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The Relationship between Iranian EFL Learners' Critical Thinking and their Inferential Ability in Reading Comprehension

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Abstract

The present study made an attempt to see if there was any statistically significant relationship between Iranian English as a Foreign Language (EFL) learners' critical thinking and their inferential ability in reading comprehension. Moreover, it attempted to see if there was any statistically significant difference between Iranian EFL learners' critical thinking and their inferential ability in reading comprehension. The participants were 127 English Literature, English Language Teaching and English Translation students at University of Isfahan, Islamic Azad University (Khorasgan Branch), Sheikh Bahaie University, Payame Noor University, and Islamic Azad University (Najafabad Branch). A quick placement test, a critical research questionnaire, and an inferential reading comprehension test were administered to the participants. The results revealed that there was a positive significant correlation between the critical thinking and inferential ability in reading comprehension. Also, the observed Z score showed that there was no statistically significant difference between the two correlation coefficients regarding gender. The findings of this study emphasize the importance of the relationship between critical thinking, and inferential ability in reading comprehension regarding gender and language proficiency in language learning and teaching.

Keywords: Critical thinking, Inferential ability, Reading comprehension, Gender, Language proficiency, Iranian EFL learners

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1. Introduction

There is a large number of research studies on the importance of speaking, writing and reading, although the focus on reading skills has been increased in recent years due to its apparent importance in language teaching and learning. Reading comprehension plays a major role in language learning process. The focus of the present study was on critical thinking and inferential ability or inference with regard to reading skills.

Critical Thinking is the process of using reasoning rationale to separate what is true, and what is false. Critical thinking is a higher-order thinking skill that involves estimating opinions and is a decided, self-regulatory judgment, which ends in interpretation, analysis, evaluation, and deduction.

The analysis of the facts to form an opinion is critical thinking. The topic is complex and there are various definitions, which typically include rational, skeptical, unbiased analysis or assessment. Critical thinking is a self-driven, self-disciplined, self-corrected thinking. It requires the acceptance and careful control of rigorous standards of excellence. It involves effective communication, solving problems and a commitment for overcoming indigenous egocentrism. Critical thinking involves a disciplined, self-directed, and deliberate thinking process that encompasses 'thinking about your thinking' in an attempt to make better decisions and actions (Scheffer & Rubenfeld, 2000).

Inference is the act of coming to a consistent logical consequence without actually witnessing or having the firsthand knowledge of an event. The capacity to get to and investigate the information is very fundamental in developing knowledge. However, individuals are not generally ready to find data rapidly, assess the significance of the data, and access it (Sligo & Williams, 2002).

Among different factors that may influence reading comprehension, critical thinking and inferential ability seem to be very important. The relationship between Iranian EFL learners' critical thinking and their inferential ability in reading comprehension considering their gender and language proficiency will be investigated in this study.

Iranian EFL learners are not impressively familiar with the idea of critical thinking. Usually, they accept many ideas without making any effort to judge them in terms of truthful pieces of evidence. There is a consensus of opinion among researchers that critical thinking is important in almost every activity due to its association with some abilities such as problem solving and decision making (NourMohammadi & Zare, 2015).

This study will attempt to show the relationship between critical thinking and inferential ability in reading comprehension. Through the enhancement of these two abilities, students and teachers will be more efficient in learning and teaching. Critical thinking and inferential ability are two important abilities, which are vital in education, so a significant relationship between these two abilities can help learners acquire a better understanding of implicit meanings of what they study. Moreover, with a better understanding of critical thinking and inferential ability, teachers can design and implement appropriate reading comprehension texts to promote the students' understanding of such texts.

The current study can assist educational decision makers to recognize to what extent Iranian EFL learners have critical thinking and inferential ability in reading comprehension and / or if there is any relationship between critical thinking and inferential ability in reading comprehension. It can assist teachers to become conscious of the significance of learners' critical thinking and inferential ability and teach them how to use these abilities to be successful in different processes of learning. Norris and Phillips (1987) mention that reading is more than just saying what is on the page; it is thinking. Moreover, Beck (1989) claim "there is no reading without reasoning" (p. 677). The following research null hypotheses, based on the above questions, were posed to be tested.

1. Null hypothesis 1: There is no significant relationship between EFL learners' critical thinking and their inferential ability in reading comprehension.

2. Null hypothesis 2: There is no significant difference between Iranian EFL learners' critical thinking and their inferential ability in reading comprehension considering their gender.

