The Role of Intelligence in Learning English as a Foreign Language

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Abstract

This study aimed to investigate the relationship between intelligence and learning English in general, and learning grammar and reading comprehension in particular. Participants were teenage Iranian learners from Kerman high schools in second grade. The tests were administered at the end of the year to two mixed classes of 60 learners whose ages ranged from 15 to 19. Standardized tests were employed to assess learners' performance in reading comprehension, grammar and intelligence (both verbal and nonverbal). The correlation between the two variables was determined through Pearson Product-Moment Correlation Coefficient. Results of the investigation showed that unlike first language acquisition, there was a positive correlation between verbal and nonverbal intelligence and learners' English language development. Data analysis showed that the relationship between intelligence scores and those of comprehension and grammar scores was significant across all the groups. The results of this research prove that intelligence is one of the important factors in acquisition of English as a foreign language, but it is not the only factor.

Keywords: Achievement, Comprehension, Foreign language learning, Grammar, Intelligence

1. Introduction

Language is essentially a human activity used for communication and is inextricably bound up with culture. It is one of the ways we represent the world (external and internal) to ourselves, i.e. the objects, people and events that make up our environment and our images of identities. As it is necessary to help individuals understand both the spoken and written language and to express themselves in a variety of ways, language is a vital component of the learning process.

When learners are learning a foreign language, it is more important to give them the most effective help possible to enable them to understand to the best of their ability. The greater our understanding of the factors involved in foreign language acquisition, the more effective our help is likely to be.

Burstall (1978, p. 1) argues that "there have been few carefully designed long term studies of the factors affecting the learning of a foreign language during childhood and adolescence". In fact, existing studies tend to concentrate on measuring language proficiency and neglect the possibilities of motivational factors. Later, Littlewood (1984, p. 68) observes little changes in the situation and believes that "The sum of our knowledge about the factors influencing second language learning is very limited and imprecise". Klein (1986, p.167) maintains that research into foreign language acquisition does not have long history to supply conclusive evidence on any important questions. Obviously, there is a need for research in this field to contribute to our existing knowledge of the factors affecting the acquisition of a foreign language.

2. Literature Review

Intelligence is one of the factors which may affect second/foreign language learning about which there is a debate among researchers. Some scholars believe that intelligence affects language learning, while others claim that intelligence and foreign language learning are not related. What we are sure about is that no negative effect of intelligence on language learning is expected. Some others also believe that intelligence affects language learning, but it doesn't mean that less intelligent people cannot learn a second/foreign language. They claim that rather than leaving these individuals on their own as unable to learn a foreign language, we should provide them with more help and opportunity facilitating learning.

"Intelligence is the general set of cognitive abilities involved in performing a wide range of learning tasks" (Ellis, 2008, p. 649). In other words, it is "a general source of aptitude not

limited to a specific performance area but is transferable to many sorts of performance" (Dörnyei, 2005, p. 32). The term 'intelligence' has traditionally been used to refer to performance on certain kinds of tests measuring linguistic or nonlinguistic abilities. (Brown, 2000).

Over the years, many studies using a variety of intelligence tests and different methods of assessing language learning have found that IQ scores were a good means of predicting success in second language learners. Some recent studies have shown that these measures of intelligence may be more strongly related to certain foreign language abilities than to others. For example, in a study with French immersion students in Canada, it was found that, while intelligence was related to the development of French as second language reading, grammar, and vocabulary, it was unrelated to oral productive skills (Genesee, 1976). What this suggests, is that, while intelligence may be a strong factor when it comes to learning language analysis and rule learning, it may play a less important role in classrooms where the instruction focuses more on communication and interaction (Candlin & Mercer, 2001). Moreover, it is believed that low intelligence and learning disabilities impedes second language learning more in formal learning settings than immigrant learners and those in immersion settings (August & Hakuta, 1997).

Intelligence has different effects regarding various skills. There are low-level correlations between intelligence and proficiency as measured by tests of listening comprehension and free oral production, but much higher correlations are found when proficiency is measured by tests of reading comprehension, dictation, and free writing. The proposed hypothesis is that intelligence is considered as an important factor in Cognitive Academic Language Proficiency (CALP), but is less involved where Basic Interpersonal Communication Skills (BICS) are concerned. CALP is the proficiency needed to engage in the kinds of context-reduced and cognitively demanding tasks which are mainly found in academic study whereas BICS consists of those skills required for oral fluency and the sociolinguistic use of language in face-to-face interaction (Ellis, 2008).

