EFL learners’ L2 achievement and its relationship with cognitive intelligence, emotional intelligence, learning styles, and language learning strategies

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Abstract: The purpose of this study is threefold: firstly, to explore the relationship between EFL learners’ cognitive intelligence, emotional intelligence, and language learning achievement, secondly, to find out the relationship between EFL learners’ language learning styles and strategies and their L2 achievement, and thirdly, to uncover the relationship between EFL learners’ emotional and cognitive intelligence and their use of learning styles and strategies. To this end, 188 Iranian EFL learners completed five different instruments, namely Raven’s Progressive Matrices, Bar-On Emotional Quotient Inventory, Kolb’s Learning Style Inventory, Strategy Inventory for Language Learning, and Final Test of English as a Foreign Language. The results of our study demonstrated that foreign language achievement was significantly correlated with IQ, three subdomains of EQ (interpersonal relationship, optimism, and problem-solving), and three learning strategies (cognitive, compensation, and social). Likewise, the findings manifested that emotional intelligence was significantly correlated with language learning strategies and learning styles. This study holds significant implications for curriculum developers, language policymakers,
and educators to afford learners with critical learning opportunities to enhance their learning skills.

**Subjects:** Education - Social Sciences; Individual Differences/IQ; Language, Psychology of; Learning; Cognition & Emotion; Educational Psychology; Language Teaching & Learning

**Keywords:** Cognitive intelligence; emotional intelligence; language learning strategies; learning styles; L2 achievement

1. Introduction

Various processes e.g. observing, memorizing, and note-taking are involved in learning. These processes do not account for how and why learning takes place (Brown, 2004). The innate complication of the ideational processes of man’s mind strangely fascinated scholars to reflect on what goes in the brain (Hasanzadeh & Shahmohammadi, 2011).

Second/foreign language learning is noticeably more erratic than first language acquisition. For this, scholars in the field of second/foreign language acquisition have recently touched upon EFL learners’ variations. Closely associated with learners’ academic success, intelligence is among the key factors that can optimize learning. Abstract intelligence has hitherto been regarded as playing a significant role in problem-solving abilities. EFL learners’ social and psychological difficulties and more specifically their low degree of attainment have prompted scholars to assume that mental intelligence is not the only requirement for a thriving life (Hasanzadeh & Shahmohammadi, 2011).

Owing to its primary significance in education, foreign language learning achievement requires a keen appreciation of its defining attributes. EFL learners, as Mitchel and Myles (2004) point out, progressively pursue a general path; yet the rate of their final achievement has conclusively been proved to be different given their diverse characteristics. Learners’ internal aspects have hence been high on the agenda in educational settings (Moafian & Ghanizadeh, 2009). As learners form the focal point of learning performance, experiential approach to learning with humanism at its core underline the fact that learners as human beings view internally and act externally at the same time (Nunan, 2001). This indicates that both cognition and emotion are salient factors in the second language acquisition process which should be attended to by foreign language teaching authorities in their programs (Amer, 2003; Rastegar & Memarpour, 2009).

Learners’ academic achievement is dependent upon their capability and task completion. It entails multiple aspects dealing primarily with the individuals’ cognitive and emotional augmentation. Psychologists have long viewed cognitive intelligence as a great predictor of learners’ educational achievement. Along the same lines, researchers have recently shifted their attention from cognitive intelligence (IQ) to emotional intelligence (EQ). The present study in the first place attempts to probe into EFL learners’ cognitive and emotional intelligence. It also aims to investigate the relationship between EFL learners’ achievement and their cognitive and emotional intelligence. Furthermore, we examine whether learners’ emotional intelligence and cognitive intelligence are correlated with their language learning styles (LLSs) and language learning strategies (LLSs). More specifically, the study is guided by the following research questions:

1. Is there any statistically significant relationship between EFL learners’ cognitive intelligence and their language achievement?
2. Is there any statistically significant relationship between EFL learners’ emotional intelligence and their language achievement?
3. Is there any statistically significant relationship between EFL learners’ language learning styles and their language achievement?
4. Is there any statistically significant relationship between EFL learners’ language learning strategies and their language achievement?
(5) Are there any statistically significant relationships between EFL learners’ emotional and cognitive intelligence and their use of language learning styles and strategies?

2. Review of literature

2.1. IQ and EQ contribution to second/foreign language learning

As a combination of numerical, spatial, and verbal capabilities, cognitive intelligence involves individuals’ abilities including imagination, memorization, perception, induction, and deduction (Sternberg, 1996). Learning, as Brown (1994) has put forth, is interconnected with intelligence and memory. He maintains that the most formidable obstacle on the way of learning a second language pertains to the issue of recollection. Emotional intelligence is defined as “the ability to monitor one’s own and others’ feelings and emotions, to discriminate among them, and to use this information to guide one’s thinking and actions” (Salovey & Mayer, 1990). Emotional intelligence emphasizes the interplay between emotion and cognition (Mayer, Salovey & Caruso, 2004). A person who is emotionally intelligent is skillful enough to recognize, employ, understand, and moderate their emotions (Mayer & Salovey, 1993).

The impact of IQ and EQ on educational achievement in general and language learning, in particular, has long turned into a controversial issue among scholars. Academic achievement, according to Neisser et al. (1996), Appelbaum and Tuma (1982), Ryan and Rosenberg (1983), and Grossman and Johnson (1982), was acknowledged to be better predicted by IQ tests. Salehi and Sadighi (2012) however, demonstrated a weak correlation between intelligence and reading comprehension. In the same vein, Goleman (1995) and Salovey and Mayer (1990) demonstrated that EQ more than IQ accounts for success in education. According to Goleman (1995, p. 34), “EI emerges more effective than IQ in distinguishing the individuals’ talent”. Goleman (1998) mentions that people can be sorted according to their IQ before they start a career; it determines which fields or professions they can hold. Goleman (1998) has eventually asserted that EI maximizes the effects of IQ and other technical activities.