3. Null hypothesis 3: There is no significant difference between Iranian EFL learners' critical thinking and their inferential ability in reading comprehension considering their language proficiency.

2. Review of Literature

Several studies have empirically explored the relationship between critical thinking and reading comprehension. For instance, Mohseni et al. (2020) examined the differential effect of metacognitive strategy training and critical thinking awareness-raising on EFL learners' reading comprehension of general reading (GR), cause and effect (CE), and argumentative (ARG) texts. The study investigated the extent to which raising Iranian EFL learners' awareness of critical thinking skills and three sets of metacognitive reading strategies including global, problem-solving, and support influence three groups of participants' reading comprehension. To this end, a purposeful sample of 54 intermediate male Iranian EFL learners attending three classes was recruited from a pool of 85 English learners and was randomly assigned to two experimental groups receiving metacognitive training (MCG) and critical thinking awareness-raising (CTG) and a control group (CG). The research data were gleaned using a researcher-made piloted 54-itme reading comprehension test. The results of the paired sample t-test analyses demonstrated that both MCG and CTG made significant improvements in comprehending GR and ARG texts from the pre-test to the post-test. Moreover, both groups outperformed the CG in comprehending GR and ARG post-tests. With regard to CE comprehension, the only significant difference was observed between the MCG and the CG. The findings offer a number of pedagogical implications.

In another study, Din (2020) aim to evaluate university students' critical thinking ability as reflected in their critical reading skills. To do so, the researcher has set two research objectives to understand the university students' attitudes towards critical thinking and to know the relationship between the university students' attitudes towards critical thinking and their language proficiency with reference to their critical reading skill and their performance in critical reading test (CRT). To achieve these objectives, the researcher has used quantitative research methodology. The participants of this study consisted of 550 male and female university students of different state-run colleges of Punjab (Pakistan). Critical

thinking inventory (CTI), Watson-Glaser's Critical Thinking Appraisal (WGCTA) (2002) and critical reading test (CRT) have been used to collect data. The researcher used SPSS to analyze the collected data. The findings of the study revealed that the university students have highly positive attitudes towards critical thinking but their level of critical thinking and their ability to reflect on critical thinking in their critical reading skill do not correspond with their attitudes towards critical thinking.

Kamgar and Jadidi (2016) investigated the relationship between Iranian EFL learners' critical thinking and self-regulation and their reading comprehension ability across beginner, intermediate, and advanced levels of proficiency. To this end, 70 learners studying English Language Teaching and English Literature, who were selected through convenient sampling procedure, completed a reading placement test, a critical thinking dispositions questionnaire and a self-regulation questionnaire. The findings indicated a statistically significant correlation for those with greater critical thinking skill among advanced and intermediate learners, while there was no significant relationship between self-regulation and reading comprehension ability except for the advanced group of learners.

Nasirahmadi (2014) conducted a study to survey the relationship between Iranian language learners' critical thinking ability and their reading comprehension achievement. To do so, two B.A. English classes from the faculty of letters and humanities of Shahid Beheshti University were selected as the participants of the investigation. They were given the Persian version of Watson-Glaser Critical Thinking Appraisal (1980) and an Academic IELTS reading test. The obtained data were analyzed using Pearson-Product Moment Correlation Coefficient and doing a statistical regression analysis. The results revealed that there was a significant, positive, and moderately high correlation between the two variables of the study. The students' scores on the critical thinking test could predict their success or failure in the IELTS academic reading section.

Also, Ghabanchi and Behrooznia (2014) studied the impact of brainstorming on reading comprehension and critical thinking ability of EFL learners. This study investigated the effect of brainstorming as a pre-reading strategy on the reading comprehension ability as well as critical thinking ability of EFL learners. The study used an experimental design with

29 participants in the control group and 25 participants in the experimental one. The results of the pretest affirmed the homogeneity of the participants in two groups regarding their reading comprehension ability as well as critical thinking ability. A 45 multiple-choice reading test taken from Flash (2005) TOEFL Reading and the 'Watson-Glaser Critical Thinking Appraisal' (CTA) were implemented to assess the students' reading comprehension ability, besides their CT ability; respectively. The post-test results demonstrated that brainstorming strategies have a positive significant effect on both CT ability as well as reading comprehension ability of the participants.