Children's ability to learn their native language is due to a genetically programmed organ that is located in the brain. Once children are born and are exposed to linguistic environments, they immediately start to develop their language. However, to do that, children must make use of the only tool available to them, their inborn mental grammar. Chomsky (2004, p. 17) characterizes this mental grammar as Universal Grammar through which newborn babies have

access to the grammar of any language existent in the world. The language principles which account for the emergence of English account as well for any other languages spoken in the world (McGilvray 2005, p. 45). After children are born and are exposed to a particular language or languages in their environment, they connect the language to Universal Grammar and that language becomes their mother tongue.

As Chomsky (1965, p. 58) suggests, children's language mastery involves an inborn knowledge of grammar and grammatical rules. Even though children make grammatical errors when they are learning their first language, they rapidly master the complex system of language on their own and without the use of parental instruction. Therefore, for language learning to take place, children need something more than just the input they receive from their environment. So to understand how children's first language acquisition happens, we must look inside the child and beyond outside influence. In a scientific sense, language does not develop in the outside world, but rather in the minds of children, therefore there is no learning in the traditional sense (Lenneberg, 2002, p. 6).

Although children have the natural ability to learn language and do it without formal instructions, they do not learn language based on general intelligence. Studies show that children who have a low IQ or are born with some mental delay learn language just as well as any other child. As Pinker (1995) explains, Hydrocephalic children occasionally end up mentally underdeveloped due to large cavities of the brain affected by malformation; however, they can take part in fully articulated and fully grammatical conversations. Furthermore, children who are born with William Syndrome, an inborn condition involving physical abnormalities and mental delays, grow up to have fully articulated language abilities. These cases illustrate that children do not depend on general intelligence to acquire language and have fluent, articulated language abilities.

Similarly, Lenneberg's Critical Period Hypothesis also approves Chomsky's theory on first language learning. As suggested by the neurologist Lenneberg in 1967, there is a critical period for the mechanism that guides language acquisition. After that period, children lose the ability to learn languages without effort. In other words, the unconscious ability children possess to construct a generative mental grammar degrades when lateralization of brain functions become complete. Therefore, children's ability to learn languages without effort diminishes when children reach puberty (Jackendoff, 1994, p. 118).

It is also believed that intelligence, in its traditional definition, may have little to do with one's success as second language learner: People within a wide range of IQs have proven to be

successful in acquiring a second language. The reason may be related to what was mentioned above about the role of intelligence in classroom language learning and its lack in real-life contexts. (Brown, 2000)

There are alternative views about what constitutes intelligence. Gardner (1993, mentioned in Richards & Rodgers, 2001) proposes a view of natural human talents labeled 'Multiple Intelligences Model'. Gardner proposes eight types of intelligence: linguistic, logical-mathematical, spatial, musical, kinesthetic, interpersonal, intrapersonal, and naturalistic. He maintains that by looking only at the first two categories – which constitute the traditional definitions of intelligence – we rule out a great number of human being's mental abilities; we see only one part of the total capacity of human mind. Moreover, he shows that traditional definitions of intelligence are cultural dependent. Gardner claims that his view of intelligence(s) is culture-free and avoids the conceptual narrowness usually associating with traditional models of intelligence.

Another view of intelligence is that of Sternberg (1988, cited in Brown, 2000). Sternberg proposed three types of intelligence: componential ability, experimental ability, and contextual ability. He believed that too much of psychometric theory is obsessed with mental speed, therefore, he dedicates his research to tests that measure insight, real-life problem solving, common sense, getting a wider picture of things, and other practical tasks that are closely related to success in real world.

Scholars such as Goleman (1995) speak of Emotional Intelligence (cited in Brown, 2000). This view places emotions at the heart of intellectual functioning. The management of even a handful of core emotions – anger, fear, enjoyment, love, disgust, shame, and others – drives and controls efficient mental or cognitive processing.

