The Impact of Intelligence on Second Language Acquisition

Tanzeel Chowdhury
ID: 07203009

Department of English and Humanities
December 2010

BRAC university, Dhaka, Bangladesh

The Impact of Intelligence on Second Language Acquisition

Thesis
Submitted to the department of English and Humanities
Of
BRAC University

Submitted by
Tanzeel Chowdhury
ID: 07203009

In partial fulfillment of the requirements for the degree of
Bachelor of Arts in ELT

December 2010

ACKNOWLEDGEMENT

Firstly, I would like to thank Allah for giving me the opportunity to study this B.A. program. Secondly, I would like to thank my thesis supervisor Ms. Asifa Sultana who inspired and guided me in doing this thesis. Special thanks to Dr. Firdous Azim and all the faculty members for their unconditional support and guidance throughout the preparation of this paper. I would also like to thank the Department Coordinator, A.K.M. Ahsan Kabir and Rafiq bhai for being with me in the department when I worked on this paper and to my peers for giving me mental support. Last but not the least I would like to express my gratitude to my parents who gave me love, support and encouragement throughout my life.

TABLE OF CONTENT

	Page
Chapter 1: Introduction	1
Chapter 2: Literature review	
2.1: Individual differences	4
2.1.1: What is intelligence	5
2.1.2: Testing intelligence	6
2.1.2.1: Types of intelligence test	7
2.1.2.2: Problems with testing intelligence	8
2.2: Relationship between second language acquisition and intelligence	9
2.3: A case study	12
Chapter 3: Research methodology	
3.1: Background information	14
3.2: Participants and settings	16
3.3: Nature of the research	
3.3.1: Primary research	16
3.3.2: Quantitative research	17
3.4: Research design	
3.4.1: Procedure	17
3.4.2: Research instruments for data collection	
3.4.2.1: Multiple choice tests	18
3.4.2.2: Individual interviews	19
3.4.3: Methods of analysis	20
Chapter 4: Results and discussion	
4.1: Presentation and analysis of the tests	
4.1.1: Proficiency test	22
4.1.2: Intelligence test	24
4.1.3: Proficiency test and intelligence test combined	26
4.1.4: Correlation analysis	27
4.2: Presentation and analysis of interviews and intelligence test	
4.2.1: Interviews	30
4.2.2: Intelligence test and interview combined	32
4.2.3: Correlation analysis	33
4.3: Discussion	35
Chapter 5: Conclusion	37
References	39
Appendices	
Appendix A: Proficiency test on Grammar	41
Appendix B: Intelligence test	45

LIST OF TABLES AND DIAGRAMS

Tables **Page**

Table 4.1: Scores of proficiency test on grammar 23
Table 4.2: Scores of intelligence test 25
Table 4.3: Correlation between grammatical proficiency and intelligence 28
Table 4.4: Scores of interviews 31
Table 4.5: Correlation between communicative competence and intelligence 33

Diagrams **Page**

Diagram 4.1: Scores of proficiency test on grammar 23
Diagram 4.2: Scores of intelligence test 25
Diagram 4.3: Proficiency test on grammar and intelligence test combined 26
Diagram 4.4: Correlation between grammatical proficiency and intelligence 29
Diagram 4.5: Scores of interviews 32
Diagram 4.6: Intelligence test and interview combined 32
Diagram 4.7: Correlation between communicative competence and intelligence 34
Diagram 4.8: Scores of proficiency test and interviews 36

ABSTRACT

Learners of second language possess different characteristics that make them different from each other. Intelligence is one of these characteristics, which is considered to affect the acquisition of formal structure of a second language when taught in a formal setting. However, it is thought to not affect the development of communicative competence of the language. The research aims at finding out whether this claim is true or not. In order to do so, 20 tertiary level students learning English as a second language were tested in terms of their intelligence, grammatical proficiency and communicative competence. The results then were compared to find out the relationship among these variables to determine the effectiveness of intelligence on second language acquisition. The results of the study very interestingly reveal that intelligence affects second language acquisition in terms of grammatical structures of the language and also in terms of communicative competence in Bangladeshi context.

Chapter One: Introduction

Second language acquisition is the process of learning a new language after the acquisition of the native language. Acquisition of a second language takes place when the learners already have learned one or two languages. The target language that is learned is called the second language. In terms of second language learning it has been observed that in the same classroom setting some students progress rapidly whereas some of them struggle a lot making very slow progress. This happens because the characteristics of different individuals are not the same. There are many factors related to these individual differences that affect individual's second language learning. Some of these factors are motivation, aptitude, intelligence, attitude, age and so on. Among these factors, intelligence is one on which comparatively little research has been conducted. This paper deals with this issue of intelligence and tries to find out how strongly intelligence affects the acquisition of a second language.

The existing researches that have been done on this topic suggest that there is a relation between intelligence and formal acquisition of the language. Intelligence affects the acquisition of a second language when it is taught in a formal manner in a classroom setting. On the other hand, it has been found that intelligence does not affect the acquisition of the language when it is acquired more naturally outside the classroom. Moreover, it has also been found that intelligence has an effect on the acquisition of the grammatical structure of the language whereas it has nothing to do with the development of the learners' communicative competence. That means, intelligence can determine how easily individuals will be able to acquire a second language but it cannot determine their

The aim of this research is to find out whether intelligence really has any effect on second language acquisition and if yes, how strongly it affects the acquisition. The study will also try to find out whether the result matches the results that the existing researches conducted on this topic suggest. The reason behind choosing this topic is that the researcher was interested to know the relationship between these variables but found very little research done on this. This is why the researcher has chosen this topic to find out whether there is any relation between these two variables and if there exists any how strong the relationship is.

In this study, the participants' intelligence has been measured by a non verbal intelligence test. The participants' success of acquisition of the language has been measures through their competence in the language. It has been assumed that learners for whom the success of acquisition of the language is high are more competent in the language than the learners who are less successful in acquiring the language. The language competence of the learners has been divided into two parts. In one part the learners' grammatical knowledge of the language has been measured and in another part their communicative competence has been measured.

Tertiary level students studying in different private universities of Dhaka who have learned English as a second language participated in the study. The methodology of the survey was testing the participants' intelligence and knowledge of grammatical structures through tests. The communicative competence of the participants has been measured through individual interviews.

Despite the appropriate methodology, the research was not free from limitations. The researcher had to conduct the survey with a limited number of participants which

more reliable. Moreover, she could not cover enough private universities because of time constraint.

The subsequent chapters include the existing literatures on this topic, the research methods used in the study and the presentation of the analysis of the results of the study. Chapter two describes intelligence as a part of individual differences followed by the existing findings on the relationship between intelligence and second language acquisition. In chapter three, the methodology of the study has been described including the participants, the nature of the research, the research instruments employed for data collection, the research design and procedures and the methods of analysis.

Chapter two: Literature Review

This chapter begins with the description of intelligence as a part of individual differences. Then it describes the existing findings on the relationship between intelligence and second language acquisition and at the end, it supports the arguments with a case study.

2.1 Individual differences:

Individuals possess different characteristics that make them different from each other. These characteristics are unique for every individual. Because of these differences, success of a second language acquisition varies greatly from person to person. For example, many teachers think that extroverted learners who interact without inhibition in their second language learning become more successful than the learners who are more introverted and do not interact that much willingly. From the early days, psychologists have been trying to explore this uniqueness of individual mind. This has been called individual difference research. As the term suggests, individual differences (IDs) are characteristics or traits because of which individuals differ from each other (Dörnyei, 2005, p.1-2). These IDs possessed by learners of second language affect their acquisition of the language in different ways because of which the acquisition of the language is supported or hindered. Individual differences can be categorized in several ways. Some of these different types of individual differences that influence second language acquisition are intelligence, language aptitude, motivation, attitude, age and so on. In addition, these different factors affect second language learning depending on the

the way in which they affect when the language is acquired in an informal manner outside the classroom.

2.1.1 What is intelligence:

Intelligence can usually be called as the general problem solving skills that human beings possess. This is the mental ability involved in reasoning, perceiving relationships and analogies, calculating, learning quickly, etc. However, intelligence cannot be defined so easily. There are many other aspects of intelligence. According to Janik (2004), intelligence "is a deceptively simple appearing idea that has proven especially difficult to define, test and measure" (p.129). It is difficult to define intelligence because it includes a number of notions. Usually, it is defined and measured in terms of linguistic and logico-mathematical abilities. For example, one's ability to interpret or manipulate language (linguistic ability) or one's ability to solve logic problems (logico-mathematic ability) can be considered as measure of intelligence (Fernández-Corugedo, 1999, p.29). On the other hand, some SLA researchers have defined intellectual ability as something that can be measured from the performance of the individuals on a standardized test (Teepen, 2005). If individuals perform better in the standardized tests, it can be said that they possess a satisfactory level of intelligence. On the other hand, if they do not do well in the tests, their level of intelligence cannot be considered as being up to the mark.

Psychologists have found out several types of intelligence that play role in differentiating human beings. These are verbal intelligence, non-verbal intelligence, concrete reasoning and abstract reasoning (Logsdon, n.d.). The uniqueness of individuals can be measured based on these different types. In recent times, educational psychologists are developing further theories concerning the complexity of intelligence.

(1983). He proposed several types of abilities that lie under intelligence. Gardner's (1983) these different kinds of intelligence are linguistic (involved in reading, writing, listening and talking), musical (involved in playing, composing, singing and conducting), logical-mathematical (involved in solving logical puzzles, deriving proofs, performing calculations), spatial (involved in moving from one location to another or determining one's orientation in space), bodily-kinesthetic (involved in using one's body to perform skillful and purposeful movement), interpersonal (involved in understanding of others' and one's relations to other), intrapersonal (involved in understanding oneself and having insight into one's own thoughts, actions and emotions). Later in 1999, he proposed another type, which is naturalistic intelligence that involves understanding and working effectively in natural world.

2.1.2 Testing intelligence:

Testing intelligence means testing peoples' abilities that are related to intelligence. Abilities that show the intelligence of an individual are tested in intelligence tests. Most of the intelligence tests measure some common abilities simultaneously. Some of these abilities are verbal ability, reasoning ability, memory and so on (as cited in Dörnyei, 2008, p. 46). These tests require an individual to accomplish a variety of tasks and evaluate him or her based on the test results. Individuals' quantified verbal, visual-spatial and mathematical skills are calculated through these tasks. After that, from the task results, a combined score is calculated and then these scores are compared between persons (Janik, 2004, p.129-130). However, most of these abilities have nothing to do with the success of foreign language acquisition. These abilities may help individuals in accomplishing variety of tasks, in solving problem, in understanding mathematical and logical problems and so on. However, only a few of them are considered to be effective

behind the acquisition of a second language (Dörnyei, 2008). As a result, some researchers have concluded that there is a very negligible relationship between intelligence and second language acquisition. As most of the abilities of intelligence do not help an individual in understanding and analyzing the language, there is a little possibility that intelligence will affect second language acquisition.