Forood and Farahani (2013) did a comparative study on the performance of Iranian high and low critical thinkers on different types of reading comprehension questions. The study aimed to detect whether there was any significant difference between the achievement of high and low critical thinkers on accurate, referential, and inferential reading comprehension questions. To this end, 42 learners were selected. Afterward, the Persian version of Watson-Glaser Critical Thinking Appraisal (1980) was administered to the participants and they were then assigned to two groups of high and low critical thinkers. The findings showed that (a) there was a significant difference between the high and low critical thinkers in their performance on factual reading comprehension questions, (b) there was a significant difference between high and low critical thinkers in their performance on referential reading comprehension questions, and (c) there was a significant difference between high and low critical thinkers in their performance on inferential reading comprehension questions.

Furthermore, Basaraba et al. (2013) examined the structure of reading comprehension questions and wanted to see if literal, inferential, and evaluative comprehension truly exist. The reasons for this investigation were twofold: (a) to examine the relative difficulty of items written to assess literal, inferential, and evaluative comprehension, and (b) to compare single factor and bifactor models of reading comprehension to decide if the items were written to assess the students' literal, inferential, and evaluative comprehension abilities. Information from around 2,400 fifth grade students gathered in the fall, winter, and spring was utilized to examine these issues. The findings showed that (a) the relative difficulty of item types might

be curvilinear, with literal items being significantly less challenging than inferential and evaluative items, and (b) literal, inferential, and evaluative comprehension measurement factors clarified unique portions of difference in addition to a general reading comprehension factor.

Also some papers have been written about inferential ability and reading comprehension. Yeari (2017) studied the role of working memory in inference generation during reading comprehension: retention, (re) activation, or suppression of verbal information. This study explored the role of working memory in online activation of bridging and predictive inferences during reading comprehension. Different patterns of results were observed for high- and low-span groups only when the participants were divided based on the listening-span test. The high-span participants generated predictive inferences faster than the low-span participants. Moreover, the high-span participants generated more bridging inferences than the low-span participants, possibly due to an enhanced retention and reactivation of inference-evoking textual information.

Besides, Saadatnia et al. (2017) inspected levels of reading comprehension across text types. They explored two levels of reading comprehension, namely literal and inferential, of two text types of narration and exposition in Iranian EFL learners. One hundred eighty upper-intermediate EFL learners were given reading passages followed by both literal and inferential multiple-choice items tests. The outcomes showed that the participants consciously outperformed on the expository texts at the level of literal comprehension. Yet, regarding inferential comprehension, there was no significant difference between the two text types. The findings, from an intra-text-type perspective, literal comprehension meaningfully outweighed inferential comprehension in the expository texts, whereas no significant difference was observed between literal and inferential comprehension in the narrative texts.

In addition, Daugaard et al. (2017) analyzed the relationship between inference making, vocabulary knowledge, and the verbal working memory of 62 sixth graders (aged 12) in reading comprehension. The results showed that it may be conceivable to enhance the effect of such vocabulary instruction on reading comprehension if the interplay between vocabulary and inference making is accentuated during instruction. To conclude, inference

making was found to increase the effect of vocabulary on comprehension. This demonstrated that word meanings are significant for comprehension in the context of inference making.

Javed et al. (2016) identified reading strategies to teach literal, reorganization, and inferential comprehension questions to ESL students. This study aimed at identifying reading strategies used by teachers that help them teach literal, reorganization, and inferential comprehension questions to ESL students. The target population was the ESL teachers teaching at a secondary school level in Penang, Malaysia. A questionnaire comprising reading strategies that help ESL teachers teach literal, reorganization, and inferential comprehension questions and developed by the researchers was used to collect data. The results, based on the quantitative analysis of the data, revealed that the ESL teachers use different reading strategies for teaching literal and reorganization comprehension questions but a small repertoire of reading strategies was employed for teaching inferential comprehension questions.

Moreover, Ulu (2016) implemented a structural equation model to explain the effect of fluent reading, literal comprehension, and inferential comprehension levels of elementary school 4th grade students on success in problem solving. The sample of the research was composed of 279 4th grade students at elementary school. When the research outcomes were evaluated in terms of the effect of reading comprehension skills on problem solving skills, it was discovered that fluent reading skills do not affect problem solving skills directly, but through literal and inferential comprehension. That is, literal comprehension affects problem solving success both directly and through inferential comprehension; and that inferential comprehension skill affects problem solving success directly.

Hall (2015) studied inference instruction for struggling readers. The reason for this investigation was to provide a synthesis of the research on inference instruction interventions conducted among students who are struggling readers. The purpose of this study was to discover and compare all intervention studies that evaluated the effects of inference instruction on inferential reading comprehension. In general, the findings of this synthesis suggest that inference instruction interventions can be useful both when they target prior

knowledge activation (and teach students to integrate prior knowledge with information in the text) and when they concentrate just on integrating information in the text.

