Investigating the Role of Syntactic and Semantic Awareness in the Sentence Comprehension of EFL Learners

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Abstract

This study investigated how English semantic and syntactic awareness contribute to the sentence comprehension of beginner, intermediate, and advanced EFL learners. Consequently, 188 Iranian EFL learners were recruited for the study and, pertinent to their English proficiency levels, were divided into three groups. To elucidate the possible contribution of semantic and syntactic awareness for comprehending English sentences, five sets of sentences were constructed controlling the frequency, length and difficulty of their comprising words: 20 syntactically correct / semantically incorrect, 20 syntactically incorrect / semantically correct, 20 syntactically / semantically incorrect, 20 syntactically / semantically correct, and finally 20 Garden-Path sentences (which are both semantically and syntactically correct but difficult to comprehend by the first attempt). With the aid of a software application (Com-Chron) designed specifically for this study on the UX platform, the participants' comprehension was checked both in terms of their success-rate and their reaction-time. Through a multiple-choice online task, the participants were asked to select the option which showed the correct understanding of the constructed sentence in 30 seconds. Statistical analyses revealed that semantically-incorrect sentences were the most challenging and syntactically-incorrect sentences were the least demanding for the participants of three proficiency levels. The findings affirmed the dominance of semantics over syntax when it came to the comprehension abilities of EFL learners across different English proficiency levels.

Keywords: English sentence comprehension, semantic awareness, syntactic awareness, Garden-path sentences

Introduction

For more than three decades, language comprehension in general and sentence comprehension in particular have been a controversial issue (Artetxe & Schwenk, 2019). It was not until recently that researchers came to the conclusion that syntax and semantics did not operate independently and their interaction accounted for the comprehension (Traxler, 2014; Huang et al., 2021; Briscoe, 2020). According to Demberg and Keller (2019), psycholinguistic evidence has shown that language comprehension takes place incrementally; that is, people normally do not wait for a sentence to be finished to form a syntactic representation. In other words, hearing or reading every new word helps the completion of the constructed representation.

Sentence comprehension refers to cognitive processes that take place in the mind while the speaker of a language is spontaneously trying to decipher the meaning of utterances or a written text (Muller & Hagoort, 2006; Khaghaninejad et al., 2022). Different factors can contribute to the sentence comprehension among which are the syntactic and semantic awareness (Sternberg & Sternberg, 2016), which is a yardstick which determines whether or not a sentence is possible within a particular language (Artetxe & Schwenk, 2019).

Kim and Sikos (2011) claim that for comprehension to happen, one needs to extract and decode all the syntactic and semantic cues in the language input. Almost the same idea is held by Demberg and Keller (2019) who mentioned that in order to comprehend linguistic input, an interaction between syntax, semantics, and discourse processes is requisite. In addition, Van Gompel et al. (2006) claimed that for comprehending a sentence, one needs to activate a proper syntactic structure. In the same vein, Frazier (1987) documented that in sentence comprehension, the syntactic analysis happens autonomously irrespective of semantic awareness. On the contrary, Hagoort (2003, p. 883) argued that "syntactic constraints conspire with semantic constraints; semantics is neglected by syntax if its contribution is not necessary. That is to say, when it comes to comprehension, syntax is a bit selfish, unlike semantics". However, Hopp (2006, p. 369) argued that proficiency level plays an important role "in L2 learners' capability to analyze specific types of morpho-syntactic information during sentence processing".

Sentence comprehension is instrumental in keeping the stream of communication going. Although numerous studies have been carried out to analyze the interconnection of semantic and syntactic processes and comprehension (e.g., Khodadady et al., 2012; Demberg & Keller, 2019; Tanenhaus et al., 1995; Matar et al., 2021; Chwilla, 2022), many of them have been in neuroscience which have specified the part(s) of the brain responsible for sentence comprehension. In fact, almost no comprehensive study has been conducted, especially in the EFL context, to determine which one of these variables is more contributing to the comprehension of English sentences, and, in addition, how comprehension varies among students of different proficiency levels. More importantly, not enough attention has been paid to comprehension on the part of the teachers in spite of the fact that comprehension is the key to understanding (Robertson & Gallant, 2019). Therefore, practitioners have

never been thinking about the supremacy of syntax over semantics or vice versa which can be pivotal in the course of instruction (Kumar et al., 2020). Knowing the secret behind sentence comprehension, whether it is done through syntax, semantics or an interplay of both, will be a huge step forward in designing syllabi more effective and productive that can probably fit a wider range of learning styles.

This study investigated the influence of syntax and semantic knowledge in English sentence comprehension in Iranian EFL learners of different proficiency levels. Moreover, the comprehension of GP sentences is compared with either of semantically or syntactically incorrect English sentences to determine the burden imposed on the mind for perceiving each of these sentences. This study attempted to answer the following research questions:

- Which one, syntactic or semantic awareness, primarily contributes to the comprehension of technical English sentences for EFL learners of different proficiency levels?

