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The effects of syntactic vs. semantic feature analysis of words on Iranian EFL learners' reading comprehension

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Introduction: The development of learners' semantic and syntactic knowledge of words and vocabulary plays an essential role in reading comprehension. This study attempted to investigate and compare the impact of instructing syntactic and semantic analyses of word features on Iranian EFL learners' reading comprehension.

Methods: Three groups were selected: one was the control group and two were used as experimental groups. Students in all groups took part in a reading pretest. Two experimental groups received specific treatments, while the control group followed a traditional syllabus. All groups took part in a reading comprehension posttest at the end of the syllabus.

Results and discussion: The results revealed that the syntactic analysis group outperformed the semantic analysis and control groups in the posttest. In addition, the participants in the semantic analysis group outperformed the students in the control group in the posttest. The results of this study could help teachers, learners, and textbook writers to improve reading skills in teaching, learning, and material development.

KEYWORDS

EFL learners, reading comprehension, semantic feature analysis, syntactic feature analysis, words

Introduction

Connecting vocabulary learning and reading comprehension is the most established approach in instructive exploration. Learners' word discernment ability, vocabulary development, and comprehension improvement are fundamental to a good reading program. Reading instruction that spotlights the development of learners' vocabulary upgrades their capacities to deduce implications and better grasp what they read (Braze et al., 2016). Word information is critical for reading comprehension and regulates how learners can understand the texts they read in language classes. Hence, if a learner does not have an idea about the meanings of some words in the text, comprehension will not be imaginable. Reading provides a rich source of vocabulary and structure; consequently, it assists in the further development of different abilities such as composition and speaking. Reading is thus a form of self-directed individual study, enabling students to continue contact with the language outside the English classroom.

Reading is important not only for enabling learners to read and comprehend materials effectively but also for utilizing insightful abilities to foster the right response through comprehension. The advancement and development of the learners' vocabulary, particularly for individuals who encounter trouble, empowers them and means that they are more likely to grasp what they read as well as increase their capacity to comprehend. Reading comprehension is a complicated endeavor that includes many degrees of processing. One of the essential parts of comprehension is the capacity to manage new words encountered in a message. Traditionally, learning new words has been mostly left to the learners and has been given only accidental consideration in numerous reading materials and language programs (Brybaert et al., 2019).

Vocabulary specialists concur that reading comprehension relies on understanding 90–95% of the words in a text. Knowing at least 90% of the words empowers the reader to get the principal idea from the passage and infer accurately what a significant number of the new words mean, assisting them with learning new vocabulary items (Hirsch, 2003).

Accordingly, contextual, semi-contextual, and de-contextual techniques of instructing vocabulary assist learners to learn words. Nation (1990) proposes a deliberate methodology instead of a coincidental way to deal with vocabulary instruction and contends that such a method is a fundamental aspect of a language course. He pointed out that coincidental learning has restrictions and that L2 learners are frequently unfit to profit from accidental vocabulary learning. He represents various systems for emphasizing vocabulary as a medium for communicative task development and stated that vocabulary teaching ought to be coordinated into the four language skills (Nation, 1990).

Instruction of vocabulary has to be dynamic and ought to consider different aspects of the learners' mental lexicon. However, it is important to involve techniques to work with the lexical union in the learners' memory. Thus, learning words needs to include a wide range of abilities (Zimmerman, 1997). According to Eddington and Tokowicz (2015), vocabulary knowledge increases reading comprehension.

Nevertheless, the type of expectations from language learners has been adjusted recently. They should be able to adapt to any learning difficulty while acquiring different language skills of listening, speaking, reading, and writing. Furthermore, there is an intense propensity toward turning students into autonomous learners and diminishing their dependence on the instructional materials used in teaching learning strategies (Francis et al., 2018), including vocabulary learning strategies.

Language learners do not have much exposure to vocabulary learning strategies. The most widely recognized strategies taught to language learners by instructors involve utilizing dictionaries and writing down new words in notebooks. Additionally, research showed that Asian learners favor using dictionaries similar to what has been found in Schmitt (1997) study.