Emotional components involved in L2 learning have recently been a matter of concern for many instructors. Thus, a large number of studies have focused on the effect of emotions on learning a foreign language (e.g., Arnold, 2011; Dewaele, 2015; Hogan et al., 2010; Méndez & Fabela, 2014; Méndez, Marin, & Hernandez, 2015; Soodmand Afshar & Rahimi, 2016). Despite the interaction between emotion and learning, ELT studies have given more considerable attention to the cognition and thought (Swain, 2013). Méndez (2011), however, believes that learning a foreign language is emotionally directed. Building on this, Swain (2013) has highlighted the importance of emotional processes in addition to cognitive processes in L2 acquisition and demonstrated that cognition and emotion are indivisible.

To determine the significance of cognitive, affective, personality-related, and demographic factors in anticipating learners’ second language achievement, Onwuegbuzie, Slate, Paterson, Watson, and Schwartz (2000) conducted a study on university students. They observed that both cognitive and affective variables played pivotal roles in predicting foreign language learning achievement. Emotional intelligence, as Chao (2003) points out, could universally denote academic success. In the same vein, Fahim and Pishghadam (2007) purported that more than one aspect of EI, namely stress management, intrapersonal, and general mood competencies could be effective in escalating success in education. Their study indicated that academic achievement had a higher correlation with verbal intelligence, a subpart of the IQ test, than the IQ itself. Although reading comprehension ability was comparatively related to some aspects of EQ (intrapersonal, interpersonal, and stress management), Ghabanchi and Rastegar (2014) demonstrated that the global EQ and its subsections could not significantly predict learners’ reading comprehension proficiency. They concluded that the correlation between IQ and reading comprehension was much stronger than the correlation between universal EQ and reading comprehension skill. They suggested developing learners’ intelligence to boost reading comprehension. This can be accomplished by
exercising the active recollection of learners and employing some organizational performance (Buschkuehl & Jaeggi, 2010). Experimental discoveries made concerning cognitive competence remedy denote that educating learners to improve the skills of observing and self-managing, handling troubles, and exchanging information can promote emotional intelligence (Carr, 2011).

Notwithstanding the fact that recent studies have centered on cognitive, emotional, and social aspects of language learning, they manifest more inclination toward affection (e.g. Han & Hyland, 2015; Sato, 2017; Swain, 2013). A great number of scholarly researchers revealed that emotions enjoy a substantial function in SLA (e.g., Dewaele, 2011, 2015; Imai, 2010; Murphy & Dörnyei, 2010; Swain, 2013). Thus, they have shifted their focus of attention from negative emotions such as language learning anxiety (e.g., Gkonou, Daubney, & Dewaele, 2017; Gregersen & MacIntyre, 2014) to positive emotions for better L2 achievement (e.g., Dewaele & MacIntyre, 2014; Murphy, 2014; Oxford, 2014). Cognition and emotion were viewed by Swain (2013) as inseparable concepts conducive to L2 acquisition. In the same vein, Poehner and Swain (2016) regard L2 development as a cognitive-emotive process.

2.2. Language learning strategies and academic achievement

Language learning strategies defined as “specific actions, behaviors, steps, or techniques—such as seeking out conversation partners, or giving oneself encouragement to tackle a difficult language task” (Scarcella & Oxford, 1992, p. 63) are among the affective factors resulting in EFL learners’ success. Among different taxonomies, Oxford’s (1990) has gained the greatest consideration. She has classified the strategies into memory, cognitive, and compensation as direct strategies and affective, metacognitive, and social as indirect strategies. According to Jensen (2004), learning can be made meaningful in case different lobes of the brain are provoked throughout the learning practice. This is indicative of the significant function of neuropsychology in the learning process. Thus, learners, as Muelasa and Navarroa (2015) put it, need to take on different types of cognitive styles, capabilities, and skills while employing learning strategies.

Recently, one of the mounting concerns in the context of language teaching is how to assist low achieving learners in mastering a second language successfully. During the last decades, LLSs have been the main concern of many studies mostly investigating the relationship between the strategy use and foreign language achievement. Studies carried out by Al-Qahtani (2013), Bromley (2013), Charoento (2016), Fewell (2010), Habók and Magyar (2018), Loret (2011), Muelasa and Navarroa (2015), Tejedor-Tejedor, González Salvador, and García SeñoráI (2008), Uslu, Sahin, and Odemis (2016), and Wong and Nunan (2011) manifested a positive and meaningful relationship between EFL learners’ strategy use and their academic achievement. According to Gharbavi and Mousavi (2012) and Pei-Shi (2012), the more strategies learners employ, the higher level of achievement they will possibly obtain. Gani, Fajrina, and Hanifa (2015) have proposed that speaking skill development results from learners’ conscious, intentional, and frequent utilization of appropriate strategies. Language learning strategies make learning situations more active, enjoyable, and learner-oriented that would lead to learner’s higher level of proficiency (Bromley, 2013).

The conformity of learning strategies with learning styles is still a debatable issue among scholars (Tulbure, 2012). Further investigations are thus called for to provide insights into the relationship between learning styles and strategies. Such insights can help students, teachers, and even prospective researchers attempting to re-assess learning approaches to enhance learners’ academic achievement.

