control group performed the tasks without having access to concordancing. The results of the pretest, as well as immediate and delayed posttests, analyzed by separate one-way ANOVAs indicated that the experimental groups outperformed the control group in learning collocations under the influence of concordancing. However, the achievement of the output group was superior to and more lasting than the non-output group.

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Findings also demonstrated that lexical collocations posed more challenge on all learners.

**Keywords:** Concordancing, grammatical collocations, intermediate level, lexical collocations, output

## Introduction

Concordancing, a software program to search for second language (L2) rules, words, and collocations in authentic contexts, has attracted the attention of researchers as an effective technological tool to help learners learn collocations in authentic naturally occurring language use (Daskalovska, 2015). Collocations, the co-occurrence of words, have been identified as one of the main components of developing native-like proficiency (e.g., Hill, 1999; Hsu & Chiu, 2008). However, L2 writers, even at the advanced level, experience difficulty in using collocations appropriately (e.g., Durrant & Schmitt, 2010). Concordancing can be taken as an immediate support for solving their problems and helping them become more autonomous and native-like writers (e.g., Yoon, 2016).

Previous studies have investigated the role of hands-on, i.e., computer-based (e.g., Mirzaee, Rahimi Domakani, & Rahimi, 2015; Rezaee, Marefat, & Saeedakhtar, 2015; Yoon, 2008; Yoon & Hirvela, 2004) and hands-off, i.e., paper-based (e.g., Boulton, 2010; Daskalovska, 2015; Vyatkina, 2016b) concordancing in learning L2 collocations, and all of them have concluded that concordancing is a powerful reference tool which facilitates learning L2 collocations. In spite of the positive effect of concordancing on learning L2 collocations (e.g., Çelik, 2011; Chang & Sun, 2009; Lee, Cheung, Wong, & Lee, 2013; Saeedakhtar, 2013; Sun & Wang, 2003; Vyatkina, 2016a; Wu, Witten, & Franken, 2010) there are some less-attended areas that need further examination.

Underlying all the previous studies has been Krashen's (1985) input hypothesis which attributes the success associated with concordancing in teaching collocations to the degree of exposure to the large pool of authentic input. In all previous studies learners were exposed to rich input in concordancing and were required to search for collocations and learn them. However, in order to ensure that learners have processed more elements in the input and have increased the amount of intake (VanPatten, 2002), they should be required to engage in production, identify the gap between their production and that of the target one, and try to fill the recognized gap by themselves (Swain, 1995). Swain's output hypothesis is the missing part of the previous studies conducted on concordancing. According to VanPatten's (2004) primacy of meaning principle, since collocations are more comprehensible, learners pay more attention to their meaning than form. Therefore, exposure to input, i.e., concordancing, alone cannot guarantee that the form of collocations would be part of the learners' intake. When learners are pushed to produce collocations,

they are likely to notice the gap, and channel their attention to the form of collocations as well.

Previous studies have ignored the role of output in benefiting from concordancing to learn L2 collocations. Few studies, if any, have investigated whether learners who are pushed to produce collocations to which they have been exposed in concordancing benefit more than those who are only exposed to them in concordancing. There is also great controversy around the most problematic type of collocations for L2 learners. Some researchers (e.g., Ceh, 2005; Chen, 2008) argued that lexical collocations are more problematic for L2 learners while some others (e.g., VanPatten, 1985) asserted that grammatical ones are more challenging. Therefore, the aims of the present study were two-fold: It intended to compare the condition in which learners only received collocations in concordancing (providing access to input) with the condition in which, after exposure to collocations in concordancing, learners were required to produce those collocations in their own writing (providing opportunities for output). It also intended to examine the most problematic type of collocations (i.e., lexical or grammatical) for L2 learners.

## Review of the Literature

### *Collocations*

The term collocation refers to the frequent co-occurrence of two or more words in a text (Sinclair, 1991) such as *protect against*, *do laundry*, and *strong tea*. Hill (1999) argued that developing collocational competence is a must for achieving native-like proficiency. Later, some researchers (e.g., Shin & Nation, 2008) concluded that collocational knowledge can improve learners' speaking and writing. Others (e.g., Hsu & Chiu, 2008; Lin, 2002) found that collocational knowledge enhances learners' writing and reading skills. In light of the above-mentioned findings, it is clear that developing collocational knowledge is of paramount importance in achieving L2 proficiency.