Other instruments for additional processing or strengthening of new words are only occasionally brought to the language class, resulting in the learners' low cognizance of techniques they can use. From a comparative perspective, Shen (2003) outlines the necessity of presenting a more considerable scope of learning procedures for learners. Therefore, this study aimed to investigate and compare the impact of instructing syntactic and semantic analyses of word features on the development of Iranian EFL learners' reading comprehension. Accordingly, the following research question was posed:

Is there any significant difference among the effects of syntactic and semantic feature analysis of words as two different learning strategies on Iranian EFL learners' reading comprehension?

Literature review

Vocabulary learning

Vocabulary knowledge plays an important role in language learning. An extensive vocabulary allows you to speak and write interestingly and clearly. Your knowledge of words is also closely related to your understanding of what you read and hear. Therefore, students' language capacity will be enhanced by vocabulary development (Linse, 2006). The question, then, is how the vocabulary of a given language is acquired. While learning L1, a child can learn some responses without an underlying concept. Hiebert et al. (2018) asserted that a child might learn to echo a word without understanding it, or they may use it in an inappropriate context, but learning L2 lexical items, particularly by an adult, occur meaningfully. In other words, the adult should be able to use the words in a linguistically acceptable approach.

According to Kangas (2017), it is sometimes held that children informally *acquire* language whereas adults *learn* language by the conscious application of rules. In learning the vocabulary of a given language, one learns two categories, namely, linguistic (word) and extra-linguistic (object). A word may be uttered with different pronunciations by different people and even by a single person on different occasions. In contrast, the object to which a particular word refers may vary in size, color, material, location, etc, but it is considered the same object. If these two categories match perfectly, it can be claimed that a concept (word) has been acquired; moreover, word knowledge has linguistic, sociolinguistic, and psycholinguistic aspects. As Stoller and Grabe (1993) put it, "word knowledge includes the ability to recall meaning, infer meaning, comprehend a text, and communicate orally" (p. 122). At that point, the lexical capability is undeniably more than the ability to characterize a limited number of words. Hiebert et al. (2019) argued that knowing a word includes having incredible information about each word and its semantic features. The process through which

learners acquire this information seems to happen slowly over an extensive period of time, which is extremely perplexing and hard to examine. Learners construct complex organizations of relationships in their mother tongue over many years and are to some extent prone to develop the size of their perceived vocabulary; then, they continue toward fluency and proficient use of the words.

Kieffer and Box (2013) expressed that vocabulary items should not be learned in isolation or memorized without understanding their meanings and uses. Furthermore, learning new words is a progressing process; that is, words are improved and laid out as they are met again (Nation, 2001). Hence, the “look and remember” method of vocabulary learning is by all accounts not exceptionally powerful for English language learners. However, Rivers (1981) suggested a few unique points that learners need to obtain to learn vocabulary. These points include transferring vocabulary to long-term memory, detecting morphemes that recur in a number of words, discovering new words for themselves, and knowing the elastic quality of vocabulary.

Reading comprehension

Reading is not a solitary activity that occurs in a vacuum. Nagy and Townsend (2012) contend that the reading process is mentally considered intrapersonal critical thinking that happens in the information design of the reader’s cerebrum. In this way, understanding a text requires various processes and strategies.

While reading, students encounter various problems in understanding the text, such as a lack of vocabulary, the inability to handle the syntactic intricacy of the text, insufficient reading abilities, and a lack of motivation. Managing these issues needs various cycles and approaches, a few of which will be discussed in the following sections.

According to Goodwin and Cho (2016), reading is the ability to exchange information from one person to another through previously acquired knowledge and skills to comprehend what someone else has coded. They state that reading cannot be a passive skill as was once believed, as this approach neglects to consider the role of the reader. In their view, reading is a receptive skill, in that the reader receives a message from the writer and tries to decode it. Since the message conveyed in the text is delivered by using appropriate vocabulary, using strategies to develop learners’ knowledge of words plays a significant role in their reading comprehension.