2.3. Learning styles and academic achievement

Learning styles defined as “a person’s preferred approach to information processing, idea formation, and decision making” (Kalsbeek, 1989, p. 32) are of paramount importance in education and learner-centered pedagogy. According to Xu (2011), individuals diverge regarding their character, culture, learning skills, and learning styles giving rise to learners’ various levels of achievement. Educationalists should keep learners abreast of their learning styles to provide an instructive environment for them to choose the most appropriate teaching methods (Sprenger, 2003).
According to Xu (2011), more than seventy learning style models have been identified by scholars. Some of these models are more frequently employed in second language learning. These learning style models cannot entirely account for foreign language learning. Nilson (2003) delineates diverse teaching models attending to the learners introduced in Kolb’s Learning Styles Model (1984). At first, divergers can employ their true experience while going through contemplative inspections. Convergers try to find out how things work. They are interested in making small alterations in things in order to make them more effective. Accommodators, on the other hand, prefer to act than to think. They give priority to practical learning rather than lectures. Assimilators, as the fourth group, are interested in learning materials which are structured and organized. They look for something to learn.

Thus, EFL learners’ styles identification and training, as Banner and Rayner (2000) put forth, lead to more efficient, relevant, and meaningful learning. Wong and Nunan (2011) are of the opinion that the adaptability of styles needs to be maintained by teachers in their educational activities. In doing so, they should take on a variety of skills and practices well suited to different learners with diverse learning preferences.

2.4. EI relationship with learning styles and learning strategies

There are abundant social and psychological factors showing variations among learners. Macaro (2007) has proposed considering individual learners’ psychological and human dimensions to acquire a foreign language. In this regard, various types of investigations were performed by scholars leading to divergent findings. In this regard, Hasanzadeh and Shahmohammadi (2011) and Aghasafari (2006) conducted a study on the relationship between emotional intelligence and learning strategies. They found that a significant correlation existed between EI and the students’ use of learning strategies. However, in a study conducted on 87 university students, Shakarami and Khajehei (2015) discovered a low correlation between learners’ emotional intelligence and language learning strategies. Unlike the quantitative data, qualitative data gleaned from the study indicated a strong relationship between the two variables in question. They concluded that “in planning instruction for a learner or groups of learners, a teacher may wish to target all the intelligence of a specific domain to provide for the experiences that strengthen that particular domain” (p.236). The relationship between language learning strategies and trait emotional intelligence was explored among post-graduate Iranian students studying overseas by Fouladi (2012). She detected that no relationship existed between high and low EQ regarding language learning strategies. Zafari and Biria (2014), on the other hand, demonstrated that emotional intelligence and language learning strategy were significantly correlated and students with higher EI employed more strategies than those with lower EI. They also discovered that the two groups of learners significantly diverged regarding their type of strategy use.

With regard to the relationship between emotional intelligence and learning styles, Alavinia and Ebrohipmpour (2012) revealed that these two variables were positively and significantly correlated. Their findings also indicated that an increase in one variable e.g. EI could cause an increase in another, e.g. LS. The result of this study is in accord with the results obtained by such scholars as Saklofske, Austin, and Minski (2003), and Saklofske, Austin, Galloway, and Davidson (2007). Elizabeth and Chirayath (2013) did not observe a strong correlation between EI and LS. They, however, stated that the impact of emotional intelligence on learning style was undeniable. In other words, emotional intelligence was viewed as a major determinant of learning style efficacy and consequence. According to Shahtalebi and Javadi (2014), the ability is associated with emotional intelligence, whereas preferences deal with learning styles. Thus, it is common not to find any relationship between learners’ abilities and preferences.

Taken together, the foregoing discussion implies that the effect of EFL learners’ cognitive and emotional intelligence on such variables as language learning styles and strategies has provoked controversy among EFL/ESL scholars. Consequently, it warrants further study to provide insights into the variables in question and their relationship.
3. Methodology

3.1. Participants
A total of 188 university students majoring in different fields of study mainly engineering, law, art, and accounting at Islamic Azad University, Bushehr Branch, took part in the study. Participants were studying in their second semester of the academic year 2017–2018 mostly at intermediate and low intermediate proficiency levels with their ages ranging from 19 to 35. They were selected based on convenience sampling. As depicted in Table 1, 84 (44.7%) female and 104 (55.3%) male participants took part in the study.

Table 1 also illustrates that out of the 188 participants taking part in this study, 28 (14.9%) were less than 20 years old while 154 (81.9%) were between 20 to 30 years old and merely 6 (3.2%) participants were more than 30 years old. Hence, the majority of the participants were between 20 to 30 years old.

3.2. Research design
To obtain a deep insight into EFL learners' language achievement and their cognitive intelligence, emotional intelligence, learning styles, and language learning strategies, the researchers in this study employed a quantitative research design.

3.3. Instrumentation
This study features five instruments to address the research questions. The instruments are described at length.

3.3.1. Raven’s progressive matrices
Raven's Progressive Matrices or Raven's Matrices is a nonverbal group test commonly applied in educational settings to gauge learners' cognitive ability. In every item of the test, the test-taker is supposed to find the missing component that completes a pattern of shapes. It is commonly made up of 60 items primarily employed to estimate abstract reasoning. It also measures fluid intelligence which shows the reasoning ability and problem-solving competency gained by making use of current information without building on the skills and knowledge formerly achieved.

The internal consistency reliability estimate for APM total raw score was reported as .87 in the standardization sample of 462 individuals. Test-retest reliability was reported as .91, and the Cronbach’s alpha reliability index turned out to be .82. The concurrent validity of the Raven’s Progressive Matrices as proved by correlations with Wechsler intelligence test was found to be .73.