To date, different studies (e.g., Bahns & Eldaw, 1993; Huang, 2015; Nesselhauf, 2003; Paquot & Granger, 2012) have elicited learners' knowledge of L2 collocations at different levels of proficiency and have unanimously concluded that even advanced learners fail to produce collocations accurately. Consequently, attempts were made to incorporate collocations into L2 pedagogy to obviate such a deficiency. The empirical studies carried out to teach collocations to L2 learners can be mainly classified into three strands. The studies of the first strand (e.g., Tseng, 2002; Webb & Kagimoto, 2009, 2011) investigated the role of explicit teaching in learning collocations and concluded that learners benefit from explicit teaching since it accelerates the learning process (Ellis, 2001). The studies of the second strand (e.g., Webb, Newton, & Chang, 2013) leveled criticism at explicit instruction in which only a limited number of collocations can be addressed, and emphasized the role of implicit instruction in teaching L2 collocations. However, implicit instruction has been questioned too, because it is a slow process which needs a large

amount of input and exposure. With the advent of technology, the third strand of studies (e.g., Rezaee et al., 2015; Vyatkina, 2016a; Yoon & Jo, 2014), i.e., corpora and concordancing, emerged. They are an inductive way of learning collocations through discovery learning.

Vyatkina (2016a), for instance, attempted to compare the role of hands-on and hands-off data-driven learning (DDL) in learning 20 German verb-preposition collocations. She also explored the effect of learners' proficiency and their DDL perception on the performance of verb-preposition collocations. For this purpose, 10 (five male and five female) American intermediate-advanced learners of German participated in 16 sessions. All learners had access to DDL under two identical conditions (i.e., hands-on and hands-off). Results showed that both hands-on and hands-off conditions were effective in improving verb-preposition collocations. However, performance on the gap-filling task (more controlled test) was superior to the sentence writing task (less controlled task). Findings demonstrated a positive role for perception and proficiency. Those who were interested in DDL did better on the gap-filling test, and more proficient learners did better on the sentence-writing task.

### *Concordancing in Learning L2 Collocations*

In the age of ever-developing technology, many researchers have chosen to focus on teaching collocations through different technological tools. They have concluded that computer-assisted language learning (CALL) has a positive influence on classroom activities and L2 learning (e.g., Lee et al., 2013). CALL "aims to enhance the learning environment, meet individual learning requirements, enrich learning experiences, and diminish the conventional role of the teacher by overcoming the restrictions of traditional instruction" (Çelik, 2011, p. 273). Recently, researchers have emphasized the role of inductive approaches against deductive ones in learning L2 collocations (Sun & Wang, 2003). One of these inductive tools which has been intimately used in teaching collocations is concordancing which is the "most frequently used tool to explore corpora, specifically with a view to examining collocational use" (Wu et al., 2010, p. 84). Through this program, learners find a selected word along with a large pool of authentic sentences containing that word (Rezaee et al., 2015). Concordancers are superior to conventional dictionaries, grammar books, and textbooks, because they expose learners to huge amounts of authentic language, promote the learners' analytical capacities, and support the development of learner autonomy (Gabel, 2001).

The superiority of concordancing to dictionaries and textbooks might be explained by Laufer and Hulstijn's (2001) involvement load hypothesis (ILH). ILH includes three components, namely *need*, *search*, and *evaluation*. *Need* is the obligation of a word in a context, *search* is looking for a word, and *evaluation* is the juxtaposition of a few words to choose the best one. Concordancing has the potential to incorporate these three components by requiring learners to write a collocate for a node (the *need* component), to search the concordance and find

the right collocate (the *search* component), and compare the collocates to choose the most suitable one (the *evaluation* component) (Wu et al., 2010). According to Laufer and Hulstijn (2001), when all components are triggered, the involvement load is high and, in turn, learning will be more effective (e.g., Rezaee et al., 2015; Wu et al. 2010). Since concordancing engages learners in all three components, the involvement load is high and consequently learning is long-lasting.

To date, different studies have investigated the role of concordancing in EFL learning, for example, in learning collocations (e.g., Çelik, 2011; Jafarpoor, Hashemian, & Alipour, 2013; Kita & Ogata, 1997; Vyatkina, 2016a), vocabulary learning (e.g., Cobb, 1999; Mirzaei et al., 2015; Murphy, 1996; Okamoto, 2015; Rezaee et al., 2015), grammar (e.g., Lin & Lee, 2017; Tribble, 1990), pronunciation (e.g., Qian, Chukharev-Hudilainen, & Levis, 2018), and writing (e.g., Kennedy & Miceli, 2010; Yoon, 2016; Yoon, 2008; Yoon & Jo, 2014), and most of them have demonstrated that concordancing is one of the most effective ways of teaching collocations with long-lasting effects. Rezaee et al. (2015), for example, examined the role of scaffolding in benefiting from concordancing to learn lexical and grammatical collocations. Results demonstrated that concordancing improved learners' reception and production of collocations on immediate and delayed posttests. However, scaffolding did not improve the use of concordancing significantly due to some factors such as novelty effect and collocation wisdom.