Clinton, et al. (2014) discovered gender differences in inference generation by fourth-grade students. The purpose of this study was to determine if there were gender differences among elementary school-aged students regarding the inferences they generate during reading. Fourth-grade students (130 females; 126 males) completed think-aloud tasks while reading one practice and one experimental narrative text. The findings suggested that males and females differ in their use of cognitive processes that underlie reading comprehension, particularly with respect to the likelihood of retrieval of information from episodic memory.

In addition, Pérez et al. (2014) investigated the role of working memory in inferential sentence comprehension. In this experiment, they researched whether working memory capacity plays a role in our ability to answer comprehension sentences that require text data based on these types of inferences. Participants with high and low working memory span read two narratives with four paragraphs. After each paragraph was read, they were presented with four true/false comprehension sentences. Outcomes showed that only the explicative and predictive comprehension sentences required working memory: the participants with high verbal working memory were more accurate in giving clarifications and faster in making predictions in comparison with participants with low verbal working memory span; conversely, no working memory contrasts were found in the associative comprehension sentences.

3. Method

3.1. Participants

The participants of this study were chosen from the sixth semester students of English Literature and Translation in University of Isfahan, the seventh semester students of Teaching and Translation in Islamic Azad University (Khorasgan Branch), the sixth and eighth semester of Translation in Sheikh Bahaie University, the eighth semester students of Teaching in Payame Noor University, and the seventh and eight semester students of Translation in Islamic Azad University (Najafabad Branch). The participants were 127

students. The sample consisted of 48 males and 79 females. 20 males and 34 females belonged to University of Isfahan, 10 males and 16 females belonged to Islamic Azad University (Isfahan, Khorasgan Branch), 7 males and 9 females belonged to Sheikh Bahaei University, 3 males and 7 females belonged to Payame Noor University, and 8 males and 13 females belonged to Islamic Azad University (Najafabad Branch). All of participants were at B.A. level, at age range of 20 to 26.

3.2. Instruments

In the present study, three instruments were used for the purpose of collecting the necessary data to answer the research questions. They were a quick placement test, a critical thinking questionnaire, and an inferential reading comprehension test.

Quick Placement Test

The Quick placement test (version 2) belongs to Oxford University Press and University of Cambridge Local Examinations Syndicate. This test was divided into two parts: Part One (Questions 1-40) was given to all students. Part Two (Questions 41-60) did not start unless the students were told to do so by test supervisor. The time allowed for the test was 60 minutes. The purpose of the placement test was to identify the level of the participants.

Critical Thinking Questionnaire

The Persian version of an English Critical Thinking Questionnaire (CTQ) consisted of multiple-choice items was administrated to the participants to evaluate the participants' critical thinking ability. The researchers translated the English version of the critical thinking questionnaire into Persian to make it more comprehensible to the participants. The translated questionnaire was administered to 30 students similar to the participants of this study. The reliability of the questionnaire was found to be 0.89, which was acceptable. The questionnaire was also a paper-and-pencil instrument in which there was no time limitation for the participants to answer the questions.

Inferential Reading Comprehension Test

The inferential reading comprehension test for the participants was taken from Longman Complete Course for the TOEFL Test Preparation for the Computer and Paper Test (2001)

because the items of the inferential reading comprehension test were too many, the test was divided into two passages, one of them with four passages and the other with six passages, each test had fifteen inferential multiple-choice items, and each item was followed by four options; therefore, the inferential reading comprehension test contained thirty inferential multiple-choice items. After administering the test to 30 students similar to the participants, the reliability of the inferential reading comprehension test was found to be 0.89, which was acceptable.

3.3. Procedures

The quick placement test, the critical thinking questionnaire, and the two separate passages of the inferential reading comprehension test were administered to 127 participants in this study. All the instruments were administered in four sessions. In the first session, the quick placement test was administrated in 60 minutes. In the second session, the Persian critical thinking questionnaire was administrated. In the third session, because the items of the inferential reading comprehension test were too many, at first, four passages of the inferential reading comprehension test were given in one session, and then the remaining passages of the inferential reading comprehension test were administrated in a different session. Each session lasted about 30 minutes. Having collected the required data, the researchers started to analyze the data.