- Which type of sentence (general-purpose, syntactically-incorrect, semantically-incorrect, or semantically / syntactically incorrect) requires the most time for EFL learners to comprehend, as measured by their response time in a reading comprehension task?

- How does the proficiency level of EFL learners, as determined by standardized language tests, impact the comprehension of general-purpose, syntactically-incorrect, semantically-incorrect, and semantically / syntactically-incorrect sentences?

Literature review

Sentence Processing

For language comprehension to happen, human mind should rapidly extract and coordinate syntactic and semantic cues from the received input (Kim & Sikos, 2011). It was first believed that sentence comprehension happens at a clause boundary, meaning that readers would stop at the end of a clause or sentence to make a conclusion of what had been read (Fodor, et al., 1974; Juffs, 1998). Nevertheless, later on, various techniques such as fast shadowing, and eye movements were employed to check the credibility of such assumption which resulted in discovering that sentence comprehension does not take place at clause boundaries, but rather happens on a word-by-word basis (Perfetti, 1985).

First assumptions regarding sentence comprehension claimed that, initially, a representation of a sentence is created based on its grammatical features in the mind of a reader or listener, and each new word which is read or listened to would be attached to this syntactic representation (Perfetti, 1985). It is argued that semantic interpretation only provides input when syntactic parsing is completed, and the parser has encountered difficulties (Warren, 2013; Khaghaninezhad & Kaashef, 2014). As a result, in case of structurally complex sentences, readers or listeners have to go over the text again or listen to the sentence several times to revise the

created representation of the sentence (Prystauka & Lewis, 2019). What actually these assumptions suggest is the separation of syntax and semantics, that is, one can construct a representation of a sentence in either domain without constructing one in the other (Warren, 2013).

Another model for language processing by Friederici and Hahne (2001) referred to three functionally distinct processing phases. Firstly, the syntactic information is analyzed and then the lexical knowledge is processed and finally the syntactic structure is adapted to the lexical knowledge. Later on, with the introduction of *Lexicalist Movement*, the focus shifted towards how individual lexical items contribute to parsing (Pozzan & Trueswell, 2016; Chwilla, 2022).

Syntactic/Semantic Awareness and Sentence Comprehension

Two types of psycholinguistic models have been presented in relation to sentence comprehension: *syntax-first models* and *interactive models*. The former recommends that the input's syntactic structure is built first, and then thematic responsibilities are assigned subsequently. However, reanalysis would be required in the final stage if the syntactic structure and thematic roles did not match. In contrast, the latter claims that there is an interplay between syntactic and semantic processes, which happens at an early stage (Ye et al., 2006; Drury et al., 2016; Pozzan & Trueswell, 2016). Despite some scholars' early ideas about language, such as Chomsky's who proposed the independence of distinct parts of linguistic ability, Briscoe (2020) supported the idea of syntax and semantics interacting. In the same vein, Huang et al. (2021) conducted a study on 80 individuals and utilized self-embedded phrases with three relative clauses each to prove whether the aforementioned premise is correct. When compared to semantically neutral sentences, participants found it significantly easier to comprehend sentences with semantic support. On the contrary, Miller (2014) discovered that learners rely on the syntactic awareness for processing wh-dependencies.

Omaki and Lidz (2015) used a range of measurements to look at the sentence comprehension for EFL learners and found that the syntactic awareness was a proper predictor of foreign language sentence comprehension using power correlations and regression analysis. Brimo et al. (2017) checked if syntactic awareness had any effects on teenagers' sentence comprehension. Findings implied that participants' syntactic awareness influenced sentence comprehension significantly. Clahsen and Felser (2006) believed that sentence comprehension calls for the ability to segment the input into comprehendible strings of words; hence, semantic awareness plays the primary role.

Friederici and Kotz (2003) carried out several studies using different neurolinguistic techniques of comprehension analysis on both healthy and retarded participants. Their findings supported the supremacy of syntax for comprehension. Kim and Osterhout (2005) employing event-related potentials (ERP) showed that due to the semantic connection between the words, participants did not pay attention to the syntactic cues denoting that the sentence is syntactically incorrect. Hence, they inferred that comprehension is influenced by semantic processing even in the face of unambiguous syntactic cues.

A Garden-path (GP) is a type of sentence that can be ambiguous structurally and semantically. In these sentences, the syntactic structure causes a different prediction and the reader assumes one meaning for a clause at first and then realizes that his assumption was erroneous; this forces him to go back and reinterpret the statement (Barahuee et al., 2020). Ambiguity of GP sentences are primarily attributable to existence of multiple possible interpretations based on the sentence structure and the comprising words. The comprehender's first interpretation may result in failure due to being led down the wrong garden road, s/he is obliged to attempt again to evaluate the statement and return to the correct garden path (Pozzan & Trueswell, 2016).