### *Output*

Krashen (1985) argued that the input which is comprehensible enough to the learners is the most necessary condition for language learning, provided that it is of interest, relevant to the learners, and the learners pay attention to it (Donesch-Jezo, 2011). However, Swain (1995) questioned the adequacy of input and claimed that, to learn the language, learners need output in addition to the received input.

By attempting to produce output, learners notice what they do not know or know only partially. Therefore, they try to fill that gap by turning to a dictionary, a book, or by asking peers or teachers (Russell, 2014). Some researchers (e.g., Ellis, 2001; Mitchell & Myles, 2004; Shehadeh, 2002) stated that the role of output in L2 learning has not been well-established yet, because there is a shortage of studies to prove the effective role of output in L2 learning.

Liming (1990) argued that in order to learn L2 successfully, we should not look at input or output in isolation; rather, we need to pursue an amalgamation of both. Although one of the main reasons for the success of concordancing in teaching collocations is exposing learners to rich and authentic input, some degree of output is necessary to guarantee its influence. Inspired by Swain's (1995) output hypothesis, the effects of concordancing can be enhanced if learners notice the so-called gap between their production and that of the target language and try to fill it by discovery learning. To strengthen the influence

of input, some studies (e.g., Donesch-Jezo, 2011; Rezvani, 2011; Russell, 2014) urged learners to produce whatever they have already received in the input.

Rezvani (2011), for instance, attempted to explore the effect of output on learners' receptive knowledge of grammatical collocations. Ninety participants were randomly divided into two experimental groups and a control group on the basis of the results of the proficiency test and the pretest. The first experimental group received a reading passage to reconstruct some sentences based on the information given in the passage. The second experimental group had access to the same reading passage but the embedded grammatical collocations were in bold typeface or underlined. After reading the passage, they were supposed to answer some reading comprehension questions. The results showed that the two experimental groups outperformed the control group in recognizing grammatical collocations, but there was no significant difference between the output and non-output groups.

Contrary to the findings of Rezvani (2011), Donesch-Jezo (2011) and Russell (2014) found a positive role for the output. The studies conducted on the role of output in L2 learning have yielded contradictory results. Moreover, a look into the literature reveals that few studies have been conducted on the role of output in benefiting from concordancing in learning lexical and grammatical collocations. There are also contradictory results about the most challenging type of collocations to L2 learners. Some researchers (e.g., Ceh, 2005; Sadighi & Sahragard, 2013) concluded that lexical collocations are more problematic because they include a wider range of words and mostly they are not provided in the dictionaries, while some others (e.g., Benson, Benson, & Ilson, 1997; Hassan Abadi, 2003) found that grammatical ones are more difficult. A look into the literature indicates that there are few studies, if any, on the role of output in the effectiveness of concordancing. The present study intended to shed some light on the influence of hands-on concordancing and output on learning lexical and grammatical collocations by answering the following research questions:

1. Would concordancing improve Iranian intermediate learners' productive performance of lexical and grammatical collocations?
2. Would opportunities for output (after exposure to concordancing) help learners learn lexical and grammatical collocations more effectively?
3. Which collocations are more problematic for the output and non-output groups, lexical or grammatical?

## **Method**

### *Participants*

In this study, 60 volunteer Iranian intermediate learners of English (22 male and 38 female) were recruited. Their average age was 22 years. All of them were bilingual in Azari Turkish and Persian or Kurdish and Persian. Fifty-six of them were majoring in English. On the basis of the results of the proficiency test, 15 participants were excluded and 45 learners (18 male and 27 female)

were randomly divided into two experimental groups (i.e., output and non-output) and a control group. Each group included 15 learners. The participants were assured that their personal information and data would be kept anonymous during and after the study.

### Concordancer

Concordancer 3.3 was installed on 12 computers to expose the experimental groups to the target collocations. This software was downloaded from [www.concordancesoftware.co.uk](http://www.concordancesoftware.co.uk). On the left side of the program, there is a column named *headword* which includes a list of nodes. By just one click on every node, the concordance lines appear on the right with the collocates on the left or right of the node. Learners were required to click on each concordancer line to have access to the context within which collocations were embedded. Every session, 15 nodes along with 10-15 authentic examples downloaded from <http://corpus.byu.edu/bnc> were incorporated into concordancing. Figure 1 illustrates a screenshot of concordancing.