2.1.2.1 Types of intelligence test:

Intelligence tests can be of many types. Verbal intelligence test and non-verbal intelligence test are the main two types. Verbal intelligence tests include analyzing information and solving problems using language-based reasoning. In verbal intelligence tests, the items are expressed in linguistic forms. Some of the different types of verbal intelligence test include insertion of missing letter, insertion of missing number or figure, words formation, jumbled words, formation of correct sentence, general knowledge tests, alphabetical test, completion test, synonym test, multiple-choice tests, arithmetic test and so on (Logsdon, n.d.).

On the other hand, non-verbal intelligence tests assess intelligence without placing language demand on either the examinee or the examiner. These tests test the examinees' level of intelligence through their ability to analyze information and solve problems using visual materials. As a result, insufficient knowledge of a language does not harm the performance of an individual in the intelligence test. Non-verbal intelligence tests comprise matrix test where a series of designs are displayed and examinees are required to complete the series or delete any particular design that does not relate to the series and so on (Logsdon, n.d.).

2.1.2.2 Problems with testing intelligence:

Like the definition of intelligence, the testing of intelligence is also not an easy task. There occur some problems in testing intelligence. The first problem is the question about "what is being measured under the rubric of intelligence" (Janik, 2004, p.131). As mentioned above a number of abilities underlie behind the concept of intelligence. All these abilities get included when we try to test someone's intelligence. For example,

> Size of vocabulary, verbal ability, clarity of expression, visual-spatial recognition, abstract mathematical ability, reasoning, ability to use tools, creativity, curiosity, sense of discovery, intuition, insight, inventiveness, cognitive clarity, conscious presence, judgment, habit, use of age-appropriate exploration strategies, ability to explain, developmental maturity, grounding, awareness of truth, rhythmic awareness, kinesthetic thinking are considered as the same as intelligence or at least some important key elements of it (Janik, 2004, p.131).

It becomes difficult to incorporate all these abilities in the intelligence test. This problem makes testing of intelligence more difficult. Moreover, it is not always possible to make proper tasks that can properly measure these different abilities.

Another criticism of intelligence tests is their gender bias. Intelligence test results vary when it comes to gender varieties. It has been found that males consistently receive lower scores than females. As a result, all intelligence tests remain internally biased. Intelligence varies in terms of gender varieties because of the following three

through talk that requires the use of language whereas males generally explore their world visually. Finally, males have a tendency to visualize the world in terms of movement of static objects in space in which females consistently score lower (Janik, 2004). This problem can be considered as a drawback in the relationship between intelligence and second language acquisition because both males and females acquire language more or less with the same proficiency.

Moreover, it is very difficult to administer intelligence tests to the very young. They do not take the tests with proper analytic thoughts and are reluctant to analyze the questions. Most of the times they are not mature enough to understand the tests. Besides, scores of intelligence test usually steadily decrease after adolescence implying that intelligence diminishes with age (Janik, 2004). It suggests that it becomes difficult to acquire a second language after adolescence if it has any relation with intelligence.

2.2 Relationship between second language acquisition and intelligence:

In terms of first language acquisition, intelligence is not considered as a determining factor. Almost everyone acquires his or her first language. Even people who suffer from mental disorders acquire their first language. However, learning a second language does not work in the same way as first language acquisition (Fernández-Corugedo, 1999, p.29). Many factors work as reasons behind this. While learning a second language people already have their first language that affect the acquisition of the second language, they do not get the similar exposure as first language, they do not have the same motivation and so on (Lightbown and Spada, 1999). These differences negatively affect second language acquisition. As a result, second language learners most of the time fail to reach native like competence (Fernández-Corugedo, 1999, p.29). It

acquisition of the first language. Therefore, intelligence may play a role in the acquisition of second language though it does not have anything to do with first language. McLaughlin (1987) suggests that intelligence is an important factor in determining the success of second language acquisition. However, it depends on the way the language is taught. When the material is taught in a formal manner and in a classroom setting that is when emphasis is given on reasoning analytically about verbal material, intelligence plays a great role (p.171). Verbal materials are those where words are used in written or spoken form. That means linguistic materials that are developed based on language are called verbal material. According to McLaughlin (1987), when this verbal material is taught in classroom setting, verbal intelligence has a role on the acquisition of the language. Moreover, findings show that intelligence is strongly related with second language learning in older than in younger learners and McLaughlin's notion of relationship between verbal intelligence and second language acquisition when taught in formal setting explains the reason. Children learn the second language in an immersion setting or in a bilingual classroom and do not approach the language analytically. On the other hand, students in traditional high schools or college classes consider the language analytically and acquire it in formal ways (McLaughlin, 1987, p.171). Researches show that "intelligence … correlate with some skills associated with SLA, particularly those used in the formal study of the language, such as reading, writing, language analysis and vocabulary study" (Fernández-Corugedo, 1999, p.29). However, it less strongly influences the acquisition of oral fluency skills. When it comes to the development of the learners' communicative competence intelligence does not play any role on it.

All researchers agree that students' performance on reading and language usage tests correlate strongly with their level of intelligence. That is, those who obtain higher

scores in intelligence tests tend to do better on tasks that test learners' knowledge of the language and its usage. Genesee (1976) (as cited in Teepen, 2005) conducted a survey where students were divided based on intelligence scores and tested in grades 4, 7, 11. Their performance in the acquisition of French as a second language were also tested and scored. Scores obtained by those placed in the higher level based on intelligence score were compared with the scores obtained by those placed in the lower groups. In all cases, people placed in the highest level performed better than those placed in the average group and people in the average group performed better than the lowest level students did in terms of intelligence. These results suggest that there is a relationship between intelligence and second language acquisition.

However, while researchers agree on the relationship between higher intelligence and greater success in academic second language acquisition, they also agree that intelligence play little or no role in many of the communicative tasks. Genesee (1976) (as cited in Teepen, 2005) found out that intelligence scores did not play any role in the ability of individuals to acquire certain communicative aspects of a second language. Higher intelligence scores were insignificant on skills such as interpersonal communication, pronunciation and listening comprehension. A native French speaker established the data for success in interpersonal communication through individual interviews of each student. The students were first shown a cartoon and were asked to describe the story depicted by it. Then they engaged in a short conversation based on the cartoon. The entire interview was conducted in French and was recorded for later analysis. Two native French speakers in five separate categories then rated the speech samples independently. These were listening comprehension, pronunciation, grammar,

which intelligence group each individual belonged. After the rating of the interviews, no significant difference was found for any of the different intelligence group. This suggests that there is no effect of intelligence on the success of second language acquisition when the second language program is primarily based on communicative competence (Teepen, 2005).

2.3 A case study:

There is a good example that proves the relationship between intelligence and formal second language acquisition. This is the story of CJ recorded by Obler (1989) (as cited in Teepen, 2005) CJ is a person who has exceptional ability to learn a language. He acquired several languages after puberty and achieved native-like proficiency in all cases. Native speakers of the languages who interviewed him confirmed his success in terms of acquiring native like competence. They concluded that he lacked a foreign accent but could acquire native like speed and ease. At the time of the study, CJ was a 29-year-old Caucasian male who was a graduate student. He was a native English speaker from a monolingual home. His first experience with a second language came with formal instruction in French in high school at the age of 15. He acquired French with excellence and began to study German and Spanish as well. After graduating from college, CJ learned Moroccan, Arabic and Italian through a combination of immersion and formal instruction. Because of the acquisition of these so many languages, researchers found an excellent opportunity to explore the relationship between intelligence and second language acquisition by researching on him. To do this, researchers examined CJ's performance on an intelligence test. In two areas of the test, CJ performed extremely

and was able to give precise one-word synonyms for words such as "burden for encumber" and "foreboding for ominous." These suggest that he has an exceptional intelligence that helped him in the acquisition of the language that he learned with native like proficiency (Teepen, 2005). Therefore, the case study of CJ is a proper example that supports the claim of the researchers that there is a relationship between intelligence and second language acquisition.

Chapter three: Research Methodology

This chapter explains the methodology of the study to measure students' intelligence and proficiency level. The research hypothesis will be mentioned in the background section. The other parts will describe the participants, the nature of the research, the research instruments employed for data collection, the research design and procedures and the methods of analysis.

3.1 Background information:

As mentioned above, intelligence involves the ability to think, solve problems, analyze situations, and understand social values, customs and norms. Intelligence testing estimates a student's current intellectual functioning through his or her performance of various tasks. Intelligence tests include different kinds of activities such as language based reasoning, visual-spatial reasoning, problem solving, logic and awareness of common social realities. There are mainly two kinds of intelligence test. These are verbal intelligence test and non-verbal intelligence test. Verbal intelligence tests are those that rely on language to measure the participants' intelligence. All the questions in the intelligence test are based on language. On the other hand, non-verbal intelligence tests do not place any linguistic demand on the participants. These tests require that the participants complete various tasks based on figures, diagrams and numbers.

In this study, the researcher has used non-verbal intelligence test to measure the participants' intelligence. Non-verbal intelligence test has been used in this study because it enables students to solve problems without relying upon or being limited by language abilities. In some cases, it happens that the scores obtained by students in non-verbal intelligence tests under-present their intellectual ability because of their incompetence of

language processing and communication. However, scores obtained by the same students in non-verbal assessment of intelligence may properly reflect their ability because their language deficit in this case does not hinder their performance. This problem of language deficiency would be more with the students with whom the researcher has done her survey because all of their first language is Bangla and they have not yet mastered the language they are learning. Therefore, it is obvious that they would face problem in using English while answering the questions. This is why the researcher has used non-verbal test of measuring intelligence in order to get answers that are not affected by language deficiency and that properly reflect the participants' intellectual ability.

In order to find out the learners' amount of learning English, the researcher has evaluated them based on their proficiency on the language. The notion behind this decision is that the score obtained by them in the tests would reflect their amount of acquisition of the language. That is, if the participants score better in the proficiency tests it would mean that the amount of acquisition is high for them and vise versa. In order to determine the participants' proficiency in English, the researcher has conducted two kinds of survey. At first, she gave them a proficiency test on grammatical structures in order to measure their overall knowledge of English language and grammar. Proficiency tests "measure people's ability in a language, regardless of any training they may have had in that language" (Hughes, 2003, p.11). The content of a proficiency test is not based on the content of the language courses that the examinees may have followed. Rather it is based on the specification of what the examinees should be able to do in order to be considered proficient (Hughes, 2003). Therefore, the researcher has not followed any syllabus that the students have followed while choosing the proficiency test. However, this criterion of measuring learners' proficiency on a language alone can sometimes give

misleading conclusion. This is because proficiency in a language does not only include knowledge of the grammatical structure of the language. It also includes the communicative competence of the learners on that language. In order to become a proficient user of a language learners have to be able to communicate in the language properly. This is why, in order to have a proper result of the participants' proficiency of the language, the researcher has interviewed the examinees as well to find out their communicative competence in English.

3.2 Participants and setting:

The participants of this study were first and second year university students ranging in the age group of 18 – 20 years. The study was conducted in some of the private universities of Bangladesh where the medium of instruction was English. All the students' first language is Bangla and they are learning English as a second language. All of them have learnt English in their schools and colleges but the medium of instruction was Bangla. None of the schools used English for communicative purpose. As a result, their acquisition of English then was not proper because they did not listen to the language and did not use it. They only learned the use of it. However, after entering the university, all of them have entered in a setting where the primary medium of communication is English and have had an opportunity to use the language they have learned so far. Moreover, all of them have done a course on English in their first semester of university. This is why; the researcher has decided to conduct the survey with these students because the acquisition of English, as a second language is more proper in this level than in school or college levels.