3.4. Data Analysis

The data collected were analyzed by using SPSS. To test the first null hypothesis, a Pearson product–moment correlation was run to check whether the relationship between the critical thinking and the participants' inferential ability in reading comprehension was statistically significant or not. To test the second null hypothesis, Pearson-product moment correlation and an equation using Z (Pallant, 2013, pp. 145-147) scores were used to decide if the correlations between the participants' critical thinking and their inferential ability in reading comprehension regarding gender were significantly different or not. To test the third null hypothesis, another Pearson-product moment correlation and an equation using Z scores were also used for investigating the difference between the participants' critical thinking and their inferential ability in reading comprehension regarding language proficiency.

4. Results

4.1. The First Research Hypothesis

The first null hypothesis was as follows. In order to test the first null hypothesis, the number of the participants, the means, the standard deviations (*SD*) of the inferential ability and the critical thinking tests were calculated. Table 1 shows the descriptive statistics for the scores of the inferential reading test. Table 1 shows that the distribution of the scores was normal because the significance levels (.058 and .065) are higher than p<.05.

H_01: There is no significant relationship between Iranian EFL learners' critical thinking and their inferential ability in reading comprehension.

Table 1

Descriptive Statistics for the Scores of the Inferential Reading

	N Valid	Mean	Std. Deviation
Inferential reading	127	16.62	4.21

Table 2

Tests of Normality for the Scores of the Inferential Reading Test

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	F	Sig.
Inferential Passage Scores	.094	127	.058	.980	127	.065

Table 3 shows the descriptive statistics for the scores of the critical thinking questionnaire. According to Table 3, the significance levels (.097 and .215) are higher than .05, which indicates that the distribution is normal.

Table 3

Descriptive Statistics for Scores of the Critical Thinking Questionnaire

	N	Mean	Std. Deviation
Critical thinking questionnaire	127	3.3278	.30521

Table 4

Test of Normality for the Critical Thinking Questionnaire Scores

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Critical thinking questionnaire	.073	127	.097	.986	127	.215

The first research question put forward earlier in this study focused on the relationship between critical thinking and Iranian EFL learners' inferential ability in reading comprehension. To answer this question, first we take a look at the scatter plot in order to get a general idea of the relationship (if any) and check some assumptions. As shown in Fig 1, a positive relationship can be observed between the two variables.

As shown, looking at the graph from the bottom left corner to the top right, a cigar shape can be observed, which indicates homoscedasticity.

Next, the graph shows a few dots standing separately on their own that shows that there are just a few outliers. Finally, as can be seen, mostly higher values on the critical thinking questionnaire are associated with higher values on the inferential test suggesting a

positive linear relationship between the two. Considering these assumptions and points, we can run a Pearson's product-moment correlation analysis to further examine the relationship.