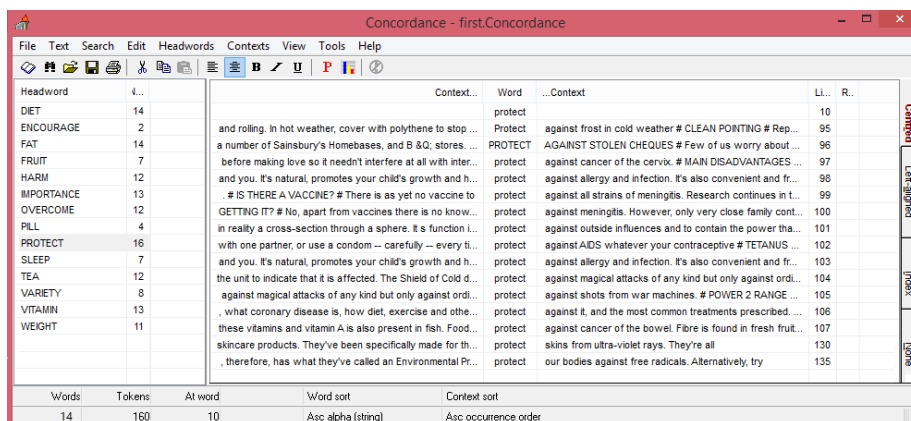


Figure 1. The screenshot of concordancing

### Collocations

During the six-session treatment, learners were taught 84 collocations (including 45 lexical and 39 grammatical). Lexical collocations included 23 adjective-noun (e.g., *heated debate*) and 22 verb-noun (e.g., *achieve improvement*) types, and grammatical ones included 21 verb-preposition (e.g., *stare at*) and 18 preposition-noun (e.g., *on diet*) types (See Appendix). The nodes of these collocations were selected based on their frequency level in Collins Cobuild English dictionary (frequency level of 3 and 4). The collocates were chosen based on the highest mutual information (MI) from Brigham Young-British National corpus available at <http://corpus.byu.edu/bnc>. MI shows



the strength and association between the node and the collocate (Church & Hank, 1990) and ranges 0-17 (Siyanova & Schmitt, 2008). Zero MI shows that the node and the collocate have been used with each other accidentally, but the highest range, i.e., 17, represents that there is a strong association between the node and the collocate. Attempts were made to choose collocations which were semantically related to the pre-selected topics of story-writing tasks.

### *Story-Writing Tasks*

Following Saedadakhtar (2013), six story-writing tasks were designed for the present study. The topics were *nutrition, wedding, travel, accident, depression,* and *divorce*, respectively. Each story-writing task included a topic along with 14 related nodes (eight lexical and seven grammatical), followed by the type of the collocate (i.e., adjective), and their Persian equivalents (e.g., [adj] cold: heavy cold (سرمای شدید)). The output group was required to go through concordancing, find an appropriate collocate for the given nodes, and write a story incorporating all those 14 collocations. The story-writing tasks were given to the output and control group only. They were required to write a story by finding an appropriate collocate for the given nodes and embedding those collocations under different conditions, i.e., with and without having access to concordancing. To ensure the reliability, the tasks were piloted on 11 intermediate learners before giving them to the main participants. Moreover, two experts were consulted with to ensure the clarity and accuracy of the tasks. Two small changes were made to the story-writing tasks after the pilot study.

### **Procedure**

The present study was conducted in simulated classes. A nine-session extracurricular program was held for each group. The classes were held at 11-1 am three times a week in fall 2015 in the computer room of the University of Mohagheghe Ardabili, Iran. Sixty learners volunteered to participate in the program. All learners were given the *Preliminary English Test (PET)*, as the proficiency test, in the first session to ensure their homogeneity in terms of their level of proficiency. The test consisted of four sections, namely reading, writing, speaking, and listening. Due to practicality concerns, the listening section of the test was excluded. The cut-off score after removing the listening part was 52.5. Those learners who obtained 45-55 were selected to be included in this study. It took about 80 minutes to complete the proficiency test.

Immediately after the proficiency test, all learners were given a pretest to ensure that they had difficulty producing the target collocations. In the pretest, learners were given a topic along with 20 related nodes (14 collocations from the pool of the target ones and six collocations as distractors, which were not included in the target collocations and were not scored) to write an imaginary two-paragraph story on a wedding ceremony. Similar to the story-writing tasks, the learners were provided with the Persian equivalents and the type of the



collocate to embed 10 grammatical and 10 lexical collocations in their writing. For example, they were given [(verb-weight) وزن کردن] and were supposed to write *lose weight*. There was no time limit for writing the story, but it took about 30 minutes. Then, the learners' correct use of collocations was given one score and counted. According to the results of the proficiency test and pretest, 15 participants were excluded, and finally 45 learners were randomly divided into two experimental groups (i.e., output and non-output) and a control group (15 in each).