One interesting point regarding sentence comprehension is that L2 learners, the same as native speakers of the language, analyze and decode the input incrementally. As Pozzan and Trueswell (2016) documented, bilinguals are not able to integrate contextual information in the way that native speakers do that, based on *Interface Hypothesis.* It is worth mentioning that besides the syntax-semantics dimension which directly influences language comprehension, so does the level of proficiency of the person hearing a speech or reading a text. Hopp (2006) found that both the advanced German L2 speakers could use case-marking information to interpret German Garden-Path sentences after conducting an experiment utilizing a self-paced reading task. Considering the inconsistent findings of the previous studies, this study endeavored to put the contributive role of semantic and syntactic knowledge of beginner, intermediate and advanced EFL learners under scrutiny regarding the comprehension of semantically incorrect, syntactically incorrect, and Garden-Path sentences.

Method

Participants

For this study, 188 Iranian EFL learners who were native Persian speakers have been selected   via convenient sample selection procedure from a private language institute and recruited for the study. There were both males (87 learners) and females (101 learners) with the age range of 18 to 30 whose consents were gained before the study and were divided into three groups of beginners (66 learners), intermediate (66 learners), and advanced (66 learners). In order to avoid potential inconsistencies and biases, more than the classification standards of the language institute, McMillan Placement Test (MPT) was also employed to assure the English proficiency of the participants. Before the study's commencement, the participants were provided with ample elaborations on the online test rubrics and the answering time limitations.

Instruments and Materials

Macmillan Placement Test (MPT)

The purpose of employing this standard test was to recheck the proficiency level of the participants and was to obtain a homogenous sample of participants in each group. This test which was conducted at the beginning of the study contained

70 multiple-choice test items and formulated to measure the EFL / ESL learners' proficiency level and to categorize them into different English proficiency levels. The satisfactory reliability (.92%) of the test is documented by Khodadady et al. (2012) and Macmillan Test Developer (2022).

Online Comprehension Test

In order to check the contribution of semantic and syntactic awareness to the sentence comprehension, 5 sets of sentences were constructed; 20 syntactically correct / semantically incorrect sentences, 20 syntactically incorrect / semantically correct sentences, 20 both syntactically and semantically incorrect sentences, 20 both syntactically and semantically correct sentences, and finally 20 GP sentences which are both syntactically and semantically correct, albeit having ambiguities which make them difficult to understand (Barahuee et al., 2020). It is worth mentioning that the sentences were meticulously constructed by the words of roughly similar frequency and difficulty levels and with approximately similar number of comprising words (between 9 to 12 words) in order to neutralize the possible effects words' frequency, words' difficulty and the sentence length on the participants' sentence comprehension. Following sentences are examples of each set, respectively:

- *Doctors have been cured to find a try for years.*

- *She went the stairs up in a hurry and fell down.*

- *The car wasn't paying attention when it happens.*

- *He couldn't obtain his degree for he failed the test.*

- *The man who hunts ducks out on weekends.*

In continuation, for each sentence, a multiple-choice test item was designed to check its accurate comprehension (100 multiple-choice test items in general). As an example:

*Q: Doctors have been cured to find a try for years.*

    A.   *Doctors want to find a try.*

    B.   *Doctors have already found a try.*

    C.   *Doctors are still curing.*

    D.   *Doctors want to find a cure.* *

A special software application (Com-Chron) was designed on the UX platform to provide the participants with 100 multiple-choice test items and to calculate the number of correct answers in addition to the elapsed time for answering each item. The items were randomly mixed to avoid the sensitivity of the respondents. Each question has 30 seconds time limit to be answered; in the case the time limit was over, the respondent had to skip the item and move to the next. 100 multiple-choice test items of the study were fed into the software application and the participants were provided with four options one of which was determinant of the

correct comprehension of the sentence. As an outcome, Com-Chron provided a file which contained the number of correct answers and the participants' reaction times. Figure 1 presents an instance of the online test item and the output of Com-Chron for one participant.