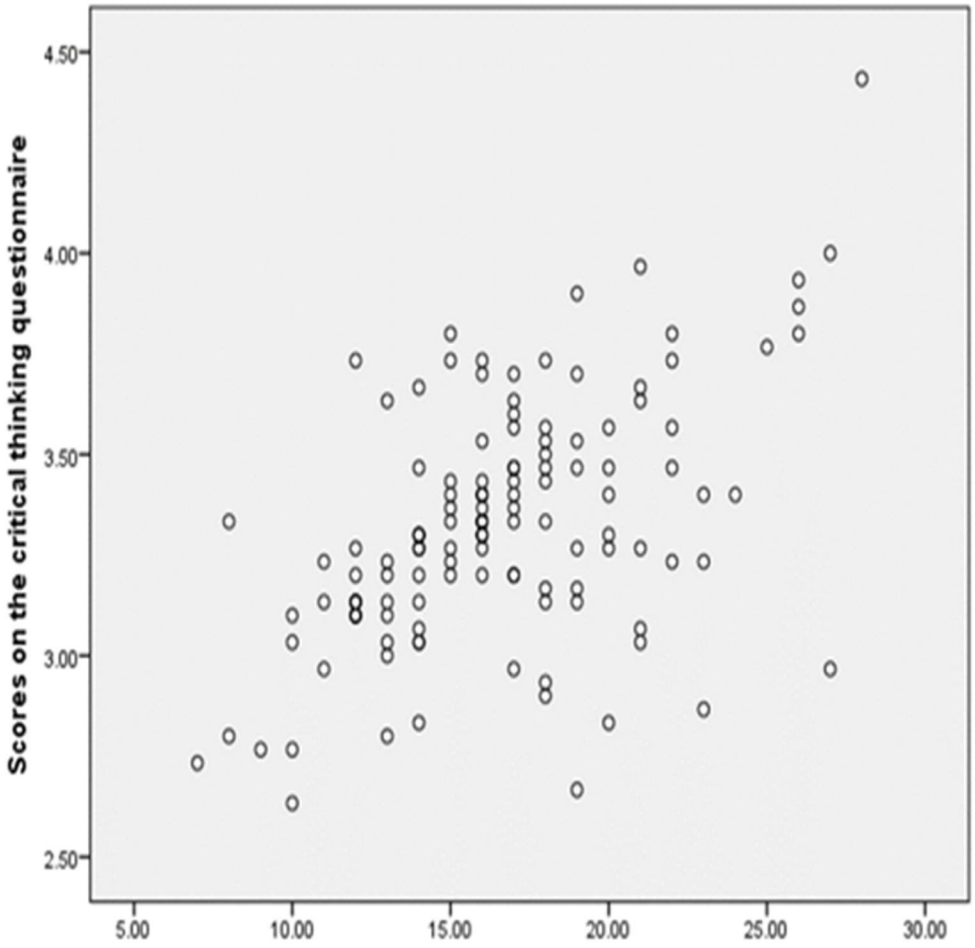

Fig 1

Scatter Plot for the Relationship between Critical Thinking and EFL Learners' Inferential Ability

Table 5 below shows the results of a Pearson's product-moment correlation procedure run on the participants' scores on the critical thinking questionnaire and the inferential reading test. As can be seen, there was a significant positive correlation between the two variables (r = .51, p = .00). Therefore, the first hypothesis is rejected. The amount of the

shared variance (r^2), the effect size calculated for this correlation was 27%, which is small according to Cohen's guidelines (1988, pp. 79-81).

Table 5

Correlations between the Critical Thinking and Inferential Ability of the Participantsin Reading Comprehension

		Inferential ability	Critical thinking
Scores on inferential questions	Pearson Correlation	1	.516**
	Sig. (2-tailed)		.000
	N	127	127
Critical thinking	Pearson Correlation	.516**	1
	Sig. (2-tailed)	.000	
	N	127	127

4.2. The Second Research Hypothesis

The second null hypothesis was posed as follows. Table 6 and 7 show the *N*, *M*, and *SD* values for both male and female participants on the placement test. Table 8 shows the results of normality tests for both groups, which indicates acceptable values for normality because the significance levels (.131 and .152) are higher than .05.

$H_0$2: There is no significant difference between Iranian EFL learners' critical thinking and their inferential ability in reading comprehension regarding gender.

The second research question posed in this study was to see if there was any significant difference between Iranian EFL learners' critical thinking and their inferential ability in reading comprehension regarding gender (N: Males = 48, Females = 79). To answer the second research question, the data file was split in two based on gender and then Pearson's product-moment correlation analysis was run.

Table 6

Descriptive Statistics for Males

	N Valid	Mean	Std. Deviation
Placement test	48	48.13	5.719

Table 7

Descriptive Statistics for Females

	N Valid	Mean	Std. Deviation
Placement test	79	45.09	7.465

Table 8

Tests of Normality for both Males and Females

Sex	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Male	.207	48	.087	.865	48	.95
Female	.183	79	.131	.910	79	.152

According to Table 9, the correlation value for females (r = .52, p = .00) was slightly higher than the value calculated for males (r = .50, p = .00). Both correlation values reached the statistical significance levels. Both values indicate medium positive correlations between the participants' scores on the critical thinking questionnaire and inferential anility in reading comprehension test in terms of gender, with shared variances of 28% and 26% for females and males, respectively, which are small according to Cohen's guidelines (1988, pp. 79-81).

Next, the r values calculated for the females and males were converted into standard Z scores in order to see if the correlations for the two groups are significantly different. The data involved 48 males (r = .50) and 79 females (r = .52). Based on calculations, we can find the equivalent Z score for males (z_1 = .56) and females (z_2 = .58). Then, based on the standard

Z scores, the observed Z score was calculated so that we could compare them for significant differences. The observed Z score, in this case, was calculated to be 0.17, which means there is no statistically significant difference between the two correlation coefficients regarding gender. Therefore, the second null hypothesis is confirmed.