In session two, the experimental groups received a brief explanation on collocations and concordancing, and were instructed for 15 minutes on how to make use of concordancing. The concordancing software was installed on 12 computers. During the six treatment sessions, the output group received a topic with a list of related nodes, searched for a collocate for the given nodes in concordancing, and then performed the story-writing task by incorporating 14 collocations in their stories. Each session, learners were exposed to only 14 collocations in concordancing so that they would not be distracted by a large pool of information. There was no time limit for performing the tasks. It took about 60 minutes to complete the task in the first session but from the following sessions on, as learners became more familiar with the procedure, they spent less time performing the tasks.

The non-output group received the same list of nodes without any topic. They were required to search for a collocate for the given nodes in concordancing and just read the examples on the screen of the computer without producing any sentence. There was no time limit for reading the examples. The control group performed the same tasks without having access to concordancing. The stories written by the output and control groups in the six-session treatment were not scored.

In the 8<sup>th</sup> session, all participants completed a parallel story-writing task with a different topic as the immediate posttest. Like the pretest, the immediate posttest included 20 collocations (14 collocations that were the same as the pretest, and another set of six distractors, which were not scored but were used in order to decrease the test effect). They were supposed to write an imaginary story incorporating 20 collocations. After three weeks, another parallel story-writing task with a different topic was administered as the delayed posttest. Like the immediate posttest, it included 14 common collocations and another set of six distractors. Both the immediate and delayed posttests were scored like the pretest.

## Results

The first research question investigated the role of concordancing in producing lexical and grammatical collocations. To ensure the homogeneity of the three groups prior to the study, an ANOVA was run on the results of the proficiency test. The results demonstrated that there was no significant difference among the three groups,  $F(2, 42) = 0.530, p = 0.593$ .

Prior to running one-way ANOVAs, the normality distribution was assessed by checking Levene's test for homogeneity on the scores of the proficiency test, pretest, and posttests. Results supported the equality of variance assumption across groups on the proficiency test,  $p = 0.865$ , pretest,  $p = 0.534$ , immediate posttest,  $p = 0.170$ , and delayed posttest,  $p = 0.215$  (Table 1).

**Table 1.**  
*The Results of the Test of Homogeneity of Variance for Scores*

	Levene Statistic	df1	df2	Sig.
Proficiency test	.145	2	57	.865
Pretest	.635	2	42	.534
Immediate posttest	1.82	2	42	.170
Delayed posttest	1.57	2	42	.215

Another one-way ANOVA was run on the data of the pretest. Table 2 represents the descriptive statistics of the three groups' performance on the pretest.

**Table 2.**  
*Descriptive Statistics for the Pretest*

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
<b>Output</b>	15	3.2000	1.93465	.49952	2.1286	4.2714	1.00	7.00
<b>Non-output</b>	15	4.1333	1.68466	.43498	3.2004	5.0663	.00	7.00
<b>Control</b>	15	3.1333	2.26358	.58445	1.8798	4.3869	.00	8.00

A look at the mean scores of the three groups indicates that they performed similarly on the pretest. The between-groups ANOVA results for the pretest

showed that there was no significant difference among the three groups on the pretest,  $F(2, 42) = 1.20$ ,  $p = 0.311$ . The third one-way ANOVA was run on the data obtained from the immediate posttest. The descriptive statistics are displayed in Table 3.

**Table 3.**  
*Descriptive Statistics for the Immediate Posttest*

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
<b>Output</b>	15	10.3333	2.63674	.68080	8.8732	11.7935	6.00	15.00
<b>Non-output</b>	15	8.6667	1.75933	.45426	7.6924	9.6410	5.00	11.00
<b>Control</b>	15	2.4000	2.16465	.55891	1.2013	3.5987	.00	7.00

As shown in Table 3, the mean scores of both experimental groups (the output group:  $M = 10.33$ ,  $SD = 2.63$ , and the non-output group:  $M = 8.66$ ,  $SD = 1.75$ ) were much higher than that of the control group ( $M = 2.40$ ,  $SD = 2.16$ ). It indicated that both experimental groups performed better than the control group in producing accurate collocations under the influence of concordancing.

Results of one-way between-groups ANOVA for the immediate posttest showed that there was a statistically significant difference among the performance of the three groups on the immediate posttest,  $F(2, 42) = 53.44$ ,  $p = 0.000$ .

To answer the second research question, the role of output in benefiting from concordancing, a Scheffe post-hoc test was conducted to determine the exact location of the difference. The results showed that there was a significant difference between the experimental groups and the control group in producing collocations,  $p = 0.000$ . However, there was no significant difference between the output and non-output groups on the immediate posttest,  $p =$

0.133. Then output did not influence the performance of the learners on the immediate posttest.

The three groups' performance on the delayed posttest was analyzed through another one-way ANOVA. Table 4 displays the descriptive statistics for the delayed posttest.