3.3.2. Bar-On emotional quotient inventory
The second instrument employed in this study was the Bar-On EI test, otherwise known as the Emotional Quotient Inventory (EQ-I). It is a self-report questionnaire assessing emotional and

| Table 1. Distribution of gender and age | Frequency | Percentage |
|----------------------------------------|-----------|------------|
| Gender                                 |           |            |
| Female                                 | 84        | 44.7       |
| Male                                   | 104       | 55.3       |
| Total                                  | 188       | 100        |
| Age Group                              |           |            |
| <20                                    | 28        | 14.9       |
| 20–30                                  | 154       | 81.9       |
| >30                                    | 6         | 3.2        |
| Total                                  | 188       | 100        |
socially intelligent behavior, and emotional-social intelligence on a five-point Likert scale designed by Bar-On in 1980 (Bar-On, 1997). Bar-On's domains and sub-domains include the following:

1. Intrapersonal skills (self-regard, emotional self-awareness, assertiveness, independence, and self-actualization)
2. Interpersonal skills (empathy, social responsibility, and interpersonal relationships)
3. Adaptability (reality testing, flexibility, and problem-solving)
4. Stress management (stress tolerance and impulse control)
5. General mood (optimism and happiness) (pp. 43–45)

In order to eliminate cross-cultural variations and avoid possible misunderstanding concerning the content of the questionnaire, the translated Persian version of the inventory was employed. The final version was declined into 90 items taking participants approximately 30 minutes to complete.

The Cronbach’s alpha values obtained in this study for the subdomains of Bar-On’s emotional intelligence questionnaire are presented in Table 2.

Following Table 2, the Cronbach’s alpha values for the subdomains of emotional intelligence were within the acceptable range of 0.700 to 0.921 confirming the reliability of the questionnaire.

3.3.3. Kolb’s learning style inventory
The other instrument deployed in this study was Kolb’s Learning Style Inventory (LSI) constructed in 1984. It was then modified in 2005, a broadly renowned measure to study characteristics of various learning styles. The LSI is a 12-item self-report instrument aimed to assess individuals’ priorities concerning specific learning styles, namely diverging, assimilating, converging, and accommodating. Participants were required to rank order the statements from 1 (the least you like) to 4 (the most you like) assessing how well they thought each statement conformed to their learning processes (Smith & Kolb, 1996) in various learning conditions. Concrete experience (CE) and reflective observation (RO) are described as diverging learning styles (Kolb, Boyatzis, & Mainemelis, 2000; Kolb & Kolb, 2005). Assimilating learning styles consist of abstract conceptualization (AC) and reflective

| Table 2. Reliability analysis of emotional intelligence subdomains |
|---------------------------------------------------------------|
| Emotional Intelligence subdomains                          | Number of items | Cronbach’s alpha |
| Independence                                                | 6               | 0.762            |
| Stress tolerance                                            | 6               | 0.784            |
| Self-actualization                                          | 6               | 0.712            |
| Emotional self-awareness                                    | 6               | 0.709            |
| Reality testing                                             | 6               | 0.804            |
| Interpersonal Relationship                                  | 6               | 0.921            |
| Optimism                                                    | 6               | 0.834            |
| Self-reliance                                               | 6               | 0.784            |
| Impulse Control                                             | 6               | 0.725            |
| Flexibility                                                 | 6               | 0.7              |
| Social responsibility                                       | 6               | 0.835            |
| Empathy                                                     | 6               | 0.709            |
| Assertiveness                                               | 6               | 0.81             |
observation (Kolb, 1984; Kolb et al., 2000). Abstract conceptualization and active experimentation (AE) constitute converging learning styles (Kolb, 1984; Kolb et al., 2000). Concrete experience and AE are identified as accommodating learning styles (Kolb, 1984; Kolb et al., 2000). Participants had to take the reverse skills into account. They continuously chose between these extreme points, that is, CE/RO (Diverging), AC/RO (Assimilating), AC/AE (Converging), and CE/AE (Accommodating). The first statement of each row corresponds to CE, the second to RO, the third to AC, and the fourth to AE (Koo & Funk, 2002). Their responses indicated their learning preferences in different situations. Noteworthy to mention is that the translated version of Kolb’s learning style questionnaire was utilized in this study. The Cronbach’s alpha reliability indices are presented in Table 3. The Cronbach’s alpha values for learners’ learning styles confirmed the reliability of the questionnaire.

3.3.4. Language learning strategy inventory
Strategy Inventory for Language Learning (SILL) was developed by Oxford in 1990 in order to assess language EFL learners learning strategies. It is “perhaps the most comprehensive classification of learning strategies to date” (Ellis, 1994, p. 539). Six strategies have been identified in the SILL: (1) Memory (2) Cognitive (3) Compensation (4) Metacognitive (5) Affective, and (6) Social. This 50-item inventory is classified into two parts comprising of direct learning strategies with 29 items and indirect learning strategies with 21 items. Direct strategies are classified into memory (9 items), cognitive (14 items), and compensation (6 items) strategies, while indirect strategies are categorized into metacognitive (9 items), affective (6 items), and social (6 items) strategies. The participants responded to the inventory on a five-point Likert scale representing what they often did while learning a language.

As shown in Table 4, the Cronbach’s alpha reliability indices of all the language learning strategies were moderately beyond the cut-off point of 0.7 confirming the reliability of all six types of strategies.