Figure 1

An Example of Com-Chron Test Item and the Output
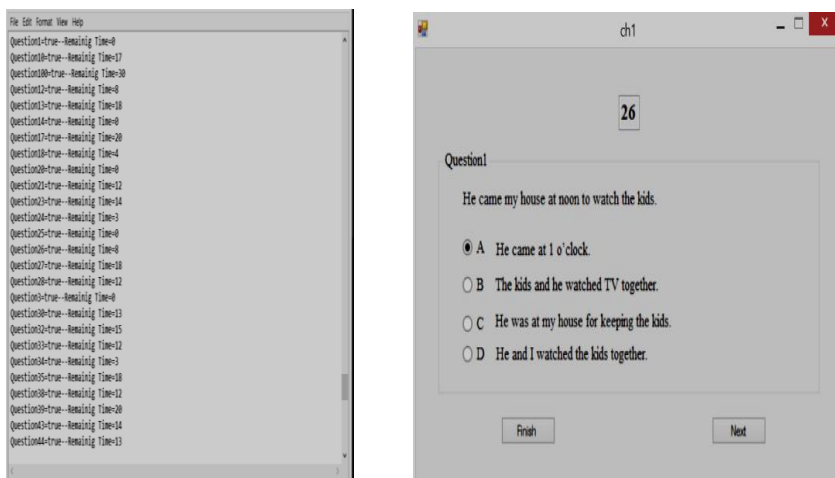
Data Collection Procedure

After classifying 188 participants into three English proficiency groups considering the institute's classification, their proficiency levels were assured with the aid of McMillan Placement Test. After a brief introduction to the test and Com-Chron, their comprehension of different constructed sentences (i.e., 20 syntactically correct / semantically incorrect, 20 syntactically incorrect / semantically correct, 20 syntactically / semantically incorrect, 20 syntactically / semantically correct and finally 20 Garden-Path sentences) was evaluated. Participants were supposed to read each sentence on the screen and click on the choice which best interprets the sentence as soon as they reached to a conclusion. Since the time consumption was a concern, the participants were asked to stop the test whenever they were distracted and continue it when they felt ready.

After the test termination, for answering the first research question, the number of the correct responses for each one of the sentence type was determined and through multiple comparisons the more difficult sentence types were distinguished. To answer the second research question, the elapsed time for answering the test items was measured and more problematic sentence types for comprehension were determined. Considering the elapsed time for answering each item, the mental challenge for answering each item could be evaluated. Based on the

comparison of the participants' performance on different sentence types, a hierarchy for the difficulty levels of comprehension for different sentence types became available. The normality of the collected data was checked by Kolmogorov-Smirnov test, then they were analyzed through SPSS; more than descriptive analyses, inferential statistical analysis procedures were employed to determine the meaningfulness of possible differences on sentence comprehension among different sentence types and different English proficiency levels.

Results

In order to check the normality of the obtained data the Kolmogorov-Smirnov test is employed. If the significance level of this test is more than 0.05, the null hypothesis that the data is normal is accepted. It should be mentioned that different sentence types are defined in the following way for the software: Syntactically Incorrect (SYI), Semantically Incorrect (SEI), Semantically-Syntactically Correct (SSC), Semantically-Syntactically Incorrect (SSI) and Garden Path (GP) sentences.

Table 1

One-Sample Kolmogorov-Smirnov Test of the Data

	SYI	SEI	SSC	SSI	GP
Mean difference	13.94	8.49	14.06	10.64	10.38
Std. Deviation	4.08	2.99	4.49	3.39	2.97
Absolute	.189	.154	.167	.101	.125
Positive	.10	.07	.09	.07	.08
Negative	-.18	-.15	-.16	-.10	-.12
Test Statistic	1.12	1.07	1.12	1.03	.10
Asymp. Sig. (2-tailed)	.098	.176	.109	.200	.096

As discernible in the table above, considering the Sig. values, the data were shown to be normal. Consequently, a one-way ANOVA was employed to investigate whether there were statistically significant differences among the performance of participants on the comprehension of different sentence types.

Table 2

Descriptive Statistics of the Participants' Performance for Comprehending Different Sentence Types

	Mean difference	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
				Lower Bound	Upper Bound
SYI	12.917	4.483	.486	11.95	13.88
SEI	7.976	3.101	.336	7.30	8.64
SSC	12.752	4.720	.512	11.73	13.77
SSI	10.094	3.318	.359	9.37	10.81
GP	9.776	3.075	.333	9.11	10.43
Total	10.703	4.233	.205	10.29	11.10

As Table 3 suggests (noting the *p* values), statistically significant differences were diagnosed concerning the participants' comprehension of different sentence types based on their responses to the constructed teat items.