3.3 Nature of the research:

3.3.1 Primary research:

The research is a primary research. Primary researches are those where the data is gathered from direct sources rather than from secondary sources in order to obtain original information (Brown, 1988, p.2). Here the data has been collected from a group of students of English learning as a second language. This is why the research is a primary research.

3.3.2 Quantitative research:

Researches where numerical data is used in order to analyze the gathered information are called quantitative research. According to Mackey & Gass (2005), "quantitative research generally starts with an experimental design in which a hypothesis is followed by the quantification of data and some sort of numerical analysis is carried out" (p.2). Quantitative data includes closed ended information such as that found on attitude behavior and performance instruments. In this study, the results of the intelligence test and proficiency test on grammatical structures have been derived and analyzed in terms of numerical data. This is why the research falls under quantitative category.

In brief, the research was a primary research where quantitative method research has been adopted.

3.4 Research design:

3.4.1 Procedure:

The study has been conducted in three parts and 20 students took part in the study. In the first part, the students were given a non-verbal intelligence test consisting of 30 questions. They had 45 minutes to finish the test. In the second part, the same students were provided with a proficiency test on grammatical structures consisting of 30 questions and in order to finish the test they were given 45 minutes as well. The third part of the study aimed at finding out the students' communicative competence in English. In order to do so the researcher randomly selected 10 students from the 20 students and interviewed them individually. After that, she got a sample result of the students' proficiency based on their interviews. The researcher has taken sample for the third part of the study because it was not feasible to interview all the 20 students in a short span of time.

The researcher herself distributed the tests and was present with the students while they were filling them up to explain all the items in the test to the students clearly in order to prevent any misunderstanding. Moreover, she provided help whenever the students faced any problem understanding the questions properly. Besides, the participants gave the interview individually in their separate free times.

3.4.2 Research instruments for data collection:

In this research, multiple-choice tests have been used in order to measure the participants' intelligence and proficiency of English and individual interviews have been taken to measure their communicative competence.

3.4.2.1 Multiple choice tests:

Multiple-choice tests consist of questions that require students to choose the best answer of a question from some given answers. The advantage of using multiple-choice test is that, as the examinee responds by choosing from several possible answers, scoring can be done quickly without consuming much time. Moreover, as there is only one possible answer, no judgment is involved in terms of the degree of correctness (Harris, 1969, p.2).

The non-verbal intelligence test that the researcher has used included 30 questions that required completion of groups of figures. In some question, there were five figures and a missing figure that the participants had to find out from six options. There were also some questions where there was a diagram a part of which was taken out and the participants had to find out the part from the given options. Moreover, two of the questions required the participants to understand a given sequence of numbers and fill the last part of the sequence. The researcher has taken the test from a source on the web (Transparent Language).

A ready-made grammar proficiency test has been used to measure the participants' proficiency on the grammatical structures of the language. The researcher has taken 30 questions from it and has adapted some of them that seemed too easy for tertiary level students. The problems included tense, parts of speech, vocabulary, phrases, reading comprehensions and so on. This test has also been taken from a source on web (Intershop.it).

3.4.2.2 Individual interviews:

The simplest and commonly used method to measure oral proficiency is to interview each participant separately (Harris, 1969). Interview is "the elicitation of data by one person from another through person-to-person encounters" (Nunan, 2002, p.231). It is a device used to assess oral competence of the participants. Interview is also used broadly like questionnaires as a research tool in language studies (Nunan, 2002, p.149). According to Nunan (2002), interviews should be placed on a continuum ranging from unstructured through semi-structured to structured. In this study, structured open-ended questions have been asked to the students. Interviews that are focused on a particular issue are called structured interviews and interviews that allow participants to express themselves freely are called open-ended interviews (Seliger and Shohamy, 2003). In this way, the topic was controlled but the students were free to speak spontaneously whatever came to their mind on the given topic. As a result, it was easier for the researcher to find out the participants' communicative competence in English.

The interviews were rated using numerical values ranging from 1 to 5 points. The speeches were rated based on five criteria. These are pronunciation, grammar, vocabulary, fluency and comprehension. Scores were given on each of these criteria and later those scores were averaged in order to obtain the final score for the participants' communicative competence.

3.4.3 Methods of analysis:

After collecting the test answers, the data was submitted to statistical analysis. After counting the number of correct answers, the numbers were tabulated and were converted into percentage. Tables and column diagrams were employed for the

presentation of the data. The interviews were recorded and graded based on the five criteria mentioned above. These scores were converted into percentages as well. After all the three data were obtained in percentage, the interrelationship between them was calculated by using correlation. At first, the correlation between the scores of the intelligence test and grammar proficiency test was calculated. After that, the correlation between the scores of intelligence test and individual interviews was calculated.

Coefficient of correlation expresses the degree of relationship between two sets of test scores (Harris, 1969). Measures of correlation take value between -1 to +1. A value of -1 means a perfect negative correlation; a value of 0 means no correlation and a value of +1 means a perfect positive correlation between the variables. Values that are more than 0.8 refer that the relationship is strong and values that are less than 0.5 refer that the relationship is weak. Positive correlation means if one variable increases another variable will also increase and vise versa and negative correlation means if one variable increases another variable will decrease or vise versa (Hornberger and Corson, 1997).

Using correlation in determining the relationship between two variables is important because it explains the relationship in terms of numerical values. It is helpful to understand the relation more easily when it is represented in terms of numerical values. This is why, the researcher has used correlation to determine the relation between intelligence and second language acquisition.

Chapter four: Results and Discussion

In this chapter, the raw data obtained from both the tests and the interviews are presented. All the data will be analyzed and interpreted in this chapter.

4.1 Presentation and analysis of the tests:

The tests have been marked out of 30 and each question in the tests carries 1 mark. After marking the tests, the scores have been converted into percentage. The two tests have been analyzed separately and the results have been shown in graphs and tables.

4.1.1 Proficiency test:

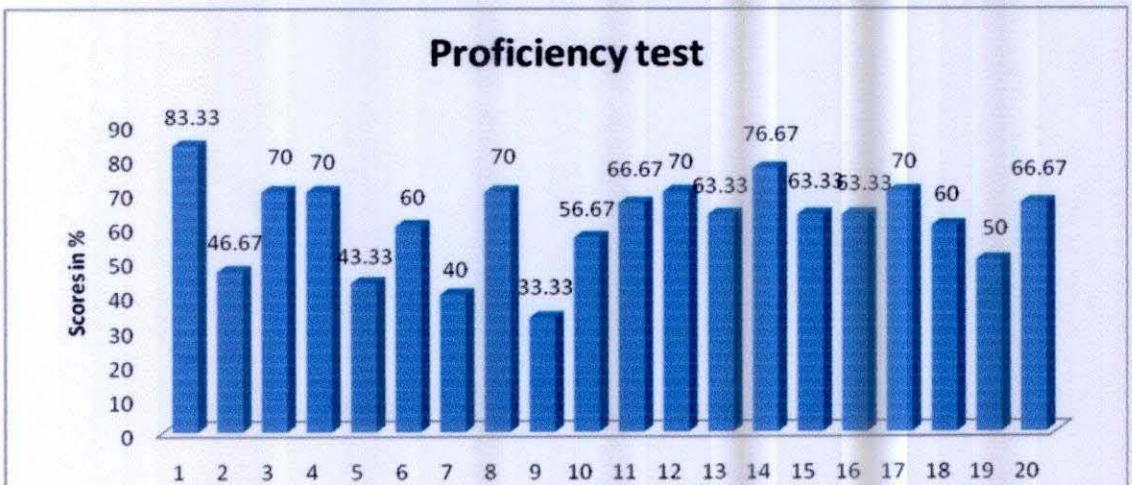
The test was an integrative proficiency test on grammar consisting of a wide range of varieties of English grammar i.e. tense, preposition, subject verb argument, sentence structure, etc. Students' grammatical proficiency test has been measured from the assumption that higher level of proficiency indicates higher success in the acquisition of the language. The scores obtained by the examinees in the test have been shown in the following table.

Participants	Score	%
1	25	83.33
2	14	46.67
3	21	70
4	21	70
5	13	43.33
6	18	60
7	12	40

8	21	70
9	10	33.33
10	17	56.67
11	20	66.67
12	21	70
13	19	63.33
14	23	76.67
15	19	63.33
16	19	63.33
17	21	70
18	18	60
19	15	50
20	20	66.67

Table 4.1 Scores of proficiency test on grammar

The following graph represents the above scores.



4.1.2 Intelligence test:

This test also has been marked out of 30 and each question carries 1 mark. This test too included a variety of questions. Some of the questions required that the participants complete a figure, a part of which was taken out and they had to find out the part from six options. Another type required them to find out the missing figure that would match the sequence of a group of figures. They also had to find out numbers that would fit in a given sequence of numbers. The scores obtained by the participants in the intelligence test have been shown in the following diagram.

Participants	Scores	%
1	19	63.33
2	11	36.67
3	13	43.33
4	11	36.67
5	10	33.33
6	12	40
7	5	16.67
8	20	66.67
9	11	36.67
10	11	36.67
11	18	60
12	17	56.67
13	17	56.67
14	19	63.33

15	16	53.33
16	18	60
17	16	53.33
18	16	53.33
19	12	40
20	18	60

Table 4.2: Scores of intelligence test

The following diagram represents the scores obtained by the participants in the intelligence test.

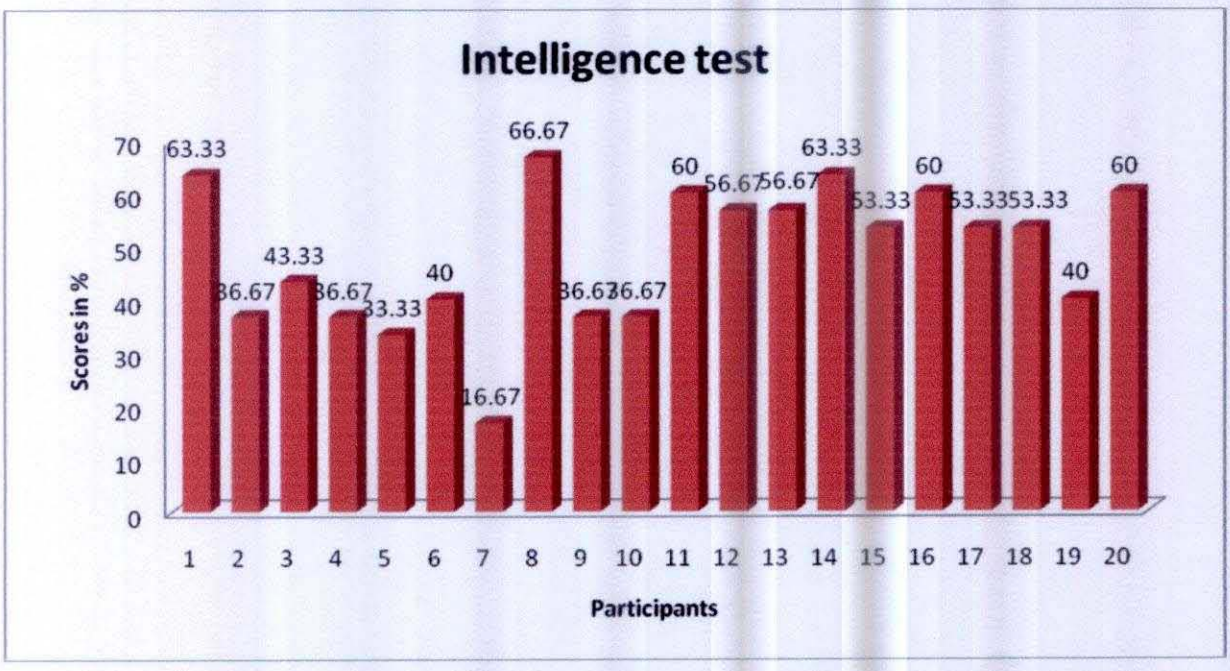


Diagram 4.2: Scores of intelligence test

4.1.3 Proficiency test and intelligence test combined:

The following diagram represents the scores obtained by the participants in the proficiency test on grammar and the intelligence test and compares the results together.