3.3.5. Final test of English as a Foreign language
In order to explore the learners’ English language achievement, a course-related test was administered to the students at the end of the semester of the academic year 2017–2018 to determine their final scores. The test included 60 multiple-choice items on vocabulary,
grammar, as well as reading comprehension passages selected from the students' textbook. It was developed and pilot-tested before its actual administration. The learners' achievement scores were obtained right after completing all the questionnaires.

The test was found to be both reliable and valid. The content validity of the test was checked by two university professors teaching the same course. The reliability of the test obtained through Cronbach’s alpha turned out to be .924 which is a high index confirming the reliability of the test.

3.3.5.1. Procedures. The Raven’s APM was administered to learners in a separate session without any time limit (up to 1 h). It was typically completed within 30 minutes. As the students were promised to be informed about the results of the IQ test, they all appeared well-motivated.

The Bar-On EQ-I was administered to the students in another session. It took them about 30 minutes to accomplish. Kolb’s learning style questionnaire was administered afterward. No time limit was set for completing this inventory. It took them nearly 10–15 minutes to complete. The next inventory administered in the same session was Strategy Inventory for Language Learning. To complete the inventory, the students were requested to read the statements carefully and mark a tick by one of the options “Always true of me,” “Usually true of me,” “Somewhat true of me,” “usually not true of me,” and “never true of me.” It took them about 15–20 minutes to complete the inventory. As the last instrument of this study, the final test of English as a foreign language was administered to the students in a separate session at the end of the semester. It took them about 45 minutes to complete. The scores obtained from the final test indicated their level of English language achievement.

3.3.5.2. Data analysis. Statistical data analyses were conducted using IBM SPSS Statistics 24 to address the research questions previously formulated. Descriptive statistics and inferential statistics were computed to analyze the data collected.

3.3.5.3. Descriptive statistics. Descriptive data of the study as depicted in Table 5 were used to examine the variables under consideration in the study. The results show the means (average of variables’ scores), the standard deviation (the difference of variables’ scores and the mean), and the range of each variable describing minimum and maximum values.

| Research variables                        | N  | Minimum | Maximum | Mean     | Std. Deviation |
|------------------------------------------|----|---------|---------|----------|----------------|
| Cognitive Intelligence (IQ)              | 188| 11      | 36      | 27.4     | 5.126          |
| Emotional Intelligence (EQ)              | 188| 269     | 372     | 309.591  | 20.15681       |
| Learning Styles (LS)                     | 188| 1       | 4       | 2.46     | 1.096          |
| Language learning strategies (LLS)       | 188| 105     | 213     | 151.5591 | 20.94908       |
| L2 achievement (Final Scores) (FS)       | 188| 10      | 56      | 29.9043  | 11.3421        |
| Valid N                                  | 188|         |         |          |                |
3.3.5.4. *Inferential statistics.* In this section, each research question was examined either by parametric or non-parametric statistical tests. The parametric tests are more precise, but they require that the data be normally distributed. For this reason, the normality of the variables was examined employing the Kolmogorov-Smirnov Test.

Table 6 shows the results of the Kolmogorov-Smirnov Test. Since p-values were greater than 0.05 (p > 0.05) for all variables (Final Scores, Emotional Intelligence, Cognitive Intelligence, Language Learning Strategies, and Learning Styles) suggesting that the assumption of normality was retained. Thus, parametric tests were used to analyze the research questions.

3.3.5.5. *Research question 1.* The scoring system used for cognitive intelligence questionnaire was on the Likert scale. Thus, the participants could choose one of the options ranging from 1 to 7. They were divided into two groups: a) those enjoying high cognitive intelligence, and b) those possessing low cognitive intelligence. The Pearson’s correlation test was employed to investigate the first research question. The results are presented in Table 7.

As appeared in Table 7, the correlation between cognitive intelligence and language achievement was significant at the level of 0.01 (r = .25). This implies that learners with high cognitive intelligence were considered high language achievers and vice versa.

3.3.5.6. *Research question 2.* The scoring system for emotional intelligence questionnaire was also on a Likert scale. The Pearson’s correlation test was utilized in order to answer the second research question. Tables 8 and 9 demonstrate the results of descriptive statistics and the Pearson correlation, respectively.

As displayed in Table 9, the correlation between EI and language achievement was not significant at the level of 0.01 and 0.05. Nevertheless, the correlation between some of the sub-variables of emotional intelligence (interpersonal relationship, optimism, and problem-solving) and L2 achievement was significant at the level of 0.05. It indicates that learners’ language achievement enhances as the use of interpersonal relationship, optimism, and problem-solving increases.

3.3.5.7. *Research question 3.* One-way analysis of variance (ANOVA) was applied to investigate the relationship between EFL learners’ learning styles and their language achievement. Tables 10 and 11 portray the results of descriptive statistics and the One-way ANOVA.

Following Table 11, the results of One-way ANOVA did not reflect any statistically significant relationship between learners’ L2 achievement and language learning styles (sig. = .654). In other words, language achievement was not significant for different language learning styles.

3.3.5.8. *Research question 4.* The scoring system used for SILL questionnaire was on a Likert scale. Pearson’s correlation test was used to find out the relationship between learners’ language achievement and their second language learning strategies. Tables 12 and 13 illustrate the descriptive analysis of six various language learning strategies and the Pearson correlation results, respectively.

As presented in Table 13, the correlation between language learning strategies and language achievement was not significant at the level of 0.01 and 0.05. Nonetheless, the correlation between cognitive, compensation, and social strategies and language achievement was significant at the level of 0.05. That is, EFL learners’ language achievement enhances as the use of cognitive, compensation, and social strategies increases.