Table 3

Comparing the Performance of Participants Regarding the Comprehension of Different Sentence Types

		Mean Difference	**Sig.**	**95% Confidence Interval**	
				Lower Bound	**Upper Bound**
SYI	SEI	4.94	.000*	3.79	6.08
	SSC	.164	.778	-.98	1.31
	SSI	2.82	.000*	1.67	3.97
	GP	3.14	.000*	1.99	4.28
SEI	SYI	-4.94	.000*	-6.08	-3.79
	SSC	-4.77	.000*	-5.92	-3.62
	SSI	-2.11	.000*	-3.26	-.96
	GP	-1.80	.002*	-2.94	-.65
SSC	SYI	-.16	.778	-1.31	.98
	SEI	4.77	.000*	3.62	5.92
	SSI	2.65	.000*	1.51	3.80
	GP	2.97	.000*	1.82	4.12
SSI	SYI	-2.82	.000*	-3.97	-1.67
	SEI	2.11	.000*	.96	3.26
	SSC	-2.65	.000*	-3.80	-1.51
	GP	.31	.587	-.83	1.46
GP	SYI	-3.14	.000*	-4.28	-1.99
	SEI	1.80	.002*	.65	2.94
	SSC	-2.97	.000*	-4.12	-1.82
	SSI	-.31	.587	-1.46	.83

As is discernible in Table 3, the participants' performance has been compared in pairs based on their mean scores. It can be concluded that SYI sentences have been the least difficult to comprehend for the participants. Interestingly, the mean difference between SYI and SSI sentences was the smallest; this may imply that they were more or less at the same level of difficulty for the participants. With regard to SEI sentences, the mean score was found to be significantly different from all the other groups, denoting that along with GP sentences, they were the most difficult sentences to comprehend. Concerning SSI sentences it was deduced that they were significantly different from SEI, SYI and SSC sentences, however, no statistically significant difference was realized between them and GP sentences. Comparing the mean differences, it can be pointed out that comprehending SSI sentences have been more demanding than SYI and SSC sentences but easier compared with SEI sentences. Deduced from the comparison report, GP sentences were found to be slightly less difficult than SEI sentences for participants to comprehend while they were harder than SYI and SSC sentences. It

was also depicted that SSC sentences were more or less similar to SYI in terms of the mental challenge on the part of the comprehenders.

Considering the fact that the needed time for accomplishing a task can be regarded as the indicator of the task's mental challenge in psycholinguistic studies (Warren, 2013; Robertson & Gallant, 2019), the average elapsed times for the challenging sets of sentences (i.e., SYI, SEI, SSI and GP) were compared through an ANOVA to check for possible statistically significant differences to answer the second research question. Table 4 presents the descriptive statistics of the average elapsed time for more challenging sentence types.

Table 4

Descriptive Statistics of the Average Elapsed Time Comparison Among the More Challenging Sentence Types

				95% Confidence Interval for Mean	
	Mean Difference	**Std. Deviation**	**Std. Error**	**Lower Bound**	**Upper Bound**
SYI	22.37	4.35	.44	21.48	23.26
SEI	26.49	2.92	.30	25.89	27.08
GP	25.58	3.18	.32	24.93	26.23
SSI	24.67	3.98	.34	25.15	26.98
Total	24.82	3.94	.23	24.36	25.28

Table 5 depicts the differences of the needed time for comprehending the more problematic sentence types of SYI, SEI, GP and SSI.

Table 5

Comparison of Elapsed Time for Comprehending SYI, SEI, GP, and SSI Sentences

					95% Confidence Interval	
		Mean Difference	**Std. Error**	**Sig.**	**Lower Bound**	**Upper Bound**
SYI	SEI	-4.11	.514	.000*	-5.13	-3.10
	GP	-3.20	.554	.000*	-4.22	-2.19
	SSI	-3.75	.564	.000*	-498	-2.45
SEI	SYI	4.11	.414	.000*	3.10	5.13
	GP	.909	.313	.078	-.10	1.92
	SSI	1.65	.456	.003*	-.65	2.67
GP	SYI	3.20	.514	.000*	2.19	4.22
	SEI	-.909	.513	.078	-1.92	.10
	SSI	-1.78	.498	.056	-3.76	.67
SSI	SYI	3.75	.876	.000*	2.98	.83
	GP	1.78	.546	.056	-.987	.76
	SEI	-1.65	.456	.003*	-1.98	.50

As Table 5 indicates, SYI sentences differed significantly from all other sentence types, implying that they were significantly less demanding for participants to comprehend. No significant difference was reported between the average elapsed time of GP and SEI sentences, referring to the fact that these two sentence types were approximately similar in terms of the mental burden they impose on the participants; however, the comprehension of SEI sentences were slightly more time-consuming. Comprehension of SSI sentences was significantly less challenging than SEI sentences while it was not the case when compared with GP sentences. Overall, close to what was found for the first research question, the comprehension of SEI, GP, SSI, and SYI sentences were the most time-consuming (hence, challenging), respectively.

To check the contribution of participants' proficiency level to their sentence comprehension, their performance regarding the comprehension of the study's five sentence types were compared. Consequently, an ANOVA was employed to analyze the data and answer the third research question. Tables 6, 7, and 8 demonstrate the comprehension differences of beginner, intermediate, and advanced participants for various sentence types of the study.