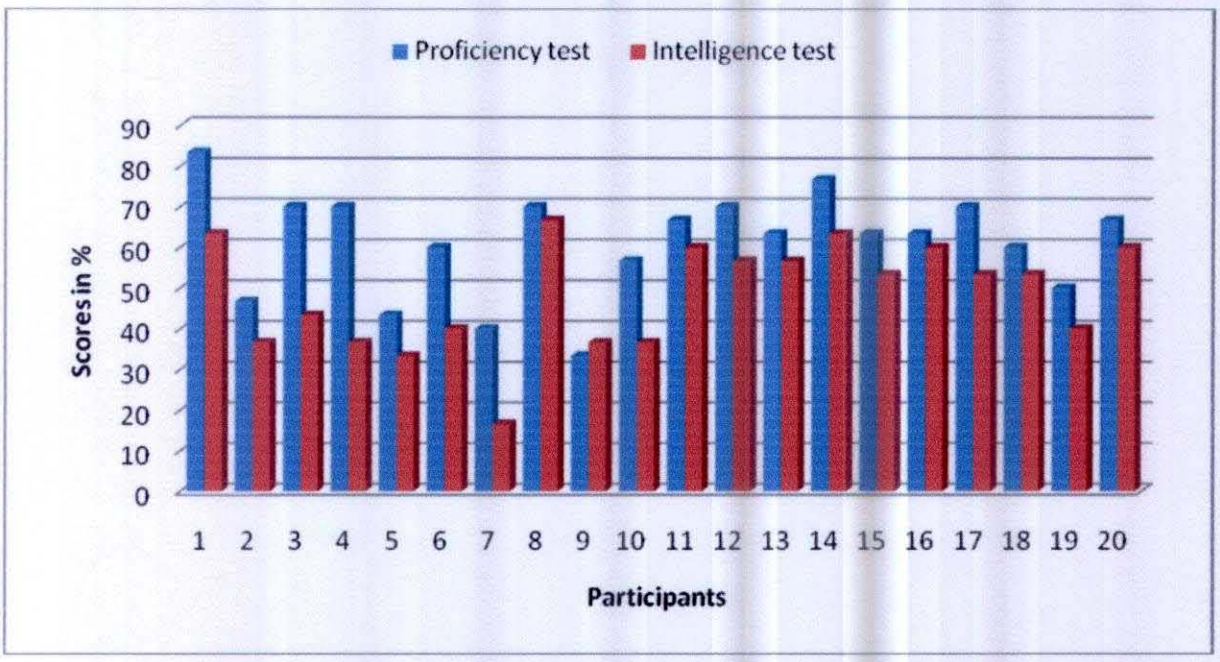


Diagram 4.3: Proficiency test on grammar and intelligence test combined

From the above diagram, it can be seen that in most cases, there is a relationship between the participants' performance in the intelligence test and in the proficiency test on grammar. In most cases participants who scored higher got higher in both the tests and who scored lower got lower in both the tests. Columns that are higher are higher for both the cases and columns that are lower are lower for both the cases. It shows that there is a relationship between the participants' intelligence and the rate of their acquistion of formal grammar of English.

4.1.4 Correlation analysis:

Correlation analyzes the relationship between variables whether they are related or not. It is measured by Pearson's correlation coefficient and is denoted by *r*.

$$r = \frac{\sum_{i=1}^{n} x_i y_i - n\bar{x}\bar{y}}{\sqrt{\left(\sum_{i=1}^{n} x_i^2 - n\bar{x}^2\right)\left(\sum_{i=1}^{n} y_i^2 - n\bar{y}^2\right)}}$$

r lies between -1 and +1. Positive values of *r* denote that there is a positive relation between the variables that is if one variable increases, another will also increase and in one variable decreases another will decrease. A value of +1 indicates that there is perfect positive correlation between the variables. On the other hand, negative values of *r* denote that there is a negative relation between the variables meaning that if one variable increases, another will decrease and if one variable decreases, another will increase. A value of -1 indicates that there is perfect negative correlation between the variables. Values that are more than 0.6 indicate a strong relationship whereas values that are less than 0.5 indicate a weak relationship between the variables. A value of 0 means there is no relation between the variables (Gupta, 2005).

In the following table, the scores obtained by the participants in the proficiency test and intelligence test have been analyzed in terms of correlation coefficient. Here, X denotes scores obtained by the participants in the proficiency test in percentage and Y denotes scores obtained by the participants in the intelligence test in percentage.

Proficiency test, Xi	Intelligence test, Yi	X_i^2	Y_i^2	XiYi
83.33	63.33	6943.889	4010.689	5277.289

46.67	36.67	2178.089	1344.689	1711.389
70	43.33	4900	1877.489	3033.1
70	36.67	4900	1344.689	2566.9
43.33	33.33	1877.489	1110.889	1444.189
60	40	3600	1600	2400
40	16.67	1600	277.8889	666.8
70	66.67	4900	4444.889	4666.9
33.33	36.67	1110.889	1344.689	1222.211
56.67	36.67	3211.489	1344.689	2078.089
66.67	60	4444.889	3600	4000.2
70	56.67	4900	3211.489	3966.9
63.33	56.67	4010.689	3211.489	3588.911
76.67	63.33	5878.289	4010.689	4855.511
63.33	53.33	4010.689	2844.089	3377.389
63.33	60	4010.689	3600	3799.8
70	53.33	4900	2844.089	3733.1
60	53.33	3600	2844.089	3199.8
50	40	2500	1600	2000
66.67	60	4444.889	3600	4000.2
ΣX_i =1223.33	ΣY_i =966.67	ΣX_i^2 =77921.98	ΣY_i^2 =50066.53	$\Sigma X_i Y_i$ =61588.68

Table 4.3: Correlation between grammatical proficiency and intelligence

$$r = \frac{61588.68 - 20*61.17*48.33}{\sqrt{(77921.98 - 20*3741.8)(50066.53 - 20*2335.8)}}$$

So, r = 0.77

As the researcher mentioned above, a positive rate of correlation means that there is a positive relation between the variables. As the value of *r* in this case is positive, it can be said that there is a positive relation between intelligence and grammatical proficiency of the participants. It means when intelligence is high grammatical proficiency in other words the amount of acquisition will also be high and vice versa. Moreover, as the value is more than 0.6, there is a strong relationship between these two variables.

The following scatter diagram represents the correlation between the two variables.

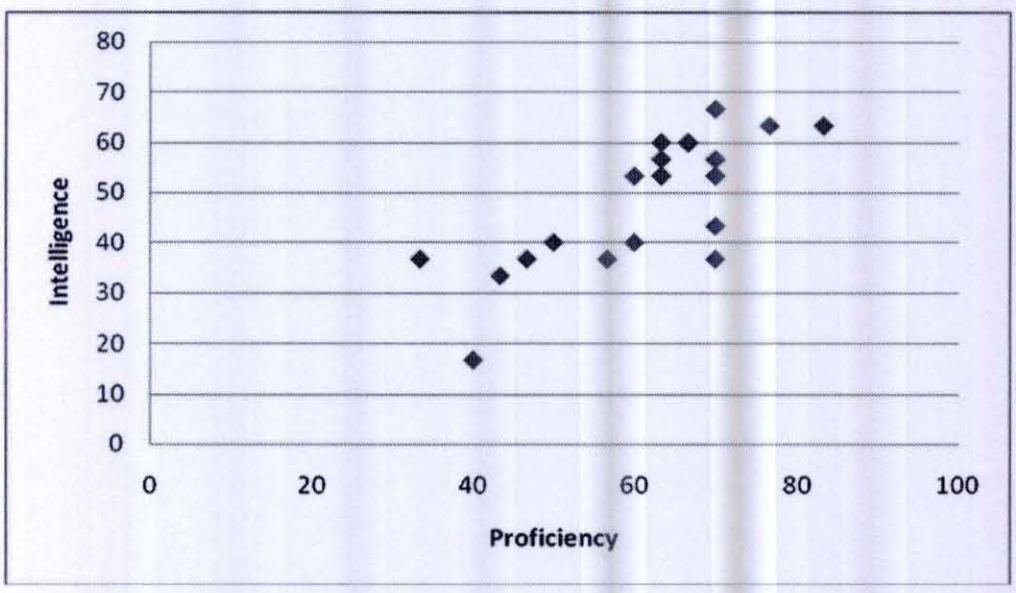


Diagram 4.4: Correlation between grammatical proficiency and intelligence

If a straight line is drawn in a scatter diagram and most of the dots fall near the line then it can be said that there is a relationship between the variables. In the above

Therefore, it can be said that there is relationship between intelligence and the amount of acquisition of the grammatical structures of a second language from the scatter diagram as well. This means, learners with higher intelligence will acquire the formal grammar and structures of a second language more easily than learners with lower intelligence.

4.2 Presentation and analysis of interviews and intelligence test:

4.2.1 Interviews:

The interviews have been scored based on five criteria. These are pronunciation, grammar, vocabulary, fluency and comprehension. The researcher rated the interviews in terms of each of these criteria and scored them out of five. After getting the scores, the researcher calculated their average and then found out the percentage of the scores. The scores that the participants obtained in the interviews have been shown in the following table.

Participants	Pronunciation	Grammar	Vocabulary	Fluency	Comprehension	Average	%
1	3	4	3	3	4	3.4	68
4	3	3	2	3	4	3	60
5	2	3	2	3	3	2.6	52
7	2	1	1	2	1	1.8	28
8	3	3	3	3	4	3.2	64
13	3	3	3	4	3	3.2	64
14	3	3	3	3	4	3.2	64
15	4	2	3	4	4	3.4	68
16	3	2	4	3	3	3	60

17	3	1	2	1	3	2	40

Table 4.4: Scores of interviews

The above table shows the interview results of 10 of the participants from the above 20 participants who took grammatical proficiency and intelligence tests. Samples have been taken from the 20 participants because there was not enough time to interview all the participants individually.

The following diagram represents the scores.

