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An investigation into the interface of critical thinking, personality factors and gender on reading comprehension ability among EFL learners

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Abstract

The studies of Critical Thinking were first initiated in disciplines of psychology and then permeated into fields of education. The aim of the current study was twofold: first of all to identify if the interaction effect of Introversion/ Extroversion and CT skills, (high, low and intermediate) affected the comprehension ability of advanced EFL learners. Secondly, it scrutinized the interaction effect of gender and CT skills on reading comprehension ability of advanced EFL learners. To fulfill the aforementioned purposes, a 34-item Persian translated version of California Critical Thinking Test, brief version of Eysinck Personality Test and a TOFEL Reading comprehension test were utilized. The results indicated gender and personality factors did not mediate CT on reading comprehension ability, however, a statistically significant difference among different levels of CT and reading comprehension scores was observed. Therefore, the results suggest a curriculum and content reform so as to assist language learners to become acquainted and adopted with trends and new technologies in an attempt to be able to realize truth from falsity in this hazy world of globalization.

Keywords: Critical thinking, Advanced EFL learners.

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1. Introduction

Assuming the focal point that our surrounding environment is virtually subject to ceaseless upheaval, our thoughts and evaluations should manure with the same speed which is congruent with societal changes so as not to lag behind the environmental and technological enhancements; otherwise, our decisions would not be accurate, proper and may have a counter effect on our daily lives. One very good path to guard safely against the improper, sensitive weighing and judging is critical thinking.

When someone benefits from mental layers to reach the optimal results, Carool (2005) believes that he thinks critically. He adds further that "to think critically is to think clearly, accurately, knowledgeably and fairly while evaluating the reasons for a belief or for taking some action (p.2). Paul and Elder (2006) in a characterization of someone to be called critical thinker mention the following features:

1-coming up with critical queries neatly

2-eliciting to the point data and applying intellect and mindfulness in order to interpret profoundly and efficiently at hand data

3-Even after the data are analyzed, we have to weigh them with respect to standards and consult others in order for our decisions to be uniquely optimal and fabulously perfect.

Also, Knight (2007) states that to provide sound definitions of Critical thinking, it is required to have a common and profound appraisal of CT. Although a consensus has not been reached concerning the definition of Critical thinking, as above lines explicate, a language learners should arm himself robustly with Critical thinking scales. Although language learners go ahead with language studies from one level to another, the passivity of role assigned to them during schooling periods reduces chances of intellectuality and creativity (Freire, 1969). Also, Dewey (1993) cites once learners are able to think, to ponder about intricate issued they encounter in their routine life (Yeh, 2004) we can substantiate the efficacy of schooling and education. Ultimately, due to bombardment of information being referenced and non-referenced, decisions are made (Oliver & Ytermohlen, 1995). L2 learning is no exception, learners master lower order skills such as mere memorization which is then lodged passively in our mind and obstacles against the learning to think about what we learn (Paul, 2004). Halpern (2003) argued each generation has its own challenges and expects the learners of its own time to cope with confronts of another generation while the system of education is fixed and equips each and every individual learner with the same adroit and features. These fixed sets of indoctrinations, however, as Halpern (2003) discusses do not guarantee to help a learner survive in the hazy world of technology, novelty and science. Swartz and Praks(1994) referred to the term critical thinking to guard and individual against the challenges and opportunities ahead and assist one to judge and act freely and independently.

The terms Critical Thinking (Hencefourth, CT) has been linked to Bloom's Taxonomy (2002) of higher order skills (Halpern, 1998; Dam & Volman, 2004). Ennis (1993) highlighted analysis, synthesis and evaluation as higher order skills one needs to be called a critical thinker.

Facione (2013) proposed a reformulation of the term CT even beyond Bloom's categorization. He whose insights were originating from a panel of experts' consensus one the main tenets of CT provided interpretation, analysis, evaluation, inference, explanation and self-regulation as the six pivotal parcels of CT.