**Table 4.**  
*Descriptive Statistics for the Delayed Posttest*

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
<b>Output</b>	15	9.4667	2.29492	.59255	8.1958	10.7376	6.00	13.00
<b>Non-output</b>	15	6.7333	3.01109	.77746	5.0658	8.4008	3.00	12.00
<b>Control</b>	15	2.6667	2.66369	.68776	1.1916	4.1418	.00	9.00

The mean scores of the three groups showed that the output group outperformed the non-output group which, in turn, did better than the control group in producing L2 collocations. Results of the between-groups ANOVA for the delayed posttest represented that there was a significant difference among the performance of the three groups on the delayed posttest,  $F(2, 42) = 24.58$ ,  $p = 0.000$ . The results of the Scheffe post-hoc test run for the delayed posttest showed that not only was there a significant difference between the experimental groups and the control group in producing L2 collocations, but also there was a significant difference between the output and non-output groups,  $p = 0.027$ . Output appears to have played a significant role in the performance of the learners on the delayed posttest.

The third research question addressed the type of collocations, i.e., lexical or grammatical, which is more problematic for Iranian intermediate learners. To examine the performance of learners as to producing lexical and grammatical collocations, two separate MANOVAs were run on the immediate and delayed

posttests. The descriptive statistics for the immediate posttest is shown in

Table 5

**Table 5.**  
*Descriptive Statistics for the Types of Collocations in the Immediate Posttest*

	Group	Mean	Std. Deviation	N
Grammatical	Output	10.3133	3.54660	15
	Non-output	9.8600	2.66480	15
	Total	10.0867	3.09089	30
Lexical	Output	10.3580	3.61207	15
	Non-output	6.9560	2.22461	15
	Total	8.6570	3.41772	30

Results revealed that the mean of the grammatical collocations was higher than the lexical ones in the performance of both the output and non-output groups. The findings also demonstrated that the output group (grammatical:  $M = 10.31$ ,  $SD = 3.54$ ; lexical:  $M = 10.35$ ,  $SD = 3.61$ ) performed much better than the non-output group (grammatical:  $M = 9.86$ ,  $SD = 2.66$ ; lexical:  $M = 6.95$ ,  $SD = 2.22$ ) in learning L2 collocatins on the immediate posttest.

The results of Wilks' Lambda = .049 of the multivariate tests for the immediate posttest indicated that there was a significant difference between lexical and grammatical collocations,  $F(1, 28) = 264.5$ ,  $p = 0.000$ . Learners produced more accurate grammatical than lexical collocations. Another MANOVA was run for the results of the delayed posttest (Table 6).

**Table 6.**  
*Descriptive Statistics for the Types of Collocations in the Delayed Posttest*

	Group	Mean	Std. Deviation	N
Grammatical	Output	9.4067	3.00463	15
	Non-output	7.5933	3.84809	15
	Total	8.5000	3.51529	30
Lexical	Output	9.5480	3.61207	15
	Non-output	5.4980	2.67247	15
	Total	7.5230	3.74012	30

Results demonstrated that, like the immediate posttest, the mean of the grammatical collocations was higher than that of the lexical ones. The findings also indicated that the output group (grammatical:  $M = 9.40$ ,  $SD = 3.00$ ; lexical:  $M = 9.54$ ,  $SD = 3.61$ ) performed much better than the non-output group (grammatical:  $M = 7.59$ ,  $SD = 3.84$ ; lexical:  $M = 5.49$ ,  $SD = 2.67$ ) in learning L2 collocations. The results of Wilks' Lambda = .091 of the multivariate tests for the delayed posttest indicated that there was a significant difference between the lexical and grammatical collocations,  $F(1, 29) = 134.9$ ,  $p = 0.000$ . Like the immediate posttest, learners produced less accurate lexical collocations on the delayed posttest.

## Discussion

The first research question addressed the role of concordancing in improving lexical and grammatical collocations. Results showed that the experimental groups outperformed the control group in learning lexical and grammatical collocations both on the immediate and delayed posttests. The results are in line with those of previous studies (e.g., Chambers & O'Sullivan, 2004; Chan & Liou, 2005; Chang & Sun, 2009; Daskalovska, 2015; Rezaee et al., 2015; Saeedakhtar, 2013; Sun & Wang, 2003; Vyatkina, 2016a; Yeh, Liou, & Li, 2007) that reported the positive role of concordancing in learning L2 collocations. Concordancing is an effective way of teaching collocations because it "provides learners with authentic and contextualized materials which have the potential to result in deeper engagement and long-lasting learning" (Rezaee et al., 2015, p. 15). It can also help learners discover the patterns of the language and modify their misconceptions by noticing authentic examples (Hill, 2000). Tribble and Johns (1990) claimed that, through concordancing, learners can be exposed to different authentic examples of vocabulary, collocations, and grammar, so it turns out to be a learner-centered learning which urges learners towards discovery learning.