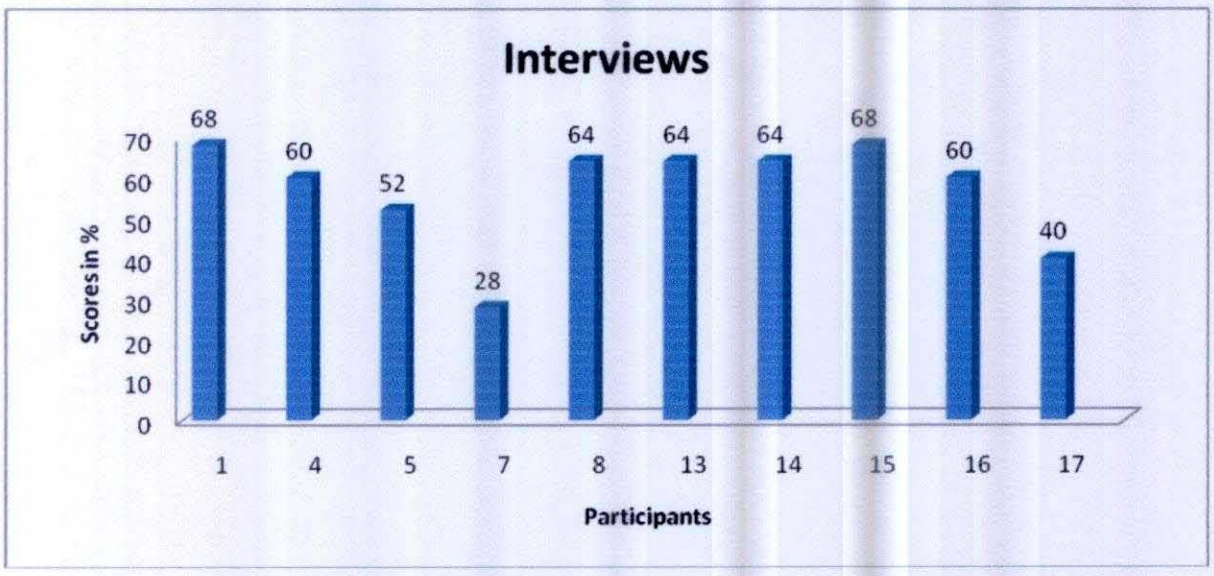


Diagram 4.5: Scores of interviews

4.2.2 Intelligence test and interview combined:

The combined column diagram representing the scores obtained by the participants in the intelligence test and in the interviews that shows the relationship

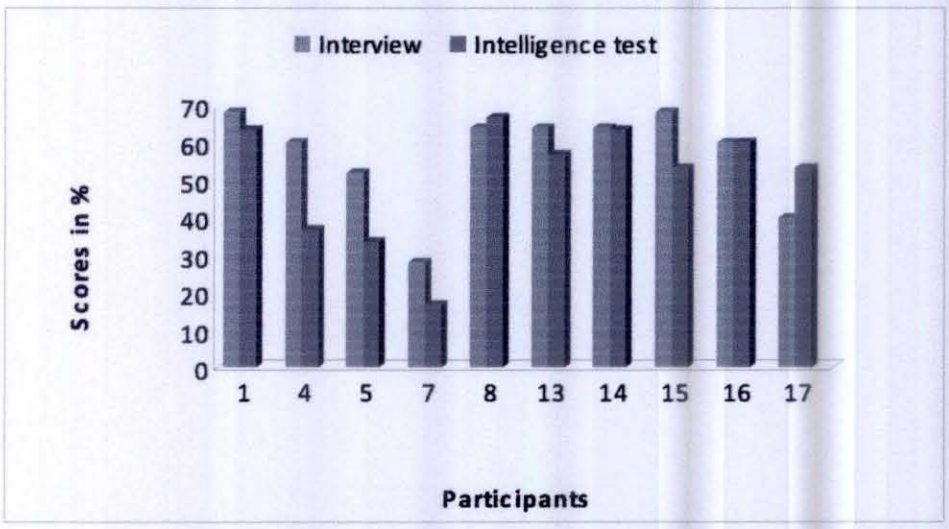


Diagram 4.6: Intelligence test and interview combined

The above diagram shows that there is also a relationship between the scores of the intelligence test and the scores of the interviews. In most cases, where columns are higher are higher for both cases and where columns are lower are lower for both cases. However, only in two cases, the columns representing the scores of the intelligence tests are the same whereas one of their related columns representing the scores of the interviews is lower and another one is higher. The results of the above diagram suggest that there is a relation between the participants' intelligence and their communicative competence.

4.2.3 Correlation analysis:

In this case, X denotes scores obtained by the participants in the interviews and Y denotes scores obtained by them in the intelligence test.

Interview, Xi	Intelligence test, Yi	X_i^2	Y_i^2	XiYi
68	63.33	4624	4010.689	4306.44

52	33.33	2704	1110.889	1733.16
28	16.67	784	277.8889	466.76
64	66.67	4096	4444.889	4266.88
64	56.67	4096	3211.489	3626.88
64	63.33	4096	4010.689	4053.12
68	53.33	4624	2844.089	3626.44
60	60	3600	3600	3600
40	53.33	1600	2844.089	2133.2
ΣX_i = 568	ΣY_i = 503.33	ΣX_i^2 = 33824	ΣY_i^2 =27699.4	$\Sigma X_i Y_i$ =30013.08

Table 4.5: Correlation between communicative competence and intelligence

$\bar{X}$ = 56.8 $\bar{Y}$ = 50.33

$$r = \frac{30013.08 - 10*56.8*50.33}{\sqrt{(33824 - 10*3226.24)(27699.4 - 10*2533.1)}}$$

So, r = 0.74

The above correlation also shows a positive strong relationship between the variables. It means if intelligence of the participants increase, their communicative competence will also increase and if intelligence decreases, their communicative competence will decrease as well. This means learners with higher intelligence will be more competent while using the language for communicative purpose.

The following scatter diagram represents the relation.

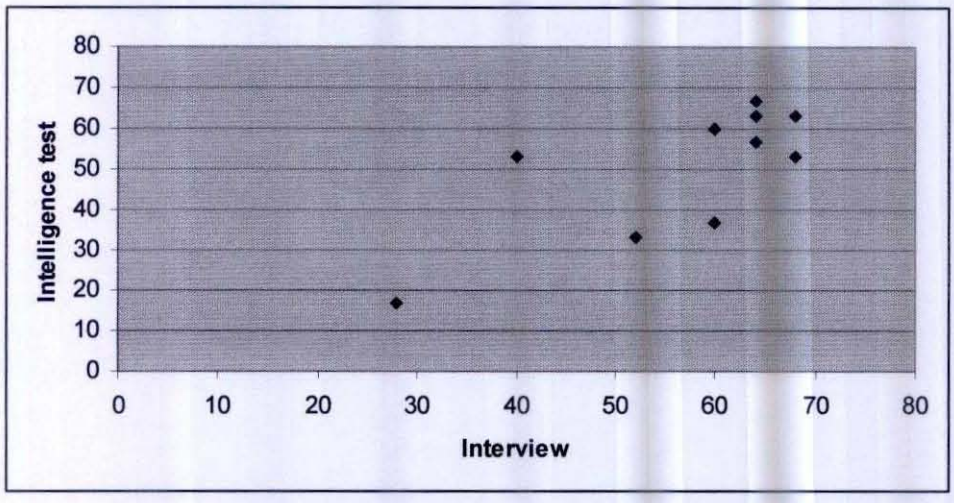


Diagram 4.7: Correlation between communicative competence and intelligence

If a straight line is drawn in the above scatter diagram, most of the dots will fall near the line. Only two dots will be far from the line. Therefore, the scatter diagram also shows a positive strong relationship between intelligence and communicative competence of the participants on the language.

4.3 Discussion:

The above analysis of the scores obtained by the participants in the different tests and interviews confirms that there is a positive relationship between a person's intelligence and the amount of his second language. It means a person who is more intelligent will learn a language more easily than a person who is less intelligent. In other words, intelligence positively affects a person's acquisition of a second language.

In chapter two, it has been mentioned in the existing literatures on the topic that intelligence affects the formal learning of a second language but does not have any effect on the learners' development of communicative competence. However, the present study has found that intelligence affects both the acquisition of the formal structure and

the participants' first language is Bangla and all of them have used Bangla for communicative purpose until entering the university. While using English for communication after entering the university, they try to take help of formal grammar while speaking in the language. They structure the sentences in their speech keeping the grammar and structural rules of the language in mind and as a result, the formal grammar influences their speech. In order to understand the influence better, the scores obtained by them in the proficiency test of grammatical structure and interview have been represented in the following diagram.

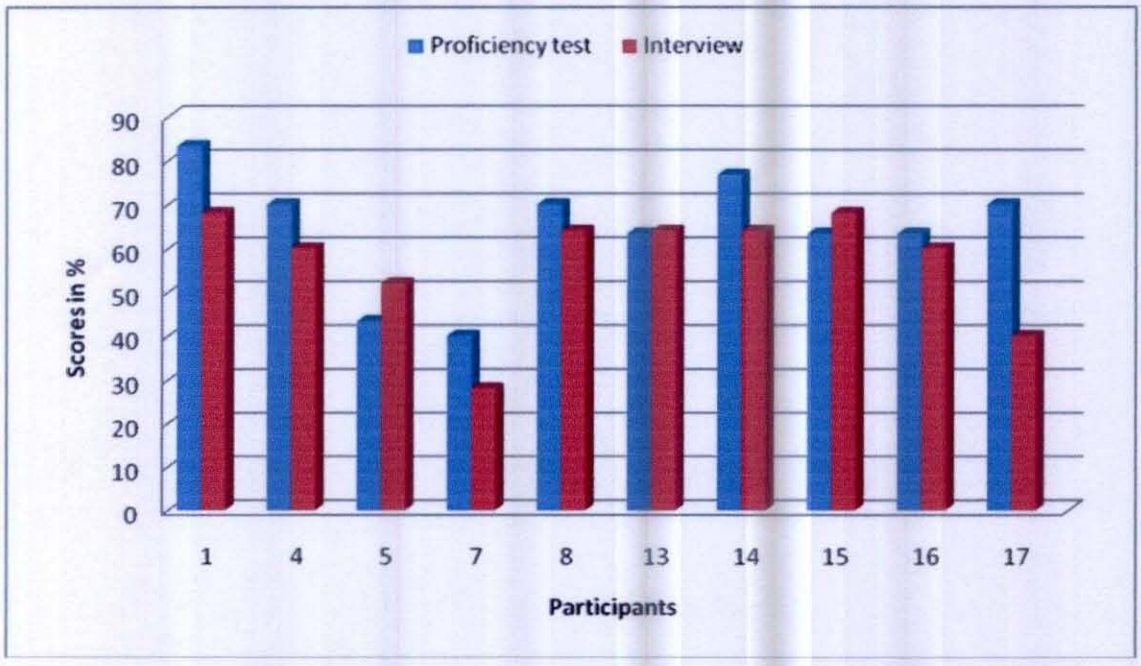


Diagram 4.8: Scores of proficiency test and interviews

The above diagram shows that in most of the cases there is a relation between the participants' structural proficiency and communicative competence. It justifies the researcher's claim that the structural knowledge of the participants influences their

in a similar way where they are taught to translate every sentence from Bangla to English. This is why their knowledge of grammatical structure affects their communication. Therefore, as all the factors are related to each other, it is natural that intelligence will affect the factors more or less similarly. This could be a reason why, in the present study intelligence has been found to have affected the acquisition of English as a second language in both ways. The result does not exactly match the existing researches because in those cases the method of teaching a second language is different from Bangladeshi context.