Critical thinking and personality factors' research was fascinated by some scholars and theorists as well suggested personality factors influence one's ability to act and judge freely. Hence, Ghafari, Shahraki, Rajabi and Baboli, (2012) in the department of management working on the relationship of personality factors on the expansion of CT skills concluded there is a positive correlation between extroversion and CT Scales. In another study, Nosratinia and Barabchian (2013) carried out a study on the role of personality traits in predicting EFL learners CT Skills. The results show that all five personality factors including extroversion ameliorate CT Skills but neuroticism was the best predictor of CT skills.

Besides CT and personality factors, Renandya (2002) and Celece-Murcia (2001) admitted the significance of reading in foreign language contexts. Celece-Muricia, however, proceeds to call reading as a dynamic and socio-cognitive process. Mason (1984) postulates understanding takes place as the results of links and associations readers make between the viewpoints incorporated in a passage with already accumulated knowledge. Likewise, Sheorey and Mokhtari (2001) cite that reading is "a process in which readers constantly form hypotheses, test predictions, and use their knowledge of the world and of the language to construct meaning". Theoretically speaking, novelty in the field of cognativism have expounded upon the terms reading comprehension by utilizing similar terms of Critical thinking, prior knowledge, inferences making and meta cognition abilities (Limbach & Waugh, 2010; Zabit, 2010). Besides aiding proper knowledge to be triggered, CT formulates prospect ideas by benefiting from inference. Inferecning mediates the appearing ideas in a text and the amalgamation of formerly mentally gathered concepts about the very ideas appearing in a text (Norris & Philips, 1987; Collins. et al, 1980). Consequently, Critical thinking play a monumental role between the surface ideas being read and links them to underlying concepts being subsumed in our mind.

Beside inference, Reasoning has been incorporated into reading (Beck, 1989) to highlight a better comprehension. Furthermore, Lewis' (1991) asserts concerning necessary and sufficient components of reading are hence interesting. He argues that our mind goes through processes like identification of words and attaching prominence to a cluster of words; however, the aforementioned components do not suffice for a through comprehension of a text. To be successful, readers must have the valid inferential and reasoning skills to establish meaningful connection between information which is in a text and the relevant back ground knowledge (Broek & Kremer, 2010). In other words, Elder and Paul (2004) stress upon the fact that "to learn well, one must read well". Moreover, the reason why we read a text can be, simply speaking, comprehension. Comprehension cannot be achieved merely form the text written by the author , the encoded meaning of a text would be unfolded by the reader. Therefore, an active role should be assigned to the reader. Put it differently, the reader is considered as an "active information processor" (Carrell, Devine & Eskey, 1998).

Hosseini, Bakhshipour khodaei, Sarfallah and Dolatabadi (2012) explored the relationship between critical thinking, reading comprehension and reading strategies of English university students. The results indicated a positive relationship between CT and Reading comprehension

Harris and Hodges (1981) characterized CT as one's ability to decide while reading and relate arguments in a text to decipher meaning. In a study on reading comprehension Baker (1985) reported some university students were able to elicit facts while reading however, they could not deduct or induct ideas providing they were implicitly embedded in texts (Arons, 1979). Consequently, Friedman and Rowls (1980) recommended there was a strong correspondence between assumptions of CT skills and understanding of a text. Fahim, Barjaste and Vaseghi (2012) in a study of CT strategy training on male and female reading comprehension concluded performance of learners on reading comprehension was not linked to CT skills mediated by the role of gender. Similarly, Piennar (2000) in a study of adults' critical thinking ability in South Africa inferred the null relationship of critical thinking and male and female adults. Likewise, Thompson (2001) found gender was not able to predict learning styles and critical thinking. Also, Kuhen (1992) in a paper investigating the possible relationship between gender and CT skills adds to the existing body of literature that gender and critical thinking skills are not related. Also, Semeric (2010) reported gender and scales and subscales of CT were not congruent. Myers and Dyer (2006) approved the zilch relationship between gender and CT Skills. Simon and Ward (1974), however, showed men outperformed women in subscales of inference, evaluation and argument.