Different above-mentioned views show that there is a relationship between intelligence and second/foreign language learning in comparison with traditional definition of intelligence (Brown, 2000). In other words, it is believed that factors such as intelligence, aptitude, left/right lateralization, affective factors, personality, type of instruction, age and social environment influence foreign language learning, but the degree and extent of them is not specified. Moreover, there is no strong evidence that such factors play any role in the achievement of foreign language learning. "Language aptitude is a phenomenon whose exact nature is not yet known" (Littlewood, 1984, p.62) but it can be defined as a specific set of learning abilities relating to the acquisition of language. Chomsky (1965) referred to this innate ability of

acquiring language as a language acquisition device (LAD).

The ability to identify sounds, the ability to memorize words and the ability to recognize how words function grammatically in a sentence all form part of language aptitude. Research literature also supports the generalization that there is an aptitude for languages, including such abilities as phonetic coding, grammatical sensitivity, memory, verbal intelligence and auditory ability. The greater the underlying abilities, the higher the proficiency in a second language is. (Gardner, 1985, pp. 20-37).

In relating intelligence to foreign language learning, can we say simply that a smart person will be capable of learning a foreign language more successfully because of greater intelligence? According to Brown (2000), it seems that the greatest barrier to second/foreign language learning is a matter of memory, in the sense that if you could remember just everything you were taught, or you ever heard, you would be a successful language learner.

Considering what is said above, the main purpose of this study is to investigate whether there is a relationship between intelligence and EFL achievement on the one hand, and language components such as reading comprehension and grammar, on the other. The research questions addressed in this study are:

1. Is there any relationship between intelligence and achievement of English as a foreign language?
2. Is there any relationship between intelligence and reading comprehension of English as a foreign language?
3. Is there any relationship between intelligence and learning the grammar of English as a foreign language?

3. Methodology

In order to investigate the above questions, a test of general intelligence and an achievement test of English as the foreign language were administered to 60 participants. Then, the scores obtained on the tests were compared to each other to answer the mentioned questions and see whether there was any relationship between cognitive abilities and learning English.

3.1. Participants

In this study, the participants were 76 teenage EFL students from Kerman high schools. They were of both sexes in 15 to 19 age range with an average age of 14.95 and standard deviation of 0.52. English was the foreign language, and Persian was their native language.

They had already studied English at school. After excluding the participants who were unable to answer either of tests completely, a sample size of 60 was chosen.

The tests were administered to two groups, consisting of 60 students on the whole. All the pupils had been taught by the same procedure, and all of them had to do the tests in the end of the same year.

The participants were of diverse language backgrounds. Many of them had never attended an EFL institute out of school. Some of them had gone to an English class but they had left it without finishing completely. And some others were going to EFL classes out of school at the time of the study. Those who attended EFL classes were also of very different levels.

3.2. Instruments

Two intelligence tests were given to participants, one oral verbal test (OVIT) and the other a non-verbal test BD. The first was a test of general intelligence designed and standardized by Raven in 1960 (Rajamanickam, 2004). It was comprised of a set of matrices that may be used as a measure of general intelligence (Kamphaus, 2005). The non-verbal test consisted of designs and patterns without any verbal statement. Non-Verbal Test BD (NFER, 1970) measured the non-verbal ability of children aged 15 to 19. The test contained four sections: cyphers, similarities, analogies and series. There was a detailed oral explanation and also practice items before the commencement of each section to ensure that all children fully understand what is expected of them and that poor readers would not be handicapped.

The other was oral verbal intelligence test (OVIT) (Young, 1984). Oral Verbal Intelligence Test (OVIT) was divided into four subtests and administered in two separate sessions. A and B were given together and then C and D a week later. Each test had two parts; the first involved an explanation and practice session and the second, the main test. Each session of the two subtests took about half an hour to be completed. Strict timing was not possible but the speed of presentation had to be carefully regulated to a deliberately slow rhythm, with each of the four words corresponding to letters on the answer sheet being said at the rate of one per second. Each subtest had 20 items in the test section.

Each question was read aloud to learners, followed by four options. This was then repeated. On the answer sheet only the first letter of each possible answer was given, and the correct one was to be circled. By using a table, individual scores could be converted to an intelligence quotient, which was an indication of intelligence. Standardization of this test gave

equal weight to the distribution of scores of girls and boys.

The next instrument of this study was an EFL achievement test. These tests measured English basic skills, including comprehension and grammar. There was no precise time limit but learners were not allowed to ask any questions once the test had commenced. End-of-year achievement tests were used to investigate comprehension. These had been devised by authors. The source of items was some texts employed during the instructional practice procedure which were taken from high school English book 2. In achievement tests, each correct item received one point and there was no correction for guessing. Therefore, the potential range of the scores was between 0 and 50 for comprehension test and between 0 and 20 for grammar test.