Table 6

Comparing the Performance of Beginner EFL Learners for Different Sentence Types

				95% Confidence Interval	
		Mean Difference	Sig.	Lower Bound	Upper Bound
SYI	SEI	3.300	.001*	1.445	5.155
	SSC	1.100	.242	-.755	2.955
	SSI	1.300	.167	-.555	3.155
	GP	1.800	.057	-.055	3.655
SEI	SYI	-3.300	.001*	-5.155	-1.445
	SSC	-2.200	.021*	-4.055	-.345
	SSI	-2.000	.035*	-3.855	-.145
	GP	-1.500	.112	-3.355	.355
SSC	SYI	-1.100	.242	-2.955	.755
	SEI	2.200	.021*	.345	4.055
	SSI	.200	.831	-1.655	2.055
	GP	.700	.456	-1.155	2.555
SSI	SYI	-1.300	.167	-3.155	.555
	SEI	2.000	.035*	.145	3.855
	SSC	-.200	.831	-2.055	1.655
	GP	.500	.594	-1.355	2.355
GP	SYI	-1.800	.057	-3.655	.055
	SEI	1.500	.112	-.355	3.355
	SSC	-.700	.456	-2.555	1.155
	SSI	-.500	.594	-2.355	1.355

SEI sentences were noticeably more difficult than SYI, SSC, and even SSI sentences for beginners to comprehend. These differences were found statistically significant; however, no significant difference was reported between SEI and GP sentences.

Table 7

Comparing the Performance of Intermediate EFL Learners for Different Sentence Types

		Mean Difference	**Sig.**	**95% Confidence Interval**	
				Lower Bound	**Upper Bound**
SYI	SEI	5.266	.000*	3.763	6.770
	SSC	.100	.896	-1.403	1.603
	SSI	3.866	.000*	2.363	5.370
	GP	2.966	.000*	1.463	4.470
SEI	SYI	-5.266	.000*	-6.770	-3.763
	SSC	-5.166	.000*	-6.670	-3.663
	SSI	-1.400	.068	-2.903	.103
	GP	-2.300	.003	-3.803	-.796
SSC	SYI	-.100	.896	-1.603	1.403
	SEI	5.166	.000*	3.663	6.670
	SSI	3.766	.000*	2.263	5.270
	GP	2.866	.000*	1.363	4.370
SSI	SYI	-3.866	.000*	-5.370	-2.363
	SEI	1.400	.068	-.103	2.903
	SSC	-3.766	.000*	-5.270	-2.263
	GP	-.900	.239	-2.403	.603
GP	SYI	-2.966	.000*	-4.470	-1.463
	SEI	2.300	.003*	.796	3.803
	SSC	-2.866	.000*	-4.370	-1.363
	SSI	.900	.239	-.603	2.403

Comprehension of SYI sentences was significantly undemanding compared with SEL, SSI, and GP sentences for intermediate EFL learners. This was certified by the statistical significance of the mean score differences. Considering the mean scores, SEI similar to SSI sentences were the most challenging types of sentences even tougher than GP ones. GP sentences have been easier than SEI sentences to comprehend; however, they were more difficult than SYI and SSC sentences to perceive. For intermediate EFL learners, SSC and SYI sentences were the most unproblematic sentences to comprehend, respectively.

Table 8

Comparing the Performance of Advanced EFL Learners for Different Sentence Types

		Mean Difference	Sig.	95% Confidence Interval	
				Lower Bound	Upper Bound
SYI	SEI	6.520	.000*	5.527	7.512
	SSC	-.880	.082	-1.877	.112
	SSI	3.400	.000*	2.407	4.392
	GP	4.960	.000*	3.967	5.952
SEI	SYI	-6.520	.000*	-7.512	-5.527
	SSC	-7.400	.000*	-8.392	-6.407
	SSI	-3.120	.000*	-4.112	-2.127
	GP	-1.560	.002*	-2.554	-.567
SSC	SYI	.880	.082	-.112	1.872
	SEI	7.400	.000*	6.407	8.392
	SSI	4.280	.000*	3.287	5.272
	GP	5.840	.000*	4.847	6.832
SSI	SYI	-3.400	.000*	-4.392	-2.407
	SEI	3.120	.000*	2.127	4.112
	SSC	-4.280	.000*	-5.272	-3.287
	GP	1.560	.002*	.567	2.552
GP	SYI	-4.960	.000*	-5.952	-3.967
	SEI	1.560	.002*	.567	2.552
	SSC	-5.840	.000*	-6.832	-4.847
	SSI	-1.560	.002*	-2.552	-.567