Despite a couple of research investigating the relationship between personality factors and CT skills, CT skills and reading comprehension, it seems there is a paucity of research on the interaction effect of CT skill and personality factors of introversion and extraversion on reading comprehension ability of EFL Learners of English in the literature. Also, there seems few or no research on the role of gender and CT Skills on comprehension scores among EFL learners.

Besides, gender and personality factors may impact reading scores. Therefore, the following research questions and hypotheses were addressed in this study:

1. Do personality factors and Critical thinking Skills affect reading comprehension ability of advanced EFL Learners?
1. Do gender and Critical thinking Skills affect reading comprehension ability of advanced EFL Learners?

Also, the following hypotheses were addressed:

H1: There is no interaction effect between personality factors and CT skills on reading comprehension scores.

H2. There is no interaction effect between gender and CT skills on reading comprehension scores.

The results of this study may suggest curricular reform in order for CT Skills to be embedded into all domains of language teaching and learning due to the fact that learners can survive in the globally distributed knowledge in economical, social and marketing settings (Ncerd, 1995).

2. Methodology

2.1. Design

This study is a quantitative one in which the researcher aimed at figuring out the contribution of personality factors of extroversion and introversion and CT skills on reading comprehension scores of advanced EFL learners. Further, the role of gender and CT skills on reading comprehension scores were investigated.

2.2. Subjects

The subjects of this inquiry were 51 advanced EFL learners of English at Kharazmi language institute in Birjand, Khorasan. A simple random sampling was employed to select the subjects of this study. Among 51advanced EFL learners, 19 of whom were male and 32 were female whose age ranged from 15 to 21 years old. Among the participants 26 of whom were introverts and 25 of them were extroverts. Regarding the CT Skills of participants 16 of them were high critical thinker and 22 of them low critical thinkers. Learners with intermediate critical thinking were also 13participnats.

2.3. Instruments

In order for the level of the participants to be homogenized, a 60 item Oxford Quick Placement test was distributed among the participants. Since the researcher would have liked to choose advanced EFL learners, 51 of participants whose scores ranged from 46 to 60 were adopted for the purpose of this study. Also, the brief version of Eysinck personality test comprising 48 items was used to determine participants' introversion/ extroversion personality factors. Besides, to come up with CT ability of EFL learners, a Persian Translated Version of California Critical thinking Test with reliability of 0.87 was utilized. Finally, to assess the reading comprehension ability of EFL Learners, a 50 item TOFEL reading comprehension test was administered to participants.

2.4. Procedures

2.4.1. Data collection procedure

The data of this research were collected at 3 different phases in Kharazmi Language institute for about a week. Each phase was completed in a different session of hourly classes at the institute.

At first phase, Brief version of Eysinck personality test was distributed among participants and they were given a 30 minute slot to answer the questions. The researcher ascertained participants that the data of whom would be kept confidential and only be used for research purposes.

At the second phase, the participants were administered the California Critical Thinking Test. It has 34 items and the participants were given a 45 minute slot to fill the responses in the answer sheet.

At the final third phase of this study, the TOFEL reading comprehension test comprising 50 items was administered to advanced EFL learners. Participants completed this test within the time limit of 40 minutes.

At the final phase of this study, the collected data were coded and entered into SPSS Version 21 to be analyzed.

2.4.2. Data Analysis Procedures

Since we had 2 categorical independent variables namely, personality factors or gender with two values and CT skills with 3 values on one continuous dependent variable that is reading comprehension scores, two way between groups ANOVA was performed to come up with results of this study.

3. Results

In this section the results of this inquiry matching the research questions would be presented and the related tables and graphs concerning each research question would be visually delineated.

3.1. First Research Question

Do personality factors and Critical thinking Skills affect reading comprehension ability of advanced EFL Learners?