Two examinations were given to cover as many aspects of comprehension as possible and to avoid one lengthy examination which may have been beyond the attention span of some individuals. The first examination presented four stories about family, car driving, a farmer and Charles Dickens. Most questions required a full sentence answer. The learners were instructed to answer in full sentences unless they were asked for a different form of answer. A few questions specifically were asked for a one-word answer. The first examination included four reading comprehension passages with 18 questions and one part included writing opposites.

The second examination was divided into four parts, first of which was verbal reasoning, offering multiple choice answers, and the second, a comprehension passage, shorter and more difficult than those in the first examination, requiring inferential skills and more advanced knowledge of vocabulary. The third part included five questions on directions and recognizing locations. The fourth part included five questions which were to be answered through interpreting a picture. This second test was designed to differentiate between ability levels at the upper end of the scale. The grammar test was presented through 20 multiple choice items.

English Progress Tests were standardized by administering them to a representative sample of learners aged 14.09 years to 15.09 years. The scores of 200 children were collected and the data used to construct a conversion table from which could be discovered a child's standardized score, using his test score and age. The method used in constructing the conversion tables for both tests was an adaptation of that devised by Lawley (1943) and described in an article in the British Journal of Psychologists (Statistical Section), volume 111, part 11, June 1950. From this table one can find a child's standardized score. The mean was 100 and the standard deviation 15, therefore in numerical distribution the standardized score was similar to intelligence quotients although not derived from mental age. The reliability of these tests was

found to be 0.969 according to Kuder-Richardson formula 20.

The grammar test is an untimed multiple choice test. More than 200 children were involved in the standardization of the test. By using tables, raw scores can be converted to reading ages, standard age scores, and percentiles. The reliability coefficient, according to Kuder-Richardson formula 20, was 0.952. In order to do tests, children worked in the familiar, relaxed atmosphere of their own classroom. The instructions were read to them and practice items were done before each child completed the test at his own speed.

3.3. Data Collection Procedure

Two tests were given to the participants of this study to measure their intelligence and EFL achievement. Both of the tests were administered during one session for each class. First of all, the intelligence test papers and its answer sheets were distributed among the students. They were told to write down their names on the answer sheets to make it possible to compare their scores with the scores obtained on the English tests. When the allotted time of the intelligence test finished, the papers and answer sheets of this test were collected and the papers and answer sheets of the English tests were distributed.

3.4. Data Analysis Procedure

After the data were collected from all groups, the scores on intelligence tests and English achievement tests were calculated. Obtaining the scores of the tests, we calculated the correlations to answer the research questions. Based on their answers to the questionnaire, children were divided into one of the following three groups: Those who had never attended any English classes outside school (Group N [=never]), and those who had attended English classes some time ago and now continue (Group B [=beforehand]). The number of students allocated to each group was 30.

4. Results

To answer the research question concerning the relationship between intelligence and foreign language achievement, correlation coefficient was calculated between intelligence scores and English test scores of the participants through Pearson Product-Moment Correlation Coefficient. This was done for three groups of students: group B students, group N students, and all students. For group B students, the correlation coefficient was .459 which is significant

at p<.01. For group N students, this number was .280 which is significant at p<.01. The correlation coefficient between intelligence scores and English test scores for all participants of the study was .262 which is significant at p<.01. The results of this part are summarized in Table 1.

Table 1.

The Correlation Coefficients between Intelligence Scores and English Test Scores in Different Groups

Participants Group	Correlation Coefficient	Number of Participants	Significance
B	.459	30	.000
N	.280	30	.211
All	.262	60	.000

The relationship between intelligence scores and comprehension scores was also calculated in these three groups. In group B, the correlation coefficient was .384 which was significant at p<.01. In the group N, this coefficient was .282 which was also significant at p<.01. For all participants, this coefficient was .236 which was significant at p<.01. Table 2 shows these results.

Table 2.