3.3.5.9. *Research question 5.* A one-way ANOVA was conducted to investigate if there were any significant relationships between the students’ learning styles and their cognitive intelligence and emotional intelligence. The results are summarized in Table 14.
Table 6. Kolmogorov-Smirnov test of normality for variables

|                  | Emotional intelligence | Learning styles | Language learning strategies | Cognitive intelligence | L2 achievement |
|------------------|------------------------|-----------------|-----------------------------|------------------------|----------------|
| N                | 188                    | 188             | 188                         | 188                    | 188            |
| Asymp. Sig. (2-tailed) |                        |                 |                             |                        |                |
| Mean             | 0.19                   | 0.237           | 0.145                       | 0.215                  | 0.174          |
| Std. Deviation   | 0.061                  | 0.077           | 0.052                       | 0.063                  | 0.054          |

a. Test distribution is Normal.
b. Calculated from data.
Table 14 depicts that the significance level of test for cognitive intelligence was higher than 0.05 (sig. = .681). Therefore, cognitive intelligence was not significant for different language learning styles. In contrast, the significance level of test for emotional intelligence was less than 0.05 (sig. = .019) revealing that emotional intelligence is significant for different learning styles.

In order to examine whether any significant relationships existed between EFL learners’ different language learning strategies and their cognitive vs. emotional intelligence, Pearson’s correlation test was performed. The pertaining results are presented in Table 15.

According to Table 15, the correlation between language learning strategies and cognitive intelligence was not significant at the level of 0.01 and 0.05 (sig. = .934). However, the correlation between language learning strategies and emotional intelligence was significant at the level of 0.01 (sig. = .009).

4. Discussion

The current research was undertaken to explore the relationship between cognitive and emotional intelligence and foreign language achievement. It also aimed to find out the relationship between EFL learners’ learning styles, language learning strategies, and their language achievement. Eventually, the relationship between EFL learners’ emotional intelligence and cognitive intelligence and their use of learning styles and strategies was investigated. The results obtained from the quantitative analysis of the instruments manifested that cognitive intelligence played a highly influential role in the development of Iranian learners’ language achievement. This finding is in line with those of Genesee (2006), Ghabanchi and Rastegar (2014), Ellis (2008), and Ghonchehpour and Mohaddam (2018) who demonstrated that intelligence is an instrumental factor in language achievement.

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### Table 7. Pearson correlation between cognitive intelligence and L2 achievement

| L2 achievement | Pearson Correlation | Sig. (2-tailed) |
|----------------|---------------------|-----------------|
| cognitive intelligence | .251** | 0.001 |

**. Correlation is significant at the 0.01 level (2-tailed).

### Table 8. Descriptive statistics of emotional intelligence subdomains

| EQ Sub-domains           | N  | Minimum | Maximum | Std. Deviation |
|--------------------------|----|---------|---------|----------------|
| Problem-solving          | 188| 17      | 30      | 2.80169        |
| Happiness                | 188| 11      | 24      | 2.15562        |
| Independence             | 188| 9       | 29      | 3.99791        |
| Stress tolerance         | 188| 14      | 25      | 2.67511        |
| self-actualization        | 188| 13      | 27      | 2.90824        |
| Emotional self-awareness | 188| 14      | 26      | 2.94146        |
| Reality testing          | 188| 6       | 26      | 3.28543        |
| Interpersonal relationship| 188| 14      | 30      | 3.84138        |
| Optimism                 | 188| 15      | 28      | 2.7064         |
| Self-reliance            | 188| 15      | 29      | 3.0247         |
| Impulse control          | 188| 6       | 30      | 5.78383        |
| Flexibility              | 188| 11      | 27      | 2.97494        |
| Social responsibility    | 188| 15      | 30      | 2.7386         |
| Empathy                  | 188| 16      | 30      | 2.70592        |
| Self-assertiveness        | 188| 12      | 27      | 2.84471        |
| Valid N (listwise)       | 188|         |         |                |

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### Table 9. Pearson correlation between emotional intelligence subdomains and L2 achievement

| Emotional Intelligence Subdomains         | L2 achievement |
|------------------------------------------|----------------|
|                                          | Pearson Correlation | Sig. (2-tailed) |
| Happiness                                | 0.145*            | 0.047           |
| Independence                             | 0.021             | 0.774           |
| Stress tolerance                         | 0.043             | 0.557           |
| Self-actualization                       | 0.014             | 0.851           |
| Emotional self-awareness                 | 0.12              | 0.1             |
| Reality testing                          | 0.012             | 0.874           |
| Interpersonal relationship               | 0.174*            | 0.017           |
| Optimism                                 | 0.204**           | 0.005           |
| Self-reliance                            | 0.111             | 0.13            |
| Impulse control                          | 0.101             | 0.17            |
| Flexibility                              | 0.003             | 0.967           |
| Social responsibility                    | 0.137             | 0.061           |
| Empathy                                  | 0.013             | 0.855           |
| Assertiveness                            | 0.047             | 0.52            |
| Emotional Intelligence                   | 0.089             | 0.225           |

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

### Table 10. Descriptive statistics of EFL learners’ learning styles

| Learning styles                | Frequency | Percent |
|-------------------------------|-----------|---------|
| Valid                         |           |         |
| Converging (AC and AE)        | 52        | 27.7    |
| Diverging (CE and RO)         | 32        | 17      |
| Assimilating (AC and RO)      | 68        | 35.1    |
| Accommodating (CE and AE)     | 36        | 19.1    |
| Total                         | 188       | 100     |
Our findings revealed that total emotional intelligence was not significantly correlated with language achievement. This is consistent with the finding obtained by Berenji (2010) and Woitaszewski and Aalsma (2004) who discovered that emotional intelligence did not contribute significantly to the academic achievement of EFL learners. Notwithstanding the insignificant relationship between the whole emotional intelligence and language achievement, some sub-variables of emotional intelligence were proved to be correlated with language learning. This is commensurate with the findings uncovered by Salovey and Grewal (2005), Pishghadam (2009),