Vocabulary learning strategies

Hatch and Brown (1995) define five steps for the process of foreign language vocabulary learning. They are (1) reading the material in which learners may encounter new vocabulary items;

(2) making a clear visual, auditory, or both conceptualization of the forms of vocabulary items; (3) acquiring the meaning of the vocabulary items; (4) making a robust memory link between the forms and the meanings of the vocabulary items; and (5) using the items in their productions. According to Fan (2003, p. 223), “all strategies for learning L2 vocabulary, to a certain extent, are associated with these five steps.”

Schmitt (1997) adopted Rubin’s definition of language learning strategies—the interaction by which data are acquired, put away, recovered, and utilized—and contended that vocabulary learning strategies could be of different types but all should influence the extensively characterized process of vocabulary learning.

Methods

The methodology used for conducting the study, which includes an explanation of the participants’ characteristics, instruments, data collection procedure and analysis, and design, is presented in the following sections.

Design

The present study has a quantitative design, including a pretest, a posttest, and two experimental groups. Since the participants of the study were not selected at random, the study failed to be true experimental research and was only quasi-experimental. In this study, the syntactic and semantic feature analyses were independent variables that impact the students’ reading comprehension as the dependent variable was investigated and compared.

Participants

This study was conducted with 75 students—39 women and 36 men—aged 18–23 years, who were upper-intermediate EFL learners at a language institute in Jahrom. They were selected from three intact classes at the institute. All of the students passed the intermediate level exam in this institute and were placed in the upper-intermediate level. To have a homogeneous sample, the authors distributed the Nelson English Language Test (NELT), resulting in 51 qualified students—28 women and 23 men. The qualified participants were randomly assigned into three groups, each including 17 learners.

Instruments

To conduct the study, the researcher used the following instruments:

1. Nelson English Language Test (NELT): The researcher used this test to select a homogeneous sample of EFL learners. The test is offered in ten levels of proficiency, ranging from beginner to advanced, and each level consists of four different but parallel tests. The number of items in each test is 50, and the researcher used an upper-intermediate level test for this study. The overall score was 50 on this test.
2. Reading tests: To measure students' reading comprehension before and after the study, two teacher-made tests of reading comprehension were used as a pretest and posttest, including 20 multiple-choice items. All test items were designed based on the materials covered in the classes. The researcher estimated the reliability of the test scores using the Kuder-Richardson 21 formula, which yielded indices of 0.79 and 0.82, respectively. According to Nunnally (1978), reliability indices equal to or over 0.70 are acceptable for eudiometric purposes. Therefore, the reliability of the test scores was desirable.

Materials

The authors used ten reading comprehension passages from *Insides Reading 2* book (2nd edition) written by Zwier (2012) for this study. The passages were used to enhance learners' reading comprehension by providing vocabulary teaching strategies. In addition, two strategies with different treatments were developed for each class in this study. Each class received a different set of strategies. All passages were of virtually equal lengths, ranging from 200 to 300 words. Due to the nature of the study, the researcher focused on nouns, verbs, and adjectives as the most common word types in order to manage the study.

Procedure

The administration of NELT was the initial step in conducting the study. Based on the results of this test, the learners whose scores were one standard deviation below and above the mean were qualified to attend the study, and other students were excluded. Then, the teacher-made reading comprehension tests were piloted on ten students with similar conditions to the participants of the main study. The Kuder-Richardson 21 formula was used to explore the reliability of the reading tests, which yielded reliability indices of 0.79 and 0.82, respectively, for the pretest and posttest. After ensuring the tests' reliability, the researchers provided a brief introduction to the study, its objectives, and its methods to the participants. The qualified learners were then divided into three groups at random and took the pretest.

The study was conducted in 10 sessions. One group was taught each strategy—syntactic feature analysis vs. semantic feature analysis, and the third group received no treatment. The researcher supplied ten reading comprehension passages to the participants. However, before reading, the students were asked to skim the passages silently for 5 min. They were then instructed to focus on the words in bold or keywords. Finally, the participants in each group were supposed to write the words on a piece of paper.