The Correlation Coefficients between Intelligence Scores and Reading Comprehension Scores in Different Groups

Participants Group	Correlation Coefficient	Number of Participants	Significance
B	.459	30	.000
N	.280	30	.211
All	.262	60	.000

The results obtained for the relationship between intelligence scores and grammar scores for the three groups of participants are as follows. In group B, the correlation coefficient was

.454 which was significant at p<.01. In group N, the correlation coefficient was .278 which was again significant at the same level of significance. And for all participants of the study, this coefficient was .246 which was significant at p<.01. These results were presented in Table 3.

Table 3.

The Correlation Coefficients between Intelligence Scores and Grammar Scores in Different Groups

Participants Group	Correlation Coefficient	Number of Participants	Significance
B	.454	30	.000
N	.278	30	.219
All	.246	60	.001

5. Discussion

The results of this study show that there is a weak positive relationship between intelligence and foreign language achievement in general, and learning reading comprehension and grammar in particular. That is although this relationship is found to be positive, it is very weak. Therefore, we can conclude that although intelligence can affect foreign language learning positively, this effect is not very strong and many other factors may affect foreign language learning and weaken the effect of intelligence. In other words, intelligence has a role in foreign language learning but a foreign language is not learned only by intelligence.

The findings of this research are in line with that of Brown (2000) and support this idea that there is a relationship between intelligence and second/foreign language learning. In other words, intelligence influences foreign language learning, but the degree and extent of it is not specified. That is, various factors which could possibly have an effect on the acquisition of English as a foreign language are identified. These may be age, language aptitude, learning strategies, motivation, attitude, anxiety, self -esteem, gender, the amount of English spoken at home, time and opportunity.

There are various theories but no universal agreement on the exact nature of intelligence. There is a positive relationship between intelligence and linguistic development, particularly at more complex levels such as reading comprehension and grammar. The more intelligent a person, the more observant and the more able he is to assign and understand meaning. The

results of this research prove that there is a positive relationship between linguistic ability and intelligence, each influencing the other. That is intelligence is one of the important factors in the acquisition of a foreign language, but it is not the only factor. It determines how well and quickly an individual understands a learning task or other aspects of language. It would seem that success in foreign language learning is related not only to intelligence but also to more specific language learning abilities. Moreover, as Khansarian-Dehkordi and Ameri-Golestan (2017: 108) believe, the physical classroom and face-to-face interaction contexts also play a role in foreign language learning.

In conclusion, the results of this study are against the claim that Chomsky (1965) makes about first language acquisition. Children acquire language without parental assistance and without the use of general intelligence. For him, the only way to explain how children acquire the complex system of language is that they are born with an innate ability to acquire a language. Consequently, he presented the Innateness Hypothesis and suggested that children are born with a mental grammar that produces knowledge of language, given that there is present experience. So without having an inborn Universal Grammar, children's language acquisition process would be more complicated and probably take longer time. Conversely, with Universal Grammar, all children are rapidly able to acquire language. The critical period evidence also supports Chomsky's view that all humans are born with an innate ability to acquire a communication system.

6. Conclusion

The results of data analysis show that there are many factors playing a role in the acquisition of a foreign language, but probably more important than a single factor may be combination of factors and the interplay between factors which may change according to the circumstances. One must always bear in mind that each learner is an individual and individual differences will have an effect on the learning of English as a foreign language.

The findings of this research indicate that language and cognition are closely connected to each other. Language development depends on the concepts an individual forms about the world and the meanings to communicate with others. Cognitive factors determine the meaning of language and also make sense of the linguistic system. That is, language is derived from cognitive development, and more intelligence helps individuals acquire foreign language faster and more easily.

This research has practical implications both for teachers and learners. The conclusions of this study show teachers that learning variations lie in the learners themselves. Many personal factors have a crucial role in learning English as a foreign language and intelligence is only one of these factors. Higher intelligent learners are better learners of English as a foreign language. However, the better foreign language learners' performance cannot be solely attributed to their higher intelligence. Therefore, teachers who teach English as a foreign language must consider intellectual diversity of learners. That is they should create a positive learning environment by paying more attention to learners who seem to be slow in learning English as a foreign language and to encourage them to share their ideas and participate in class activities even if they commit errors. In other words, teachers should consider various ways learners learn and present class materials in a variety of formats. Learners should also bear in mind that intelligence is not the only influential factor in learning and other factors can compensate for being less intelligent. Moreover, less intelligent learners should also know that practice makes perfect, therefore they must make an extra effort to learn English as the foreign language although it takes longer for them.

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