Chapter five: Conclusion

The previously illustrated analysis of the scores of proficiency test of grammatical structure and intelligence test obtained by the participants show that there is a relationship between these two variables. Participants for whom intelligence is high, proficiency on the language's formal grammar is also high. This means that intelligence affects acquisition of a second language at structural level. Besides, the analysis of the scores obtained by the participants in intelligence test and interview show the relationship between these two. Results show that intelligence affects the development of the learners' communicative competence in Bangladeshi context. Therefore, it can be said that intelligence has an effect on second language acquisition.

The reason behind the effect of intelligence on the acquisition of English grammar is that while learning the grammatical structures of a language learners approach it in an analytical way. They analyze the different structures of the language and try to understand them. In this way, their intelligence caters their understanding of the language. On the other hand, intelligence affected the learners' progress of communicative skill probably because in this case all the learners are from Bangla medium and have learned to use the language in a way where they develop a sentence by keeping the structures in mind. This is why, they heavily relied on structures for both grammar test and communicative test. This is probably the reason why intelligence has been found to affect the acquisition of grammatical structures along with the development of communicative competence.

However, the method of this study is not free from some limitations. The major

which is a small number for conducting a research. Moreover, only ten of them, which are even smaller, could be chosen for individual interview because of time constraint. Besides, it was difficult to manage enough time to interview the participants individually. As a result, the duration of every interview was only five to six minutes. Furthermore, she could cover enough private universities of Dhaka and could manage students from only five universities. If there were enough time for the study the researcher could overcome these limitations.

In conclusion, the research has revealed the fact that intelligence affects second language acquisition in terms of both structural and communicative means if the language is taught in a formal manner as it is taught in our country.

Reference:

Brown, J. D. (1988). *Understanding research in second language learning: a teacher's guide to statistics and research design.* (3rd ed.). United Kingdom: Cambridge University Press.

Dörnyei, Z. (2008). *The psychology of the language learner: individual differences in second language acquisition.* New Jersey: Taylor &Francis e-Library.

Fernández-Corugedo, S. G. (Ed.). (1999). *Essays in English language teaching: a review of the communicative approach.* Spain: Servicio de Publicaciones.

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. New York: Basic Books.

Genesee, F. (1976), THE ROLE OF INTELLIGENCE IN SECOND LANGUAGE LEARNING. *Language Learning*, 26(2), 267–280. Retrieved on 5 October, 2010. doi: 10.1111/j.1467-1770.1976.tb00277.x

Gupta, S. P. & M. P. Gupta. (2005). *Business Statistics* (14th ed.). New Delhi: Sultan Chand & Sons.

Harley, B. (Ed.). (1990). *The Development of second language Proficiency*. New York: Cambridge University Press.

Harris, D. P. (1969). Testing English as a second language. Singapore: McGraw-Hill Book Company.

Hornberger, N. H. & David C. (1997). *Research methods in language and education.* (Vol. 8). The Netherlands: Kluwer Academic Publishers.

Hughes, A. (2003). *Testing for Language Teachers* (2nd ed.). United Kingdom: Cambridge University Press.

Intershop.it. Retrieved on 29 October, 2010. <http://www.intershop.it/intelligence_test_iq.htm>.

Janik, D. S. (2004). *A neurobiological theory and method of language acquisition.* Germany :LINCOM GmbH.

Lightbown .P. and N. Spada. (1993). *How Languages are Learned.* Oxford: Oxford University Press.

Logsdon, A. (n.d.), *Intelligence Quotient Testing - Measuring the Intelligence Quotient.* Retrieved on 3 November, 2010.

Mackey, A. & Susan, M. G. (2005). *Second language research: methodology and design.* New Jersey: Routledge.

McLaughlin, B. (1987). *Second-Language Acquisition in Childhood: School-Age Children.* (2nd Ed., Vol. 2) New Jersey: Routledge.

Nunan, D. (2002). *Research Methods in Language Learning*. United Kingdom: Cambridge University Press.

Seliger, H. W. & Shohamy, E. (2003). *Second Language Research Methods.* Oxford: Oxford University Press.

Teepen, J. (2005). n the Relationship between Aptitude and Intelligence in Second Language Acquisition. *Teachers College, Columbia University Working Papers in TESOL & Applied Linguistics.* Vol.4. Retrieved on 13 September, 2010. <http://journals.tc-library.org/index.php/tesol/article/view/69/75>.

Transparent Language. Retrieved 29 October, 2010. <http://www.transparent.com/learn-english/proficiency-test.html>.

Appendix A: Proficiency test

Name:

Proficiency test

1. I _____ the street when I saw the car, so I didn't move.

A. Was going to cross
B. Crossed
C. Was crossing
D. Used to cross

2. Eli's hobbies include jogging, swimming, and _____.

A. To climb mountains
B. Climb mountains
C. Climbing to mountains
D. Climbing mountains

3. Mr. Haque requests that someone _____ the data by fax immediately.

A. Sent
B. Sends
C. Send
D. To send

4. I am sorry to hear that Nazmul and Kamrul have _____. They were such good friends.

A. Dropped against
B. Fallen out
C. Dropped out
D. Fallen against

5. How much time _____ to boil an egg?

A. Do you take
B. Does take
C. Does take you
D. Does it take you

6. The concert will begin _____ fifteen minutes.

A. In
B. On
C. With
D. About

7. I have only a _____ Christmas cards left to write.

A. Few
B. Fewer
C. Less
D. Little

8. Each of the Olympic athletes _____ for months, even years.

A. Have been training
B. Were training
C. Has been training
D. Been training

9. Anthropologists _____ within their environments and evaluate the adaptations they have made.

A. Who study societies are
B. Study societies
C. Societies are studied
D. Their societies are studied

10. That's got nothing to do _____ me; it's absolutely none of my business.

A. For
B. With
C. In
D. About

11. When I graduate from college next June, I _____ a student here for five years.

A. Will have been
B. Have been
C. Will be
D. Will have

12. Ms. Nilima _____ rather not invest that money in the stock market.

A. Has to
B. Could
C. Would
D. Must

13. Many cultures have special ceremonies to celebrate a person's _____ of passage into adulthood.

A. Right
B. Rite
C. Writ
D. Write

14. The rate of _____ has been fluctuating wildly this week.

A. Money
B. Bills
C. Coins
D. Exchange

15. After several hours on the road they became _____ to the fact that they would never reach the hotel by nightfall.

A. Disillusioned
B. Resigned
C. Depressed
D. Dejected

16. Jerry Seinfeld, the popular American comedian, has his audiences _____.

A. Putting too many irons in the fire
B. Keeping their noses out of someone's business
C. Rolling in the aisles
D. Going to bat for someone

17. She went _____ her notes before the exam to try to learn every last detail.

A. Over
B. Round
C. Into
D. Through

18. The rather humid climate in no way _____ from the beauty of the place.

A. Attracts
B. Protracts
C. Detracts
D. Subtracts

19. The critics had to admit that the ballet _____ was superb.

A. Procrastinate
B. Performance
C. Piece
D. Psychosomatic

20. I am awfully sorry but I'll have to ask you to pay because "I'm out of cash." Here the quoted expression means

A. I have no money
B. I have no card
C. I have no bank
D. I have no cheque

21. You have a limited number of minutes to answer the test and you've spent 3 minutes so "you are out of time." Here the quoted expression means

A. You've used out your time
B. You've used for your time
C. You've used for your time
D. You've used up your time

Which of the underlined words is incorrect?

22. Mr. Khan <u>does</u> not take <u>critical</u> of <u>his</u> work very <u>well</u>.

A. Does
B. Critical
C. His
D. Well

23. <u>The</u> majority <u>to</u> the <u>news</u> is about <u>violence</u> or scandal.

A. The
B. To
C. News
D. Violence

24. Rajib <u>swimmed</u> one <u>hundred</u> laps <u>in</u> the pool <u>yesterday</u>.

A. Swimmed
B. Hundred
C. In
D. Yesterday

25. Fahim <u>intends</u> to <u>starting</u> his own <u>software</u> business in a <u>few</u> years.

A. Intends
B. Starting
C. Software
D. Few

Read the following passage and answer the questions.

Directions to Erik's house

Leave Interstate 25 at exit 7S. Follow that road (Elm Street) for two miles. After one mile, you will pass a small shopping center on your left. At the next set of traffic lights

26. What is Erik's address?

A. Interstate 25

B. 2 Elm Street

C. 3rd Erika Street

D. 33 Maple Drive

27. Which is closest to Erik's house?

A. The traffic lights

B. The shopping center

C. Exit 7S

D. A greenhouse

Anna Szewcyzk, perhaps the most popular broadcaster in the news media today, won the 1998 Broadcasting Award. She got her start in journalism as an editor at the *Hollsville County Times* in Missouri. When the newspaper went out of business, a colleague persuaded her to enter the field of broadcasting. She moved to Oregon to begin a master's degree in broadcast journalism at Atlas University. Following graduation, she was able to begin her career as a local newscaster with WPSU-TV in Seattle, Washington, and rapidly advanced to national television. Noted for her quick wit and trenchant commentary, her name has since become synonymous with *Good Day, America!* Accepting the award at the National Convention of Broadcast Journalism held in Chicago, Ms. Szewcyzk remarked, "I am so honored by this award that I'm at a total loss for words!" Who would ever have believed it?