The first experimental group (EG1) was instructed to use syntactic features of words, including parts of speech, prefixes, suffixes, and some grammar rules, to guess the meaning of the unknown words. Students were informed about how they can use meaningful word parts to make sense of the unknown word.

In the second experimental group (EG2), students were taught the semantic features of the unknown words. The semantic features considered in this group were the synonyms and antonyms of the nouns and adjectives. In addition, some other lexical relations (i.e., metonymy and hyponymy) were taught when needed. For this purpose, the following steps, based on the definition of Cook (1987), were considered:

- (1) The intended strategy was introduced and described to the participants during the first session of the study. Afterward, the reason, time, and method of the strategy application were explained;
- (2) During each class session, the learners read the text, and then, the teacher made a matrix and inserted the fundamental words of the text in the vertical side of the matrix;
- (3) The instructor and the participants wrote the appropriate and outstanding features of the intended words and their synonyms and antonyms on the board cooperatively;
- (4) The teacher completed the matrix by putting a plus sign (+) for the correct features of each word and a minus sign (-) for the incorrect features of that word. In case of uncertainty, the teacher used a question mark (?);
- (5) Upon completing the semantic feature analysis matrix, the learners became aware of the relationships. What they did in this step was copy the matrix into their notebooks. In this way, the unique characteristics of each word have been discovered and discussed;
- (6) The process has been repeated for other word categories.

Then, the participants in both groups recorded all nominated words in their vocabulary notebooks. Finally, the students were asked to use the strategy in the next reading comprehension passages. In the control group (CG), the traditional methods of teaching reading, reading the texts, and answering the set questions at the end of the text without any specific treatment were applied. After finishing the 10th session, the reading posttest was administered to the students in all groups, and its results were used to compare the effects of syntactic and semantic feature analysis of unknown

TABLE 1 Descriptive statistics of the participants' NELT scores.

	N	Minimum	Maximum	Mean	Std. Deviation
NELT	75	9	49	34.27	9.855
Valid N (listwise)	75				

TABLE 2 The results of the participants' pretest and posttest scores in the EG1.

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest in EG1	17	7	15	11.12	2.369
Posttest in EG1	17	14	20	17.35	1.998
Valid N (listwise)	17				

TABLE 3 The results of the participants' pretest and posttest scores in the EG2.

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest in EG2	17	8	14	11.06	1.886
Posttest in EG2	17	12	19	14.94	2.436
Valid N (listwise)	17				

words on the EFL learners' reading comprehension after the treatment.

Results

This section displays the detailed results of the data analysis. First, the descriptive statistics and analysis of NELT results, pretest, and posttest are presented. Then, the results regarding the research question obtained using ANCOVA are reported.

The results of the english language proficiency test

As mentioned in previous sections, to have a homogeneous sample, all of the original 75 EFL learners took the NELT. The descriptive statistics of the participants' NELT scores are shown in Table 1.

TABLE 4 The results of the participants' pretest and posttest scores in the CG.

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest in CG	17	8	14	11.18	1.667
Posttest in CG	17	8	18	12.82	2.789
Valid N (listwise)	17				

According to Table 1, the mean of the 75 EFL learners' NELT scores was 34.27, with a standard deviation of 9.85. From these initial participants, 51 students with scores between 25 and 44 were chosen.

Descriptive statistics of the participants' scores

As mentioned earlier, the study participants were assigned into three groups. Table 2 displays the descriptive statistics for the participants in the group who experienced syntactic analysis of words.

Table 2 indicates that the participants' reading pretest mean score in the syntactic analysis group was 11.12, with a standard deviation of 2.369; in the posttest, their mean score was 17.35, with a standard deviation of 1.998.

Table 3 presents the descriptive statistics for the semantic feature analysis group participants.

As seen in Table 3, the participants' reading pretest mean score in the semantic analysis group was 11.06, with a standard deviation of 1.886. Moreover, regarding the posttest, the participants' mean score was 14.94, with a standard deviation of 2.436.