Table 11. Results of One-way ANOVA for L2 achievement and language learning styles

|                      | Sum of Squares | Df | Mean Square | F    | Sig. |
|----------------------|----------------|----|-------------|------|------|
| Between Groups       | 201.515        | 3  | 70.172      | 0.541| 0.654|
| Within Groups        | 23,845.762     | 184| 129.597     |      |      |
| Total                | 24,056.277     | 187|             |      |      |

Table 12. Descriptive analysis of EFL learners’ language learning strategies

| Language Learning Strategies | N  | Minimum | Maximum | Mean     | St. Deviation |
|------------------------------|----|---------|---------|----------|---------------|
| Memory                       | 188| 15      | 41      | 26.9468  | 5.1799        |
| Cognitive                    | 188| 9       | 30      | 18.4894  | 4.25081       |
| Compensation                 | 188| 16      | 45      | 32.5319  | 6.74945       |
| Metacognitive                | 188| 7       | 21      | 14.0532  | 3.76976       |
| Affective                    | 188| 7       | 30      | 17.7128  | 4.09675       |
| Social                       |    |         |         |          |               |
| Valid N (listwise)           | 188|         |         |          |               |

Table 13. Correlations between language learning strategies and L2 achievement

| Language Learning Strategies | L2 achievement |
|------------------------------|----------------|
| Memory                       | Pearson Correlation | 0.055 |
|                              | Sig. (2-tailed)    | 0.457 |
| Cognitive                    | Pearson Correlation | 0.247** |
|                              | Sig. (2-tailed)    | 0.001 |
| Compensation                 | Pearson Correlation | 0.256** |
| Metacognitive                | Pearson Correlation | 0.045 |
|                              | Sig. (2-tailed)    | 0    |
| Affective                    | Pearson Correlation | 0.076 |
| Social                       | Pearson Correlation | 0.302 |
|                              | Sig. (2-tailed)    | 0.174* |

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

achievement. Our findings revealed that total emotional intelligence was not significantly correlated with language achievement. This is consistent with the finding obtained by Berenji (2010) and Woitaszewski and Aalsma (2004) who discovered that emotional intelligence did not contribute significantly to the academic achievement of EFL learners. Notwithstanding the insignificant relationship between the whole emotional intelligence and language achievement, some sub-variables of emotional intelligence were proved to be correlated with language learning. This is commensurate with the findings uncovered by Salovey and Grewal (2005), Pishghadam (2009),
Berenji (2010), and Farahani and Shahbazi (2019) who manifested a number of EQ components as positively affecting learners’ second language achievement.

To justify the results of the study in terms of the significance of IQ and non-significance of the whole EQ in predicting language achievement, it can be pointed out that owing to the teacher-centeredness of educational system in Iran, learners’ emotional intelligence are not taken into much consideration by EFL educators during instruction. Further, the trainability of EQ (Lotfi Kashani, Lotfi Azimi, & Vaziri, 2012), the inseparability of cognition and emotion (Swain, 2013), and the impact of affection on cognitive processes (Heydarnejad & Ebrahimi, 2019) are neglected and not attended to by most EFL teachers in Iranian contexts.

The results of the study also illustrated that all types of language learning strategies were not significantly correlated with learners’ second language achievement. The same was uncovered by Bialystok (1981), and Mullins (1992). However, not all the sub-variables were found unrelated to language success but among six strategies of language learning three strategies were considered strong predictors of language achievement. These results are in conflict with the findings uncovered by Soodmand Afshar, Tofighi, and Hamazavi (2016), Hong-Nam and Leavel (2006), and Ghonchepour and Moghaddam (2018) who have established that strategy use plays a crucial role in learning a foreign language and is also a strong predictor of language achievement. The finding of the study regarding the significant relationship of merely three strategies among six components in learning a second language can be justified on the ground that strategy use depends on such factors as learning situation, learners’ capabilities, and language skill. Thus, not all the strategies could prove effective in the same way. Further, learners’ lack of awareness and sufficient background knowledge concerning learning strategies may hinder their utilization of appropriate strategies.

In the same vein, the current study reflected no statistically significant correlation between EFL learners’ learning styles and their L2 achievement relationship. This finding agrees with the results obtained by a number of researchers such as Bailey, Onwuegbuzie, and Daley (2000), Bicer (2014), Busato, Prins, Elshout, and Hamaker (2000), Soodmand Afshar et al. (2016), and Yildirim, Cevat Acar, Bull, and Sevinc (2008) who demonstrated no significant relationship between learning styles and L2 achievement. One line of explanation might justify the results regarding the insignificant correlation.
between LSs and language achievement. In point of fact, educators’ limited knowledge of learning styles efficacy and up-to-date teaching methods have made them not to be mindful of the learning styles of their learners during instruction. Additionally, learner’s lack of awareness and knowledge of their own learning styles and preferences prevent them from perceiving the learning styles required for better achievement.