28. What is the purpose of this announcement?

A. To invite people to the National Convention of Broadcast Journalism

B. To encourage college students to study broadcasting

C. To recognize Ms. Szewcyzk's accomplishments

D. To advertise a job opening at the *Hollsville County Times*

29. The expression "to become synonymous with" means

A. To be the same as

B. To be familiar with

C. To be in sympathy with.

D. To be discharged from.

30. What was Ms. Szewczyk's first job in journalism?

A. She was a T.V. announcer in Washington

B. She was a newscaster in Oregon

C. She was an editor for a newspaper in Missouri

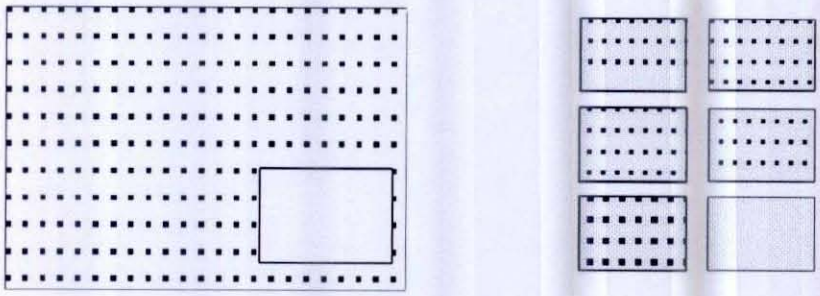
D. She was a talk show host in Chicago

Appendix B: Intelligence test

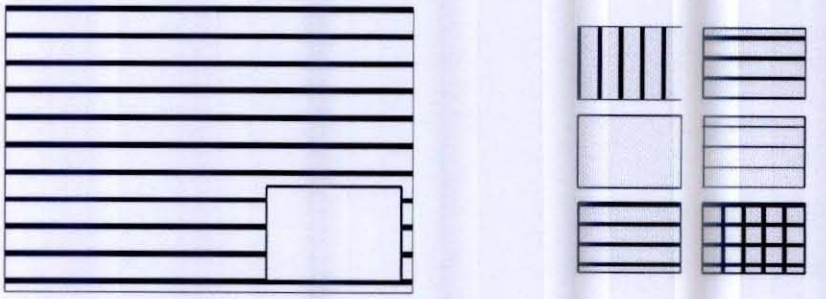
Name:

Intelligence test

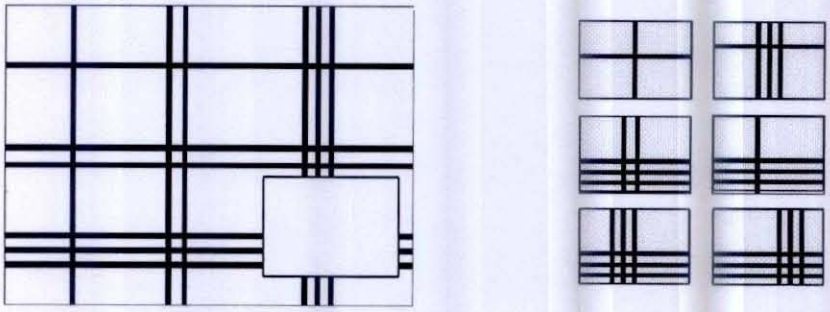
1.



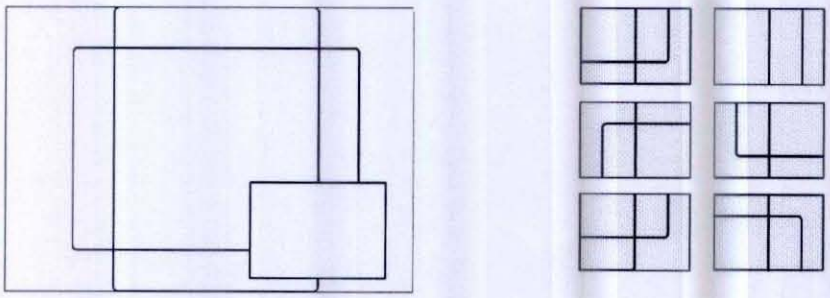
2.



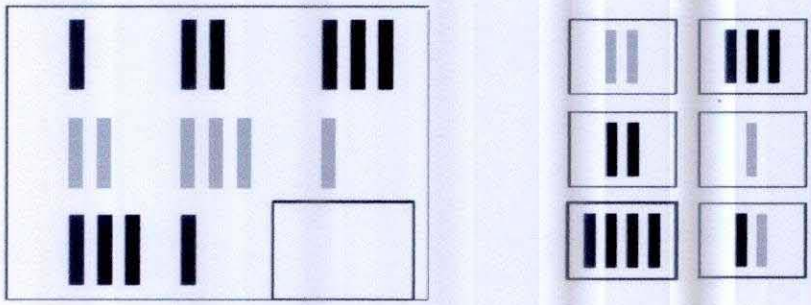
3.



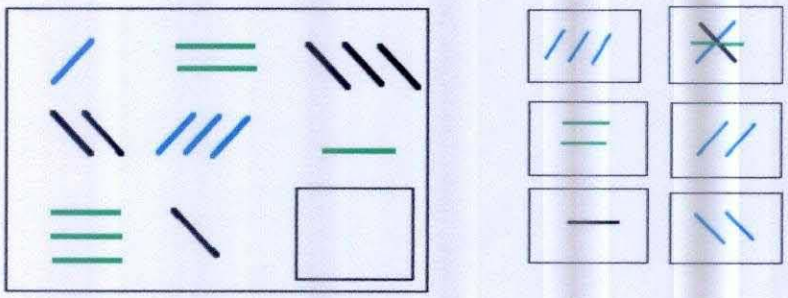
4.



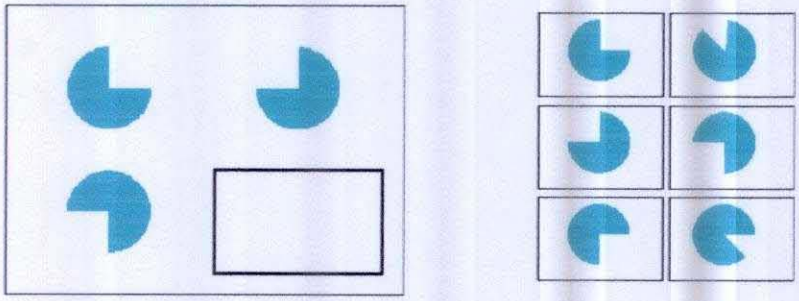
5.



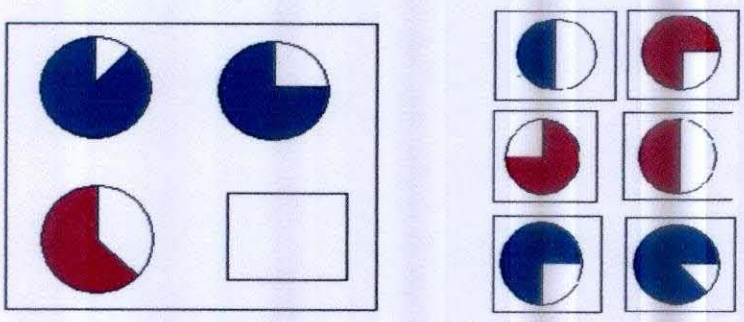
6.



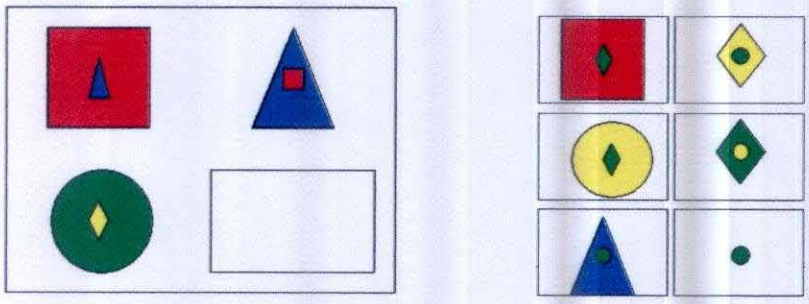
7.



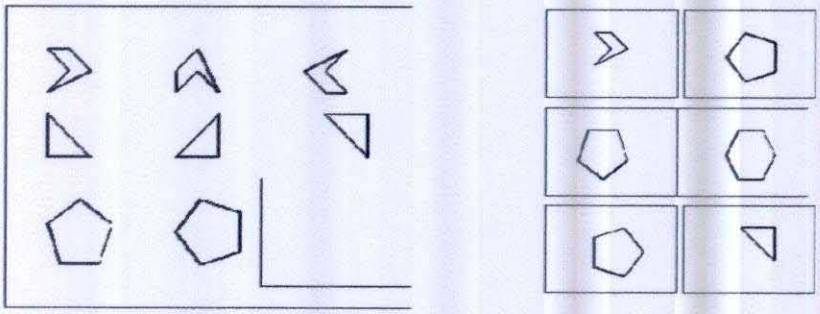
8.



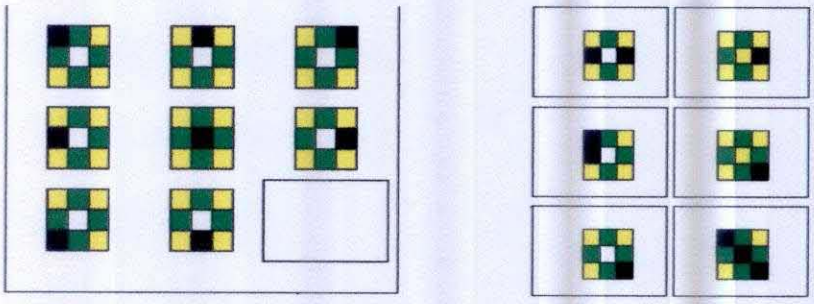
9.



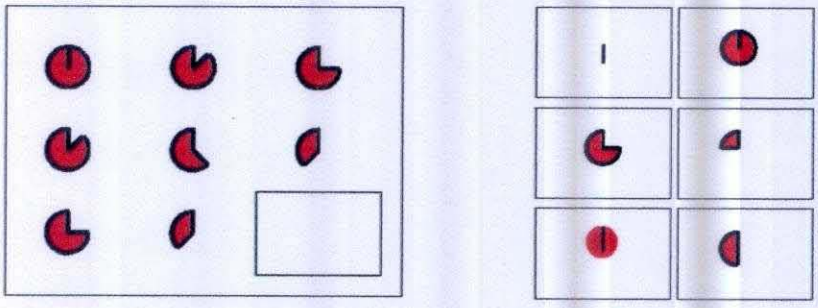
10.



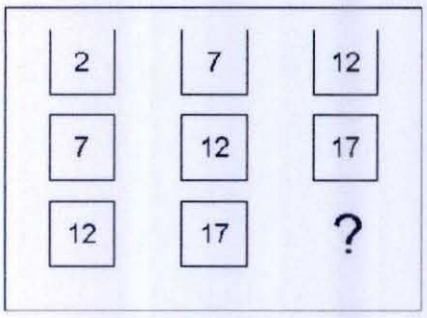
11.

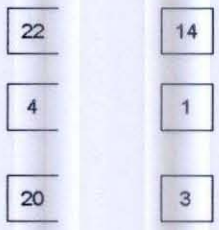


12.

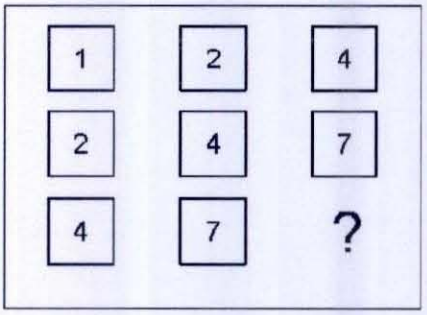


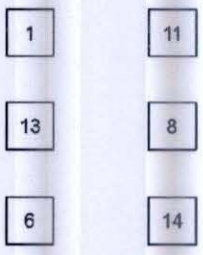
13.



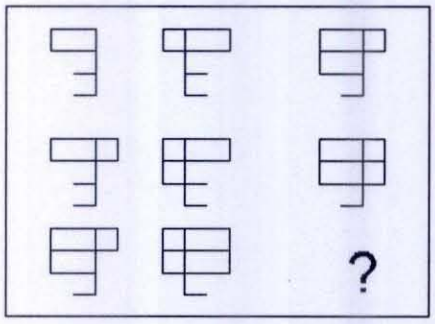


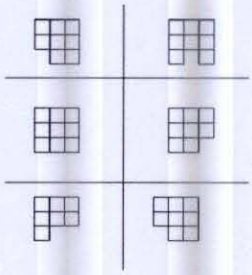
14.