Table 4 shows the descriptive statistics related to the control group.

Table 4 indicates that the participants' reading comprehension pretest mean score in the control group was 11.18, with a standard deviation of 1.667, and their posttest mean score was 12.82, with a standard deviation of 2.789.

Results regarding the research question

To answer the research question, after ensuring the normal distribution of the participants' scores in both tests across all groups, the researcher performed an analysis of covariance (ANCOVA) on the collected data. The results of this analysis are presented in Table 5.

TABLE 5 Analysis of covariance (ANCOVA).

Dependent variable: Reading posttest source	Type III sum of squares	df	Mean square	F	Sig.	Partial Eta squared
Corrected Model	174.632 ^a	3	58.211	9.658	0.000	0.381
Intercept	337.221	1	337.221	55.948	0.000	0.543
Pretest	0.004	1	0.004	0.001	0.979	0.000
Groups	174.624	2	87.312	14.486	0.000	0.381
Error	283.290	47	6.027			
Total	11993.000	51				
Corrected Total	457.922	50				

a. R-squared = 0.381 (adjusted R-squared = 0.342)

TABLE 6 The pairwise analysis of reading posttest scores.

(I) Groups	(J) Groups	Mean difference (I-J)	Std. error	Sig.	95% Confidence interval for difference	
					Lower bound	Upper bound
Syntactic	Semantic	2.411*	0.842	0.006	0.717	4.106
	Control	4.530*	0.842	0.000	2.835	6.224
Semantic	Syntactic	-2.411*	0.842	0.006	-4.106	-0.717
	Control	2.118*	0.842	0.015	0.424	3.813
Control	Syntactic	-4.530*	0.842	0.000	-6.224	-2.835
	Semantic	-2.118*	0.842	0.015	-3.813	-0.424

*The mean difference is significant at the 0.05 level.

As shown in Table 5, after adjusting for pretest scores, there was a significant effect of the group, $F_{(1, 47)} = 14.486$, $p < 0.05$, and partial $\eta^2 = 0.381$. As the p -value was < 0.05 , the difference between the three groups was significant, and the participants who implemented syntactic, semantic, and no analysis of word features before and after treatment as a covariate had different performances in the reading comprehension posttest, so the null hypothesis was rejected. However, it was still unclear which pair of groups had significant differences in their performances. To find out the groups with significant differences, the researcher performed an LSD *post-hoc* test. Table 6 displays the results of the LSD *post-hoc* test.

Based on the results presented in Table 6, the mean score of the participants in the syntactic analysis group differed significantly from both the semantic analysis ($p = 0.006 < 0.05$) and control ($p < 0.05$) groups; moreover, the semantic analysis group had a significant difference with the control group ($p = 0.015 < 0.05$). As the mean differences indicate, the syntactic analysis group outperformed both the semantic analysis (I-J = 2.411) and control (I-J = 4.530) groups. Similarly, the semantic analysis group performed better than the control group (I-J = 2.118).

Discussion

This empirical study aimed to discover the impact of instructing syntactic and semantic analyses of word features on the improvement of Iranian EFL learners' reading comprehension. To the best of our knowledge, there were no earlier studies that looked at the effects of syntactic and semantic analyses of word features on reading comprehension in the literature.

The findings of the present study indicated that even though both experimental groups had a significant degree of difference in the amount of their progress compared to the control group, the implementation of the syntactic analysis of word features had a better effect on their reading comprehension improvement than the semantic analysis. The reason for this may lie in the fact that syntactic analysis is based on a limited set of rules, so acquiring and mastering them seems easier than mastering semantic features or synonyms, which may cover a wide range of areas. This finding is consistent with that of Barnes et al. (2021). They stated that semantic features need a high level of interaction and active comparison as the words and sentences should be read and understood with reference to each other; therefore, it is somehow more challenging for the learners in

comparison with syntactic features. Tasci and Turan (2021) showed that the contribution of syntactic knowledge to L2 reading comprehension was more than that of breadth and depth of vocabulary. Moreover, Gascoigne (2005) confirmed that form-focused activities such as syntactic features affect meaning-driven reading comprehension tasks.