Furthermore, the current study demonstrated a significant relationship between EQ and language learning styles and strategies. These findings disagree with the results obtained by Shahtalebi and Javadi (2014), Giadenaka (2008), and Suliman (2010) who demonstrated a weak relationship or even no relationship between learning styles and language achievement. However, in line with the results of the current study, Alavinia and Mollahossein (2012), Garcia-Fernandez et al. (2015), Hasanzadeh and Shahmohamadi (2011), and Soodmand Afshar et al. (2016), and Zafari and Biria (2014) demonstrated a significant relationship between LLSs and language achievement. They revealed that learners with higher emotional intelligence applied more strategies than those with lower emotional intelligence. The rationale behind the findings of the study in terms of the significant relationship between learners’ EQ and their use of LLSs and LSs lies in the fact that emotions not only generate learners’ inclination to perform but also impel them to act physically. Further, positive emotions lead to the learners’ productivity, new potentiality, and opinions concerning social, mental, and physical promotions. Negative emotions, in contrast, restrict learners’ repertoire of thinking and performing.

As far as the results of the study are concerned, EFL learners’ cognitive intelligence was discovered to be correlated neither with learning styles nor with language learning strategies. However, this does not underestimate the significance and value of cognitive intelligence. Conversely, as the first finding of the study demonstrated, cognitive intelligence plays a fundamental role in university learners’ language achievement. The significance of cognitive intelligence in language achievement on the one hand and the high correlation between emotional intelligence and language learning strategies and learning styles, on the other hand, elucidates the fact that both types of intelligence are integral to language acquisition. Along the same lines, Ghanchepour and Moghaddam (2018) stress the impact of intelligence on language learning. Nonetheless, they hold the degree to which intelligence influences language learning is not specified. In addition to cognition, a number of emotional factors such as happiness, independence, self-awareness, assertiveness, empathy, etc. can also play a pivotal role in learners’ utilization of LLSs and LSs and thereby learning a foreign or second language.

The current study thus illuminates the fact that cognitive intelligence, despite being indispensable in L2 achievement, is not sufficient. Developing emotional intelligence leads the learners to attain their great goal of L2 learning more smoothly as it leads to productive thought as well as reasonable performance (Nelson & Low, 2006). The skills associated with emotional intelligence can synchronize cognitive intelligence with emotional intelligence leading to practical performance. Also, they assist learners in coping with the challenges they encounter in their surroundings.

5. Conclusion and implications

The current study investigated the relationship between cognitive intelligence and emotional intelligence and learners’ language achievement. The results of the study demonstrated that language achievement possessed a significant correlation with cognitive intelligence, yet a nonsignificant relationship with total emotional intelligence. Among 15 subdomains of emotional intelligence, only three i.e. interpersonal relationship, optimism, and problem-solving manifested a significant relationship with language achievement. Thus, teachers should take the EQ sub-variables most effective in learning a foreign language into consideration to provide learners with the necessary assistance and emotional training. This will raise their awareness of the importance of emotional intelligence in learning a foreign language in addition to cognitive intelligence.

The findings of the study manifested no statistically significant relationship between learners’ language achievement and their utilization of all types of language learning strategies and learning styles. However, among the six types of language learning strategies, merely cognitive,
compensation, and social strategies were found highly correlated with language achievement. EFL teachers, thus, should impart the knowledge of learning strategies to language learners. Language learners require teachers’ guidance and instruction to learn how to learn. In so doing, educators have to train and empower learners to plan for their own learning and react to what they have achieved. This will prepare individuals for independent language learning.

In respect of the relationship between EFL learners’ emotional and cognitive intelligence and their use of language learning styles and language learning strategies, the findings manifested that emotional intelligence, unlike cognitive intelligence, was significantly correlated with language learning strategies and learning styles. EFL teachers should thus refrain from using their comfort zone and try a diversity of styles and strategies conducive to successful language learning. Moreover, they should do their best to extend the learners’ repertoire of styles and strategies, identify their various types, acquaint learners with various tasks related to each type, and instruct them to capitalize on the necessary activities and skills properly.

Additionally, curriculum developers, language policymakers, and educators should afford learners important learning opportunities to hone their learning skills. Affective strategies, according to Oxford (1990), are instrumental in generating an emotional atmosphere which seems to be appropriate for the classroom. By making use of many tasks and practices, learners could overcome their negative attitudes towards cultural issues, shyness, and vagueness. Learners should also be motivated by teachers to take risks in learning a second language. These skills and many others might assist students to enhance their emotional intelligence. This mission, as Vieira (2003) points out, could be achieved by prevailing over the curriculum constraints present in the learning environment. Language instructors could also make the classroom environment as enjoyable and stimulating as possible by utilizing a variety of techniques such as second language learning practices and stimulating tasks and games.

The results of the current study could carry important implications for curriculum developers and syllabus designers to have an effective collaboration with English teachers. Through this cooperation, they could dedicate a considerable amount of time in the curriculum to teachers so as to familiarize learners with language learning strategies in EFL classrooms. This collaboration could also lead to the development of textbooks and materials that conform to learners’ emotional intelligence, language learning strategies, and learning styles.

The results of the present study might be of great assistance to educators to opt for various sorts of well-suited teaching materials to meet the requirements of language learners enjoying differing capabilities. Thus, educationalists and program developers are required to carry out needs analysis before specifying instructional materials or textbooks. This will allow instructors to base their proposed tasks and activities upon learners’ learning requirements. Educationalists, thus, can design and develop textbooks and materials which highlight language learning strategies and learning styles that best suit EFL learners’ emotional intelligence.

The findings of the study may also contribute to teachers to modify their instruction, design appropriate syllabus and materials, afford considerable learning opportunities, and specify appropriate tasks and assignments with a view to promoting EFL learners’ academic achievement.

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