Table 9

Correlation between Critical Thinking and Inferential Ability in terms of Gender

Gender		**inferential ability**	**critical thinking**
Scores on inferential Questions	**Pearson Correlation**	1	.508
	Sig.(2-Tailed)		.000
	N	48	48
Males	**Pearson Correlation**	.508	1
Critical thinking	**Sig.(2-Tailed)**	.000	
	N	48	48
Scores on inferential Questions	**Pearson Correlation**	1	.526
	Sig.(2-Tailed)		.000
	N	79	79
Females	**Pearson Correlation**	.526	1
Critical thinking	**Sig.(2-Tailed)**	.000	
	N	79	79

4.3. The Third Hypothesis

The third research hypothesis was posed as follows. Table 10 shows the descriptive statistics of the placement test (N = 127). Moreover, the normality tests are presented in Table 11, which indicates a normal distribution, because the significance levels (.057 and .071) are more than .05.

$H_0$3: There is no significant difference between Iranian EFL learners' critical thinking and their inferential ability in reading comprehension regarding English language proficiency.

Table 10

Descriptive Statistics for the Placement Test

	N Valid	Mean	Std. Deviation
Placement test	127	46.24	6.991

Table 11

Tests of Normality for the Placement Test Scores

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Placement Test	.197	127	.057	.893	127	.071

In addition, the descriptive statistics were also calculated. (N_{low} = 58, N_{high} = 69). Table 12 shows the values for the mean and SD. The participants were divided into high proficiency and low proficiency according to the median of the placement test. Table 13 shows the normality tests for both groups, which indicates acceptable values.

To test the third null hypothesis, the data file was split in two based on the participants' language proficiency (high and low proficiency). The participants whose scores on the placement test were above the median were considered as high proficiency and those whose scores were below the median were considered as low proficiency. Then, the

Pearson's product-moment correlation analysis was run, the results of which are shown in Table 14. As it is shown, the correlation value for the low proficiency participants (r = .43, p = .00) was lower than the value calculated for the high proficiency participants (r = .57, p = .000). Both values were statistically significant. These values indicate medium positive correlations. The shared variances calculated for these correlations were 19% and 33% for the low and high proficiency participants, respectively, which are small according to Cohen's guidelines (1988, pp. 79-81).

Table 12

Descriptive Statistics for the High and Low Proficiency Participants

Placement test	Mean	Std. Deviation
Lower Advanced	40.14	5.856
Higher advanced	51.36	1.855

Table 13

Tests of Normality for the High and Low Proficiency Students

Placement Test	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Lower-Advanced	.101	58	.200	.944	58	.159
Higher-Advanced	.145	69	.221	.916	69	.174

Next, the r values calculated above were converted into standard Z scores in order to see if the correlations for the two groups were significantly different or not. The data consisted of 58 low proficiency (r = .43) and 69 high proficiency (r = .57) participants. Based on Pallant (2013), we calculated the equivalent Z scores for the low (z_1 = .466) and the high proficiency (z_2 = .655) participants.

Then, on the basis of the standard Z scores, the observed Z scores were calculated so that we could compare them for the significant differences (if any). The observed Z score, in this case, was calculated to be -1.04, which means that there was no statistically significant difference between the two correlation coefficients regarding English language proficiency. Therefore, the third null hypothesis is also confirmed.

Table 14

Correlation between Critical Thinking and Inferential Ability in Reading Comprehension regarding Language Proficiency

Placement Test (Binned)			Scores on inferential questions	Critical thinking
Low proficiency participants	Scores on inferential questions	Pearson Correlation	1	.436**
		Sig. (2-tailed)		.001
		N	58	58
	Critical thinking	Pearson Correlation	.436**	1
		Sig. (2-tailed)	.001	
		N	58	58
Higher- proficiency participants	Scores on inferential questions	Pearson Correlation	1	.573**
		Sig. (2-tailed)		.000
		N	69	69
	Critical thinking	Pearson Correlation	.573**	1
		Sig. (2-tailed)	.000	
		N	69	69

5. Discussion

The first research question was answered based on the relationship between critical thinking and Iranian EFL learners' inferential ability in reading comprehension. As it was indicated in the previous section, there was a medium, positive, and significant relationship between critical thinking and inferential ability in reading comprehension. The participants might have lacked experience in answering inference type of questions due to their teachers' tendency to focus on literal questions in the classroom, and the participants might have answered the questions by chance. This finding is similar to the findings of Hosseini et al. (2012), who investigated the relationship between critical thinking, reading comprehension, and reading strategies of English university students. The findings showed that there was a significant positive relationship between Iranian EFL readers' critical thinking ability and reading strategy use. Moreover, a significant positive relationship was observed between critical thinking and reading comprehension. Their results also manifested that those strategies along with critical thinking ability act as the best predictors of reading comprehension. Of course, these two studies are different to some extent, but in both studies, there was a positive relationship between critical thinking and reading comprehension.