The first research question of this study investigated if personality factors of introversion and extroversion and CT skills of high, intermediate and low affect reading comprehension ability of Advanced EFL learners. In other words, it attempted to figure out if any interaction effect exists between independent variables of this study on the dependent one. Interaction effect exists when the effect of one independent variable on the continuous variable is affected by a level of the second independent variable. The following tables report on descriptive and inferential statistics concerning the interaction effect of Personality factors and CT skills on Reading comprehension ability of EFL learners:

Table 1. independent variables of this study

		Value Label	N
personalityfactor	1	Introvert	26
	2	Extrovert	25
totalCT	1	High CT skill	16
	2	Low CT Skill	22
	3	Intermediate	13

As table 1 reveals, there were 26 introverts and 25 extroverts in this study. Also, concerning CT skills of participants we had16 participants with high CT Skills, 22 participants with low CT skills and 13 participants with intermediate CT skills.

Table 2. Descriptive Statistics

Personalityfactor	totalCTJadid	Mean	Std. Deviation	N
Introvert	High CT skill	42.3333	5.03322	3
	Low CT Skill	31.0000	5.79655	16
	Intermediate	36.5714	8.52168	7
	Total	33.8077	7.45128	26
Extrovert	High CT skill	44.9231	3.45112	13
	Low CT Skill	31.6667	4.80278	6
	Intermediate	41.3333	8.26236	6
	Total	40.8800	7.42361	25
Total	High CT skill	44.4375	3.74110	16
	Low CT Skill	31.1818	5.43916	22
	Intermediate	38.7692	8.41778	13
	Total	37.2745	8.18310	51

Table 2 presents descriptive statistics for the independent variable mediation of this study. As it can be seen, among 26 introverts, three of whom had high CT skills (M: 42.33, SD: 5.03), 16 of them had low CT skills (M: 31, SD, 5.7) and 7 participants had intermediate CT skills (M: 36.56, SD: 7.45). Concerning extrovert participants who were totally 25 participants, 13 of whom were high (M: 44.92, SD: 3.45), 6 of introverts were low (M: 31.66, SD:4.08) and the remaining extroverts were intermediate.

Table 3. Inferential Statistics concerning the Effects of PF and CT Skills on Reading scores

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1758.186[a]	5	351.637	9.952	.000	.525
Intercept	54698.029	1	54698.029	1548.086	.000	.972
Personalityfactor	67.752	1	67.752	1.918	.173	.041
totalCTJadid	1036.050	2	518.025	14.661	.000	.395
personalityfactor * totalCTJadid	31.193	2	15.597	.441	.646	.019
Error	1589.971	45	35.333			
Total	74207.000	51				
Corrected Total	3348.157	50				

a. R Squared = .525 (Adjusted R Squared = .472)

As Table 3 illustrates, a significant interaction effect was not observed between personality factors and CT skills, *F(2, .45)=.44, p=.64).* There was not a statistically significant different between personality factors of extroversion and introversion, *F(1, 45)=1.91, p=.17),* However, there was a meaningful main effect for CT skills, *F(2, 45)=14.66, p=.001*). Although, main effect table showed there was a difference between CT skills; groups, it did not show where these differences occur. To get more information, we need to check the Multiple Comparisons Table.

Table 4. Multiple Comparison of CT Skills Using Tukey HSD

(I) totalCTJadid	(J) totalCTJadid	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
High CT skill	Low CT Skill	13.2557*	1.95303	.000	8.5223	17.9891
	Intermediate	5.6683*	2.21950	.037	.2891	11.0475
Low CT Skill	High CT skill	-13.2557*	1.95303	.000	-17.9891	-8.5223
	Intermediate	-7.5874*	2.07941	.002	-12.6271	-2.5477
Intermediate	High CT skill	-5.6683*	2.21950	.037	-11.0475	-.2891
	Low CT Skill	7.5874*	2.07941	.002	2.5477	12.6271

Based on observed means.
The error term is Mean Square(Error) = 35.333.