As Table 8 indicates, again the comprehension of SYI sentences was shown to be the least challenging along with SSC sentences for advanced EFL learners. Similar to the beginner and the intermediate participants, the advanced learners' most difficult job was on SEI sentences even tougher than those of GP and SSI sentences which were more difficult than SYI and SSC sentences to comprehend. GP sentences were the second most challenging type of sentence. The findings suggest that as the level of proficiency raises, the comprehension of all types of sentences improves; however, still the challenge exists for SEI and GP sentences. Interestingly, the comprehension of SYI and SSC sentences was very close for the advanced learners implying that for the more proficient EFL learners the role of syntactic awareness shrinks to minimum for comprehension tasks while the semantic proficiency still plays a noticeable role. Figure 3 illustrates the comprehension of the participants of three levels of proficiency for different sentence types of the study schematically.

Figure 3

Comprehension of the Participants of Three Levels of Proficiency for Different Sentence Types
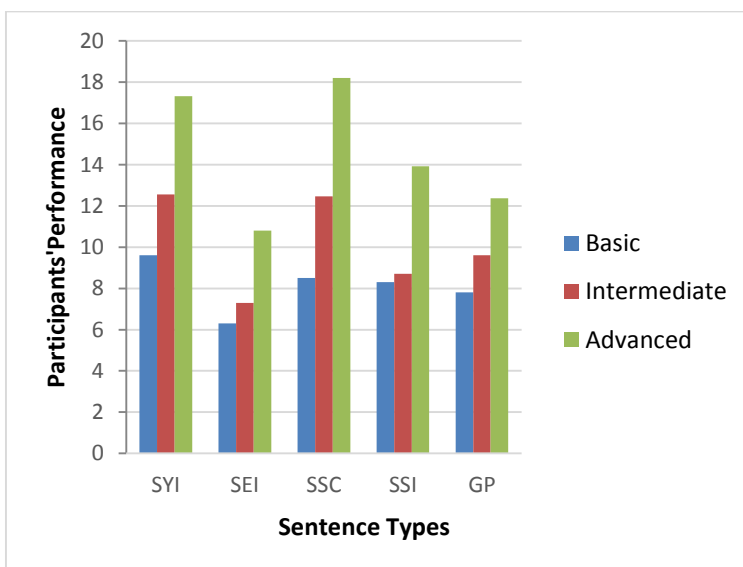
Discussion

The first research question addressed the issue that which one of syntactic or semantic awareness is more contributive to English sentence comprehension for EFL learners of different proficiency levels. It was concluded that SYI sentences

had been the least challenging for the participants of the three proficiency levels who were able to comprehend these sentences despite their syntactic errors. It was also concluded that SEI sentences had been the most difficult to comprehend which accounts for the importance of semantic knowledge in sentence comprehension. SSI and GP sentences were the second and the third most troublesome sentences for the participants while SSC and SYI were the easiest.

The findings were inconsistent with Traxler (2014) who argued that syntax is the most important factor helping to comprehension. Omaki and Lidz (2015) also proposed that the ability to comprehend complicated sentences in a foreign / second language contributes to one's efficient syntactic awareness of that language. Brimo et al. (2017) also concluded that syntactic awareness has a significant contribution to sentence comprehension among the adolescent learners. The results were also in disagreement with Friederici and Kotz's (2003) study which supported the supremacy of syntax for comprehension, the opposite was concluded to be the case in this study. Afhami and Khaghaninejad (2021) also documented that presence of explicit syntactic markers (ESMs) and consequently syntactic awareness affected the sentence comprehension of EFL learners remarkably. Nonetheless, the results of the study are in line with Morgan et al. (2020) who found that comprehending sentences with semantic support were much easier for the participants comparing to semantically neutral sentences. They also provided preliminary evidence for the availability of some semantic processes prior to the full developmental emergence of syntax. Also, it is consistent with the study conducted by Kim and Osterhout (2005) which revealed that interpretation can be influenced by semantic processing in a way that it might be controlled by these processes even in the face of unambiguous syntactic cues.

Regarding the second question of the study which dealt with the reaction-time for different sentence types' comprehension, it was revealed that the comprehension of SEI, SSI, and GP sentences required more time than SYI and SSC sentences regardless of the learners' proficiency levels. This implies that sentences with semantic ambiguities are more challenging to perceive for EFL learners of different proficiency levels. This is in line with the findings of Clahsen and Felser (2006, p. 45) who argued that since the syntactic awareness is "shallower" than the semantic knowledge, L2 learners have to rely on lexical information to be able to process and comprehend L2 sentences. According to Friederici and Hahne (2001) and Tamimy et al. (2022), difficulty in comprehension for L2 learners can also be due to the low speed of the lexical and semantic information retrieval.