The outperformance of the experimental groups on the immediate and delayed posttests can be attributed to Laufer and Hulstijn's (2001) ILH. Concordancing can provide the situation in which all components of ILH, i.e., *need*, *search*, and *evaluation*, are highly triggered and, as a result, ILH is high and learning is reinforced as effectively as possible.

The second research question investigated the influence of output on benefiting from concordancing. Findings showed no statistically significant difference between the performance of the output and non-output groups on the immediate posttest. This result is in line with that of some previous studies (e.g., Rezvani, 2011) which concluded that output cannot help learners benefit from the received input and internalize it effectively. These findings, however, are contrary to those of other studies (e.g., Donesch-Jezo, 2011; Russell, 2014) which have proven the positive role of output.

The non-significant difference of the experimental groups on the immediate posttest may be attributed to three reasons. Firstly, it might be due to Clark and Sugrue's (1988) "novelty effect". In the present study, since both experimental groups were enthusiastic enough to learn collocations through a completely new experience, i.e., concordancing - as they reported at the beginning of the study - even the non-output group who was not given the opportunities for production improved their knowledge of collocations significantly as a result of paying more attention and being highly motivated. Lending support to the "novelty effect", Moos and Azevedo (2008) argued that when learners accomplish the tasks in hypermedia, their enthusiasm, cognitive processes, and motivation increase over time. Concordancing, as an instance of hypermedia, increases learners' motivation and confidence to learn L2 components efficiently (e.g., Hyland, 2003; Kennedy & Miceli, 2010; Yoon & Hirvela, 2004). Therefore,

when learners are involved in learning with full interest, pleasure, and motivation, the effect of autonomous and self-regulated learning may increase.

The second reason might be the prevention of learners from taking notes and writing down any collocation they learned in concordancing. If they were allowed to do so, they might have memorized them at home or might have learned them through more exposure and repetition rather than the influence of concordancing. Such prevention is more likely to trigger their motivation and consciousness to keep in mind those collocations. Winter, Greene, and Costich (2008) stated that to learn any material in CALL, learners need high degrees of cognition and engagement in comparison with the traditional explicit teaching in which they put more emphasis on taking notes to which they refer when they prefer. In this study, learners were not allowed to take any note; therefore, the only opportunity for learning the target collocations was deep mental involvement.

The third reason for the non-significant performance of the experimental groups on the immediate posttest may be the user-friendly nature of Concordancer 3.3 used in the present study. Every session the participants of the experimental groups were exposed to only 14 collocations followed by 10-15 examples for each collocation rather than being flooded and distracted by a large pool of data. Therefore, learning those collocations in a limited number of authentic examples was not a challenging task for the experimental groups.

However, there was a statistically significant difference between the output and non-output groups on the delayed posttest. The output group outperformed the non-output group in benefiting from concordancing in producing more accurate lexical and grammatical collocations. One justification for such a finding might be that the so-called "novelty effect" vanished towards the delayed posttest, and output played a significant role in learning L2 collocations. Swain (2005) believes that comprehensible output is important for long-lasting learning because it guarantees mental grammatical processing and is the most effective stimulus for the development of the learners' interlanguage. Although providing opportunities for output failed to moderate the effect of concordancing on the immediate posttest, it did result in the significant outperformance of the output group on the delayed posttest.

Results of the third research question, which intended to identify the most challenging type of collocations (i.e., lexical and grammatical) indicated that lexical collocations were more problematic for both the output and non-output groups on the immediate and delayed posttests. Findings of the present study are in line with those of previous studies (e.g., Ceh, 2005; Chen, 2008; Keshavarz & Salimi, 2007) which found that lexical collocations are more problematic for learners than grammatical ones. Sadighi and Sahragard (2013) claimed that lexical collocations are difficult and "the reason is that there is no explicit rule for lexical collocations" (p. 123). Furthermore, Ceh (2005) and Le (2010) argued that grammatical collocations can easily be acquired through exposure and there is no need for any intervention.



## Conclusion

This study investigated the role of concordancing in learning lexical and grammatical collocations; it also examined the influence of output on benefiting from concordancing. The results showed that both the experimental groups outperformed the control group in learning lexical and grammatical collocations under the influence of concordancing. However, there was no significant difference between the experimental groups regarding the influence of output on the immediate posttest. This may be because of the novelty effect, user-friendly nature of the concordancer, and learners' enthusiasm. However, there was a significant difference between the experimental groups on the delayed posttest which can fortify the positive and long-lasting influence of Swain's (1995) output hypothesis. The results also revealed that lexical collocations were more challenging than the grammatical ones both on the immediate and delayed posttests.