*. The mean difference is significant at the .05 level.

Post-hoc comparisons using Tukey HSD test as Table 4 above displays, the mean difference of High CT skill and low CT Skills have reached statistical significance (M: 13.25, *p=.001).* The same is true for High and intermediate CT Skills (M: 5.6, P=.03). As we observe, there is a difference between each level of CT Skills, but the main mean difference is between High and low level CT skills

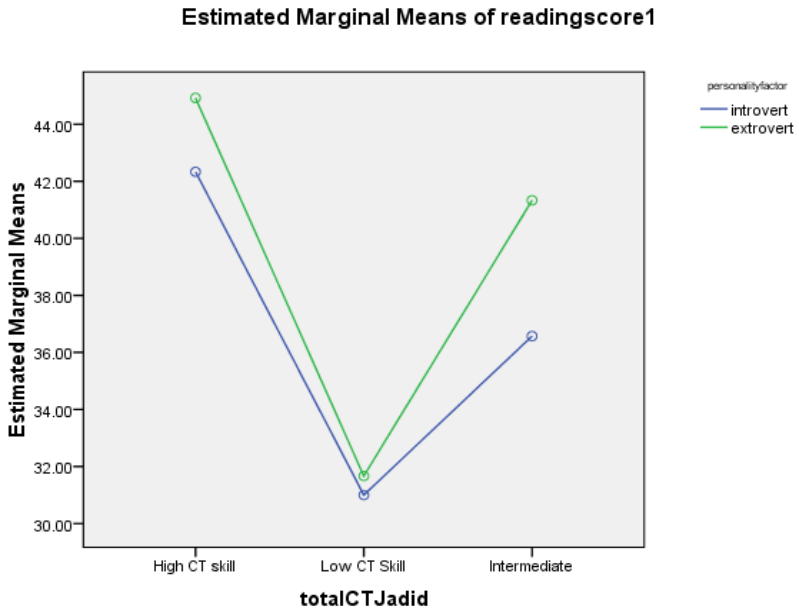


Figure 1. Interaction effect of personality factors and CT skills on reading score

As it can be visually inspected, there is not a major difference among introverts and extroverts being high, low and intermediate critical thinkers and their overall reading

comprehension scores, but the difference among high, low and intermediate ability of CT and their overall reading comprehension scores is drastically clear.

3.2. Second Research Question: Do gender and Critical thinking Skills affect reading comprehension ability of advanced EFL Learners?

Second research question of this study attempted to find out if gender moderated the relationship between CT skills and reading comprehension scores. To that end, a two way between groups ANOVA was run and its descriptive as well as inferential statistics were reported.

Table 5. Independent variables

		Value Label	N
totalCTJadid	1	High CT skill	16
	2	Low CT Skill	22
	3	Intermediate	13
Gender	1	Male	19
	2	Female	32

As table 5 reports, the first independent variable of this study is CT Skills categorized into high (16), low (22) and intermediate (13). The second independent variable is gender with two values of males (19) and females (32).

Table 6. Descriptive Statistics

totalCTJadid	Gender	Mean	Std. Deviation	N
High CT skill	Male	44.7500	3.61544	8
	Female	44.1250	4.08613	8
	Total	44.4375	3.74110	16
Low CT Skill	Male	32.2857	5.96418	7
	Female	30.6667	5.31395	15
	Total	31.1818	5.43916	22
Intermediate	Male	37.2500	7.32006	4
	Female	39.4444	9.19390	9
	Total	38.7692	8.41778	13
Total	Male	38.5789	7.65445	19
	Female	36.5000	8.50427	32
	Total	37.2745	8.18310	51

Table 5 presents descriptive statistics for interaction of the independent variables of this study. As it can be observed, among 32 females, eight of whom had high CT skills (M: 44.12, SD: 4.08), fifteen of them had low CT skills (M: 30. 66 , SD, 5.31) and 9 participants had intermediate CT skills (M: 36.56, SD: 7.45). Concerning male participants who were totally 19, 8 of whom were High (M: 44.12, SD: 4.08), 15 of them were low (M: 32.28., SD: 5.96) and the remaining were intermediate.