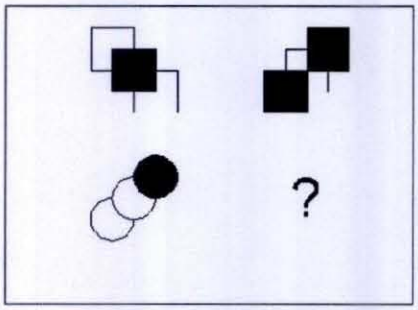


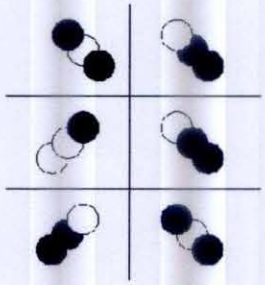
15.



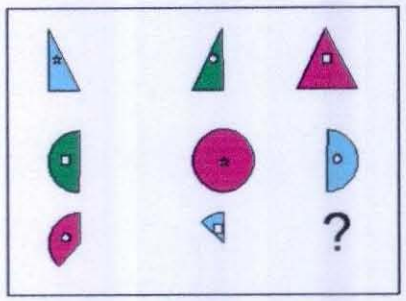


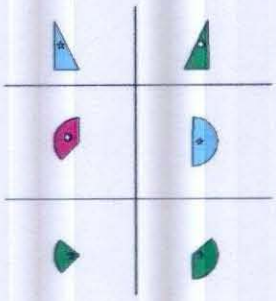
16.



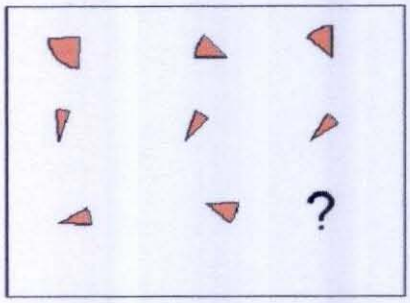


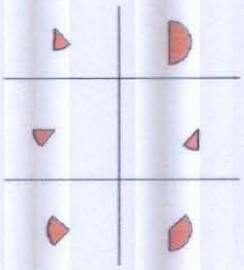
17.



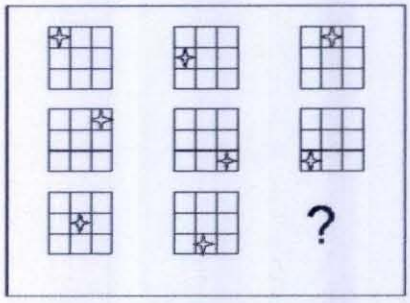


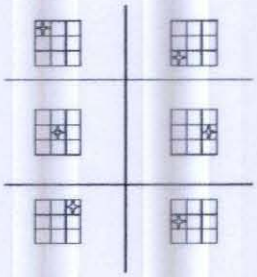
18.



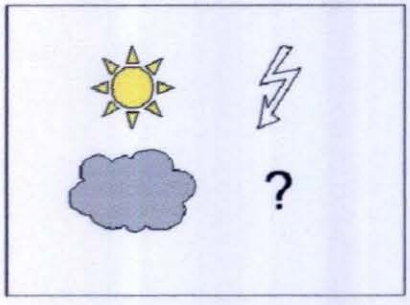


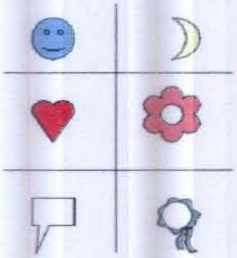
19.



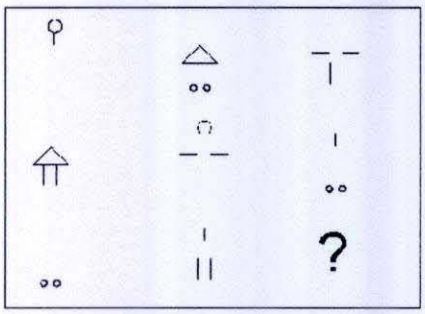


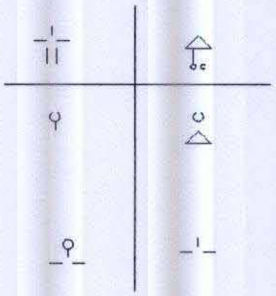
20.



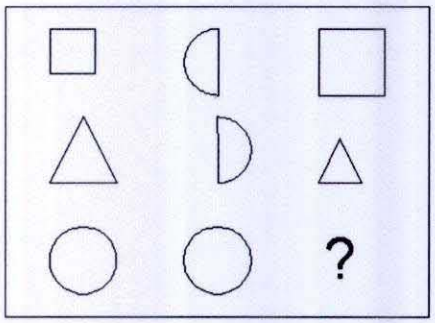


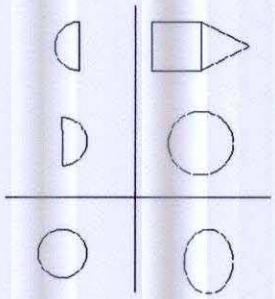
21.



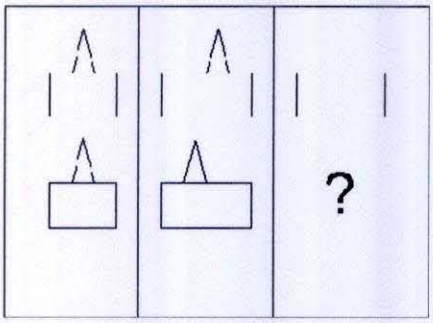


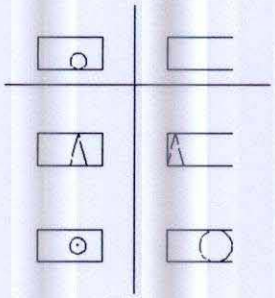
22.



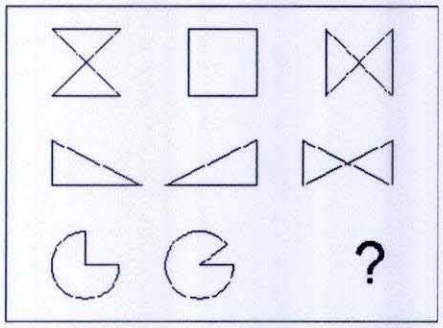


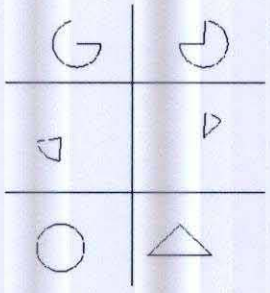
23.



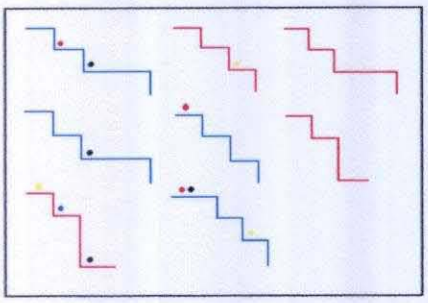


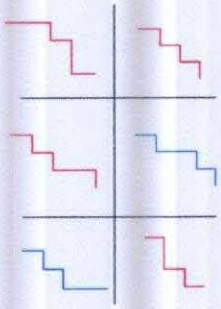
24.



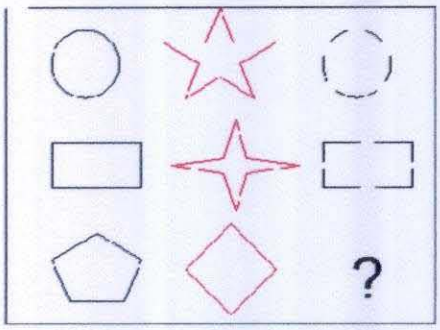


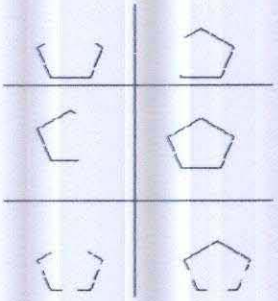
25.



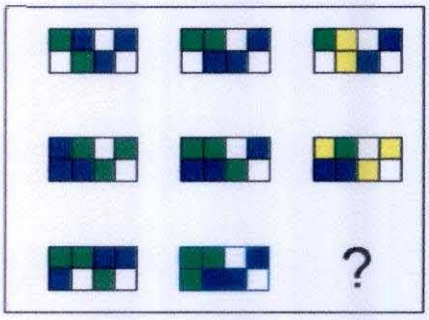


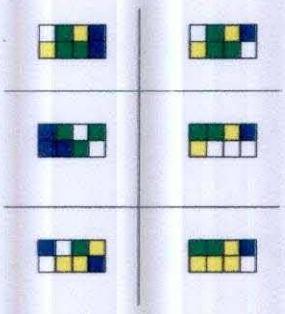
26.



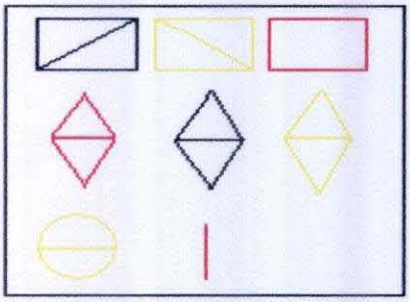


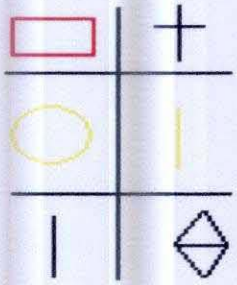
27.



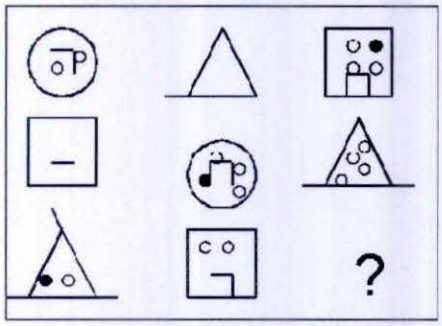


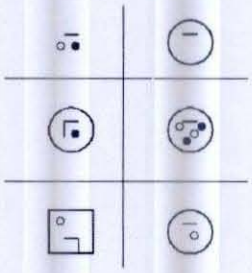
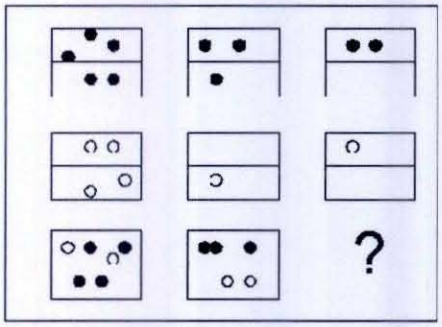
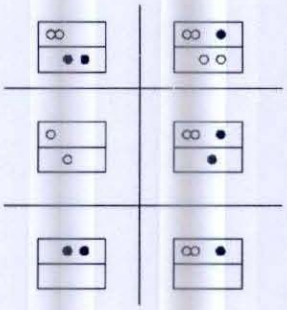
28.





29.





30.