The present study is not free from shortcomings. First of all, the participants were all intermediate-level learners. Maybe other levels of proficiency would lead to different results. The second limitation is that the participants of each group were limited to 15 learners who were volunteers. According to Ary, Jacobs, Sorensen, and Razavieh (2010),

People who volunteer for a study may differ in some important aspects from non-volunteers. If the researcher then compares volunteers with non-volunteers following the experimental treatment, the researcher does not know if the differences are caused by the treatment or by preexisting differences between the two groups. (p. 278)

The present study highlighted the role of concordancing and output in learning lexical and grammatical collocations which have been neglected in Iranian classrooms and textbooks. The results of this study may encourage syllabus designers to incorporate collocations into textbooks and, if possible, incorporate technology-enhanced tools such as concordancing into L2 classrooms to let learners develop their collocational competence along with other competencies. This study can also inspire teachers to pay more attention to the importance of collocations in mastering the language and try to teach them to learners through recent technological tools. It can also make learners aware of their poor knowledge of collocations and encourage them to learn collocations as enthusiastically as possible through novel and modern technology-enhanced tools.

Future researchers are recommended to incorporate other levels of proficiency, i.e., beginner and advanced levels, to examine the role of output in more detail. It is also suggested that they subdivide both the output and non-output groups into two sub-groups, where half of the learners can work individually and the other half can work collaboratively with their peers, to measure the role of group-working as another variable in benefiting from concordancing.

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## Appendix

The List of the Target Collocations in Conjunction with the Frequency of the Node (F) and Mutual Information (MI)

<b>Adjective-noun</b>	<b>F</b>	<b>MI</b>			
Deep impression	3	7.77	Serve dinner	4	6.17
Dried fruit	4	11.61	Take a pill	3	6.71
Fatal accident	3	12.55	Wear make-up	3	11.60
Freezing cold	4	13.2			
Frequent cry	4	7.06	<b>Verb-preposition</b>	<b>F</b>	<b>MI</b>
Frequent travel	4	7.69	Accuse of	4	4.48
Heated debate	4	11.28	Coat with	3	3.78
Heavy rain	4	11.15	Comment on	4	6.49
Heavy snow	3	8.68	Convince in	3	3.07
Heavy traffic	3	9.64	Cope with	3	7.13
Horrific crash	4	12.82	Cross over	4	4.01
Immense rage	3	9.24	Cry for	4	4.08
Juicy fruit	4	11.32	Defeat by	4	4.96
Little celebration	3	5.53	Encourage towards	4	7.21
Paramount importance	3	12.43	Fine for	3	4.98
Proper sleep	4	7.12	Insist on	4	6.90
Qualified doctor	4	9.26	Knock on	3	6.32
Severe depression	3	9.96	Overcome by	3	6.87
Severe pain	4	9.24	Protest against	4	10.27
Significant difference	5	9.89	Resist at	3	4.73
Strong wind	4	8.79	Sink into	3	7.61
Thick make-up	3	8.60	Stare at	3	6.90
Weak tea	4	9.24	Struggle against	4	8.17
			Suspect for	4	3.6
			Trail across	3	6.53
			Trust in	4	4.23
<b>Verb-noun</b>	<b>F</b>	<b>MI</b>			
Achieve improvement	3	11.34	<b>Preposition-noun</b>	<b>F</b>	<b>MI</b>
Add variety	4	9.35	At sea	4	5.92
Allocate blame	4	11.18	Beneath weight	4	7.76
Arise sympathy	3	13.02	Beyond belief	3	10.99
Attend ceremony	3	13.81	By convention	3	6.32
Cast a glance	3	10.02	By permit	3	5.99
Cast doubt	4	12.59	In consequence	3	5.52
Catch cold	4	7.93	In excess	3	5.16
Cause damage	4	8.81	In luxury	3	3.23
Cause harm	3	9.44	In protest	4	4.81
Contain vitamin	3	10.29	In scene	4	4.20
Do surprise	4	9.48	On arrival	4	6.62
Draw breath	3	11.04	On diet	4	4.32
Express regret	3	8.75	On holiday	4	6.66
Generate belief	4	10.24	On purpose	4	5.17
Go shopping	3	8.45	Through the window	4	5.91
Go fishing	3	7.03	Under stress	4	7.63
Imply intervention	3	9.77	With fat	4	3.47
Imply recommendation	3	13.70	With rage	4	6.30