The third question of this study dealt with how EFL learners' language proficiency level affected the comprehension of semantically or syntactically incorrect sentences; consequently, the success rates of different sentence types were compared across different proficiency levels. SEI sentences were found to be the most demanding sentences for all three proficiency levels to comprehend. GP and SSI sentences were also challenging for all the participants in the next row. However, SYI sentences were the least challenging specially for advanced learners whose comprehension of these sentences was very close to the comprehension of SSC statements. As stated by Hopp (2016), L2 learners theoretically were able to

utilize the syntactic information; however, in practice, it was limited by various factors such as lack of automaticity in applying linguistic information, lower reading speed, etc. As a result, to compensate for these deficiencies, they relied more on lexical information to understand the sentences better. Therefore, in case of semantic ambiguities or errors, it became more difficult for L2 learners to comprehend new sentences. This finding would certify what Briscoe (2020) and Chwilla (2022) claimed about the supremacy of semantic knowledge over the syntactic awareness for the sentence comprehension of proficient readers.

The findings also revealed that semantic awareness played a more determining role in sentence comprehension in line with Huang et al. (2021). The more proficient learners relied on semantic proficiency more than the beginners; hence, they were usually capable of coping with SYI sentences more successfully. The findings were in agreement with what Hopp (2016) documented; this reliance was intensified as the language proficiency level rose. This reliance was even traceable in perception of Garden-Path sentences whose complexity was the outcome of structural mismatch at the first sight but as Pozzan and Trueswell (2016) put it, this was the semantic ambiguity not the syntactic confusion which necessitated for another attempt for logical comprehension.

In a very recent study, a close relationship was witnessed by Deniz et al. (2023) between the EFL learners' semantic knowledge (but not lexical phonology) and both regular and irregular word recognition. They concluded that during the early stages of learning to read, semantic knowledge might support word reading irrespective of regularity and contextual support particularly benefitted reading of irregular words. These findings implied that semantic treatment but not phonological awareness should be realized in almost all class activities from the early stages of instruction to improve sentence comprehension and production.

In the same vein, Keenan and Betjemann (2008) claimed that the semantically proficient readers were more autonomous and relied less on the contextual clues during the reading comprehension tasks than their peers. They also empirically documented that the semantic working memory predicted reading comprehension performance better than the orthographic or syntactic memories. They also suggested that the language network might be generally more strongly concerned with meaning than syntactic form. However, Washington and Wiley (2023) reported evidence that semantic awareness contributed to word identification, but significantly less than the syntax and only in syntactically grammatical sentences; this effect was moderated by EFL learners' language proficiency, further constraining the conditions under which the shared cross-linguistic representations were rapidly accessed in the bilingual mind.

In a comprehensive study, Massol et al. (2021) found a significant, collaborative interaction between the semantic and the syntactic awareness on sentence comprehension tasks. This interaction was greater with semantically regular sentences compared with semantically anomalous sentences. They concluded that sentence-level semantic information could constrain word identities under parallel word processing, albeit with less impact than that exerted by syntax.

Although many studies documented the dominance of either semantics or syntax for sentence comprehension, the interaction between the two proficiencies was not negligible.

Conclusion

This study verified the dominance of semantic over syntactic awareness for comprehension of L2 sentences for the participants of different levels of English proficiency. Moreover, the findings suggested that the dependence on the semantic proficiency increased as the level of L2 proficiency rose. Semantic knowledge seemed to be a more determining factor as far as comprehension accuracy and speed were concerned. According to Clahsen and Felser (2006), during parsing, adult learners have been guided by lexical-semantic cues much more than syntactic information. Additionally, this reliance on semantic knowledge was cross-lingual as Artetxe and Schwenk (2019) claimed. Tan et al. (2017) also found that the learners' reaction time for perceiving sentences was highly dependent to their semantic knowledge regardless of their syntactic proficiency.

Inspired by the findings of this research, teachers and instructors would be asked to draw the attention of EFL learners to a more semantically-based approach of teaching of the materials. Consequently, the focus could be shifted towards building a more comprehensive vocabulary bank for the learners without which instructors and even learners might devote unnecessary additional time to materials which were not going to be as helpful as they are expected. Associative strategies of vocabulary instruction (i.e., context-based instruction, morphemic analysis, concept mapping etc.) would be helpful techniques for developing the learners' lexicon eloquently and making them aware of lexical items' interrelationships.

More importantly, books and teaching materials could be designed in a way that learners would encounter various phrases and expressions helpful for developing their communicative competence. In this way, they would use their lexical repertoire to make informed guesses when encountering structurally erroneous expressions. In the realm of reading comprehension, instructors would draw learners' attention explicitly to some semantic information, thus making them more equipped to make use of various cues to decode a text. However, the interconnection of semantic and syntactic proficiencies should not be downgraded (Demberg & Keller, 2019).

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