The results of the present study propose that, when guided toward organized discussion of the main concepts within the content area, passive learners actively engage in learning. Furthermore, an activity that necessitates a dynamic, reasonable association of the language learners' abilities brings about reading comprehension and expanded vocabulary development. In implementing the treatments, initially, learners seemed to withstand taking part in the syntactic and semantic analysis of word features. Some learners in the experimental groups reported that they preferred to search for words in the dictionary since it was easier to find new words than to take part in the discussion needed in the experimental groups. Nevertheless, at the end of the treatment period, several students indicated positive reactions.

In traditional language classes, vocabulary teachers suggested and taught unknown or difficult words that were irrelevant to the major opinions in the subject area content to their students. These vocabulary teaching approaches, although practical in their own right, have confined usefulness to those who are going to teach vocabulary in the content areas. Most of these approaches in the real teaching world imply that when instructors teach vocabulary lessons, they are teaching difficult words instead of idea-related vocabulary items. The findings of this study, regardless of the superiority of syntactic analysis over semantic analysis, suggest that, when students interact with the reading passage and the vocabulary related to that text, they comprehend what they are reading and learn the vocabulary.

The results of the present study were in line with the findings of the study performed by Anders and Bos (1986), considering the effect of semantic analysis on reading comprehension. Both the present study and Anders' study proved that semantic analysis of word features has a positive impact on learners' reading comprehension.

The findings also revealed a degree of consistency with the results of Xinjie (2011) in terms of the effects of syntactic analysis on reading comprehension. In other words, both studies indicated that a focus on word parts could be a useful strategy for improving learners' reading comprehension levels by making the ragged path of reading. However, Wagovich et al., 2014, applied both of them in the treatment group, found the optimal improvement in vocabulary development, and concluded that syntactic and semantic features are interrelated. The syntactic features of a word such as a noun or a verb are related to the semantic features such as agent, object,

and action, which can be accompanied by some additional meaning information such as the nature of the action implied by the word.

Conclusion

Instructors need to modify their ways of dealing with vocabulary instruction for EFL learners. Yet, it is important that they pay attention to two significant points. The first relates to findings in recent studies on vocabulary teaching and learning, and the other is the needs of EFL learners. Ongoing research findings, as well as the outcome of this study, recommend that vocabulary learning strategies should be considered when teaching vocabulary. Since learners frequently encounter new materials to study, they should be able to determine the meaning of new words from available resources.

Finally, it is important to remember that acquiring proficiency in utilizing different strategies happens step by step. It is estimated that it takes a long time for learners to master different strategies (Richards and Renandya, 2002). In this way, learners and instructors should measure their expectations. Unfortunately, this issue cannot be settled for the time being.

This study offers insights to assist students in clarifying common misconceptions and helping them develop strategies and skills for identifying what they want to learn and how they should start to learn. In the long run, vocabulary learning strategies enable students to learn efficiently. Furthermore, by using these strategies, students undoubtedly learn to think more, observe the structure of words, evaluate and monitor what they are doing, and plan to learn efficiently.

The findings of this study indicate that textbook publishers should include learning strategies, especially vocabulary learning strategies, in developing various textbooks. Concerning the potential advantages of strategy-based teaching, developers of language learning textbooks should consolidate interesting materials as per the strategies that reveal a significant effect on vocabulary achievement in this study.

Each study has its limitations and delimitations. The present study considers the effect of two vocabulary learning strategies (i.e., structural and semantic feature analysis of words) among Iranian upper-intermediate EFL learners at a Language Institute in Jahrom. However, to broaden the scope of the generalizability of the findings, EFL learners from other institutes or even high schools and universities can be selected as the population of similar studies. Moreover, it is possible to consider other vocabulary teaching strategies.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

Author contributions

MS prepared the manuscript, data collection, and data analysis. MR edited, proofread, and finalized the manuscript for submission. Both authors contributed to the article and approved the submitted version.

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