The findings of this study also support the findings of the study done by Aloqaili (2012), who aimed at investigating the relationship between critical thinking and reading comprehension. The findings of his study revealed that there was a significant and positive relationship between reading comprehension and critical thinking. Another study with which the results of this study are in agreement is the study done by Nasirahmadi (2014). He examined the relationship between Iranian language learners' critical thinking ability and their reading comprehension achievement. The results showed that there was a positive and moderately high correlation between the two variables of the study.

When it comes to the second research question, the relationship between critical thinking and inferential ability in reading comprehension of males and females was positive and medium. It was also shown that the correlation value for the females was slightly higher than the value calculated for the males, both of which reached the statistical significance. The findings also showed that there was no statistically significant difference between the two

correlation coefficients in terms of gender. A good reason for this result might be that the participants of these studies were at the same range of age. Another reason might be that the type of instruction they received was more or less the same.

These findings are in line with the findings of Yousefi and Mohammadi (2016) who investigated the role of critical thinking skills in EFL learners' reading comprehension, and attempted to study the possible differences between males and females. The results of the present study and their study are the same

In another study, Ghorban DordiNejad and Heydari (2012) examined whether there was any relationship between the learners' critical thinking ability and their reading comprehension ability, in general, and the micro-skills of reading comprehension (i.e. inference, main idea, and specific details), in particular. Also, this study made an attempt to investigate the differences between the learners' critical thinking ability and their reading comprehension skills with regard to their gender. The results showed that there was a strong, positive correlation between the two variables with the high level of reading comprehension associated with high level of critical thinking. Moreover, it showed that there was a strong, positive correlation between critical thinking and reading comprehension micro-skills. On the other hand, the study indicated that the differences between the male and female students' micro-skills were not significant.

Regarding the third research question, there is a significant, medium, and positive correlation between critical thinking and inferential ability in terms of language proficiency. It is shown that the correlation value for the low proficiency participants was lower than the value calculated for the high proficiency participants. One reason for these findings might be that the high and low proficiency learners received the same type of instruction in terms of reading comprehension. Another reason might be that none of the two groups received any instruction in critical thinking ability. This finding is in line with the finding of Barjasteh and Vaseghi (2012) who investigated the role of critical thinking skills in EFL learners' reading comprehension performance using Bloom's taxonomy. In this study, the role of critical thinking strategies training over two language proficiency levels, high and low, was investigated. Each proficiency group was divided into a critical and non-critical group. The

outcomes demonstrated that critical thinking skills altogether influenced EFL learners' reading comprehension performance. Nonetheless, the impact of critical thinking strategy training did not differ across different language proficiency levels.

Moreover, Kamgar and Jadidi (2016) investigated the relationship between Iranian EFL learners' critical thinking and self-regulation with their reading comprehension ability. The purpose of this study was to explore the relationship between Iranian EFL learners' critical thinking and self- regulation with their reading comprehension ability across beginner, intermediate, and advanced levels of proficiency. The results indicated that there was a significant relationship between critical thinking and reading comprehension ability of the intermediate and advanced learners. Because of using a quick placement test for language proficiency, using an insufficient number of inferential reading questions, using a non-random method of sampling, and using students from specific universities and areas, the results should be generalized with caution.

6. Conclusion

The current study attempted to determine whether there is any statistically significant relationship between critical thinking and EFL learners' inferential ability in reading comprehension. It also attempted to see if there was any statistically significant difference between Iranian EFL learners' critical thinking and their inferential ability in reading comprehension regarding gender. Moreover, it attempted to see if there was any statistically significant difference between Iranian EFL learners' critical thinking and their inferential ability in reading comprehension regarding language proficiency.

The findings showed that there was a medium, positive, and significant relationship between the critical thinking and inferential ability in reading comprehension. Furthermore, the results revealed that there was no statistically significant difference between the two correlation coefficients regarding gender and language proficiency.

Therefore, it can be concluded that improvement in critical thinking and inferential ability can lead to improvement in reading comprehension. As a result, teachers should

instruct the language learners to think critically and inferentially while reading, if they intend to become proficient readers of English texts.

Conflict of interest

The author(s) certify/certifies that they have no affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in the present research paper.

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