Table 7. Inferential Statistics concerning the Effects of Gender and CT Skills on Reading scores

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1694.048[a]	5	338.810	9.217	.000	.506
Intercept	63636.367	1	63636.367	1731.226	.000	.975
totalCTJadid	1470.123	2	735.062	19.997	.000	.471
Gender	.003	1	.003	.000	.993	.000
totalCTJadid * Gender	25.916	2	12.958	.353	.705	.015
Error	1654.109	45	36.758			
Total	74207.000	51				
Corrected Total	3348.157	50				

a. R Squared = .506 (Adjusted R Squared = .451)

According to table 6, the main effect for the interaction of gender and CT skills was not statistically significant *F (2, 45)=.35, p=.70).* Also, the Sig value of gender is more than 0.05 (p=.99) which showed no significance main effect concerning male and female reading comprehension scores, however, a statistically main effect difference was spotted for CT Skills of high, low and intermediate, F(2, 45)=19.99, p=.001).

Table 8. Multiple Comparisons of CT Skills Using Tukey HSD

					95% Confidence Interval	
(I) totalCTJadid	(J) totalCTJadid	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
High CT skill	Low CT Skill	13.2557*	1.99203	.000	8.4278	18.0836
	Intermediate	5.6683*	2.26383	.042	.1816	11.1549
Low CT Skill	High CT skill	-13.2557*	1.99203	.000	-18.0836	-8.4278
	Intermediate	-7.5874*	2.12093	.002	-12.7277	-2.4471
Intermediate	High CT skill	-5.6683*	2.26383	.042	-11.1549	-.1816
	Low CT Skill	7.5874*	2.12093	.002	2.4471	12.7277

Based on observed means.

The error term is Mean Square(Error) = 36.758.

*. The mean difference is significant at the .05 level.

Because Table 6 could not demonstrate which one of CT skills were statistically different in terms of reading comprehension scores and only showed the difference among CT skills was significant, it is better to consult with Table 7 to get more information about the exact difference among high, low and intermediate CT skills. As observable in Table 7, the Sig value of all CT skills (High, low and intermediate) was less than .0.05, which showed the difference among all CT skills was statistically meaningful.

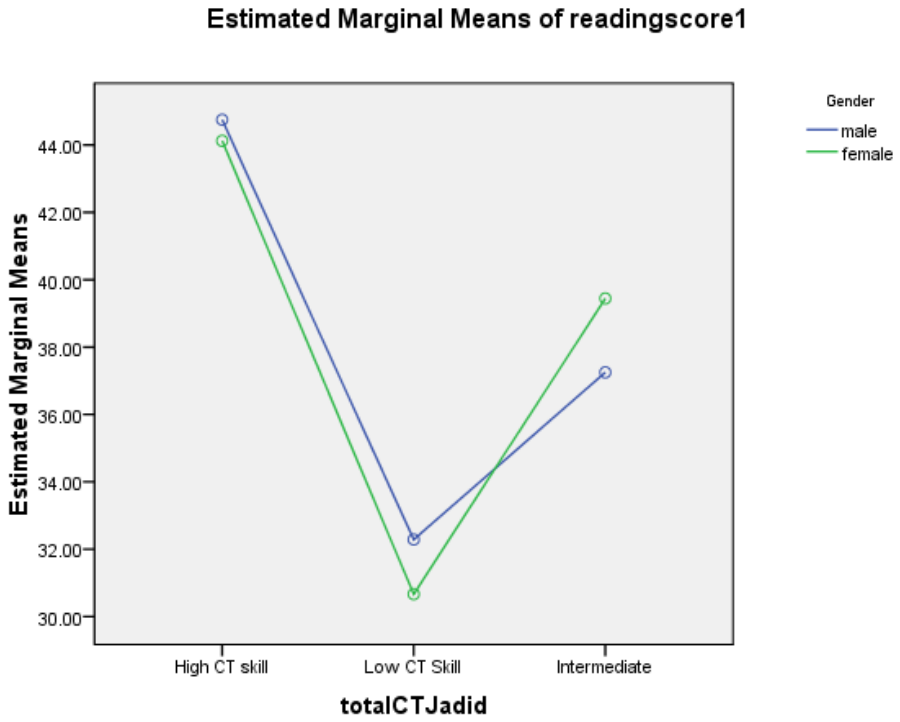


Figure 2.Visual representation of Interaction effect of gender and CT skills on reading scores.

As Fig 2 clearly shows male and female performance on reading comprehension was approximately the same and a drastic difference cannot be inspected on the Fig 2, but the difference in reading comprehension scores as scattered on the figure 2 is obviously clear.

4. Discussions

Previous studies have provided insights about the impact of CT skills and personality factors separately on reading comprehension ability of EFL learners, however, few or to the best of my knowledge no studies have already considered the contribution of personality factors and CT skills together on the overall achievement of advanced EFL learners on reading comprehension scores. The results indicated the impact of CT skills on the reading ability of EFL leaners without the mediation of personality factors that is introversion and extroversion. Therefore, the first research hypothesis is confirmed. The results of this study negate Ghafari, Shahraki, Rajabi and Baboli, (2012) and Nosratinia and Barabchian' (2013) studies. Part of this inconsistency of results with previous studies might be attributed on the close link and association of CT skills and reading comprehension not personality factors and reading scores. The finding affirms Friedman and Rowls (1986) claim saying that there was a strong correspondence between assumptions of CT skills and understanding of a text. The results also are congruent with Harris and Hodeges (1981) description of critical reading. Results also support Sheorey and Mokhtari's (2001) definition of reading. Moreover, the findings of this study affirms Hosseini, Bakhshipour khodaei, Sarfallah and Dolatabadi (2012) study. They indicate there is a positive relationship between CT skills and reading comprehension

In this study, the researcher also investigated the interaction effect of gender and CT Skills on reading comprehension abilities of advanced EFL learners. The results illustrated there was a significant main effect for CT skills, but gender was not significant. Simply put, there was a difference between high, low and intermediate CT groups; however, no difference among males and females was identified. Findings confirm the second hypothesis of this study stating there is

no interaction between male / female participants and CT groups. Findings of this study support Fahim, Barjaste and Vaseghi's (2012) study on the interaction effect of gender and CT study training on reading comprehension. The results also approve Thompson' (2001) and Piennaar's (2000) studies. Further, the results substantiate Kuhen (1996), Semeric (2010) and Myesrs and Dyer's (2006) findings. The similarity in the results can be explained in terms of human thinking ability regardless of gender. In other words, Analysis, interpretation and synthesis which are three main tenets of CT depend more on creativity, novelty and the system of education one has been grown up with, not with gender categories of male and female.

5. Conclusions

This study addressed two research questions concerning if the mediation role of either personality factors of extroversion and introversion or gender and CT skills fostered reading comprehension abilities of Advanced EFL learners. The answers to both research questions were negative and no evidence of difference concerning gender contribution or personality factor support was identified. But CT Skills indeed contributed better performance on reading comprehension. The influence of CT Skills may urge the need for policy makers to reform the content of subject areas since the results of this study clearly showed among 51 participants only 16 of whom were high Critical Thinkers and 32 of whom were low critical thinkers and the remaining ones were intermediate. Therefore, attempts should be made to expand CT ability since in the hazy world of technology and modernism learners cannot survive to become scholars unless they are critical thinkers and can find the truth value of information provided to them (Halpern, 2003).

Future studies of this kind can focus on the quality of the arguments rather than trusting the results of multiple choice items (Koziol, 1991) .Therefore, future studies can replicate the current study seeking the support of answers on tests of multiple choices followed by written or oral interviews.

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