

## CHAPTER I

### INTRODUCTION

#### I.1 Background of the Study

As we are approaching the year of 2000, our government is facing the so-called global era where it would seem to be impossible for a country not to depend on another. It is a fact that information controls all aspects of our life, as it holds an important role in the global era. Without information, one country may have difficulties in developing and in competing with others. In exchanging information with others, obviously we use language as a tool of communication. Since only English is the most widely used in the world, it is called an International Language. Thus, we find that English, now, is taught in schools; from elementary until tertiary levels, by our government as the very early preparation.

School is an educational institute. There is a number of educational levels which are in accordance with the ages of students, for instance, elementary level is for elementary school students, secondary level is for junior and senior high school students, and tertiary level is for those who want to reach higher education. Each level teaches many things to their students both skill and knowledge. In elementary level, in this case is elementary school, teachers teach the very basic skills and knowledge. And in the higher levels, the students get higher levels of skills and knowledge.

In Indonesia, in the elementary school teachers teach basic knowledge larger than skill. For example, they teach easy and simple mathematics, general natural and social sciences, and basic level of mastery of language - in this case Indonesian, the regional language and also English - and so on. Then, in the secondary level - junior and senior high schools - the students are taught a great deal of things deeper and broader than in elementary schools. They are taught about specific knowledge, for example, natural sciences which are mainly divided into physics, chemistry and biology, social

sciences which consist of history, economics, and so on. Similarly, the mastery of language in secondary levels, especially English also attains a higher level than that in the elementary school. In the elementary school, the teachers teach their children simple English. That is the introduction of the use of simple English sentence patterns that are used in daily activities.

As their primary duty, teachers in every single school, especially high school, try as hard as they can do to teach their students all subjects which are primarily considered important such as mathematics, natural sciences, foreign language, and perhaps others. They want their students to be well-provided for the future. This is a heavy duty especially for the senior high school teachers, because they must give their students a very strong basic knowledge. After the students graduate from senior high school, they must decide their future, whether they want to continue their study to the higher levels such university or to find a job immediately. Therefore, the students are asked to know the subjects and, moreover, to master them.

Although the teachers teach their students in the same way, use the same method, teach the same subjects at the same amount of time, the result is different on each student. Some students can achieve good marks in mathematics, physics and others in natural sciences and also in language courses. Some of them can only make high achievements in one subject, for example in physics, but not in language. This phenomenon makes me wonder whether or not it has something to do with the brain as an organ related to the process of thinking.

There is a process of thinking in human brain namely behaviorism, which is developed by Bloomfield (Palmer, 1976:56). The process in behaviorism comprises stimulus and response both of which are controlled by the brain. Actually, the human brain as the processing unit is divided into two symmetrical parts the so-called **left** and **right hemisphere**. Each hemisphere has a function to control all activities of human beings. In brief, the right hemisphere controls particular cognitive functions such as music, pattern recognition, and so on. And the left hemisphere controls particular cognitive functions

like analytic reasoning, language, arithmetical and so on.

Since the courses in natural sciences, mathematics and English which correspond respectively to analytic reasoning, arithmetical and language are controlled by the same hemisphere, through these subjects, I want to figure out the correlation of the score of each of these subject. And to see whether the students have more or less the same ability in these respective subjects.

## **I.2 Statement of the Problem**

Based on the background of the study, I attempt to provide possible explanations in order to answer the following questions as the statement of the problem:

1. Is there any correlation of the scores of the courses in natural sciences and mathematics to those of English?

Ho: There is no correlation of the scores of courses in natural sciences, mathematics and English.

H<sub>1</sub>: There is a correlation of the scores of courses in natural sciences, mathematics and English.

2. If there is a correlation, is it a positive or negative one?
3. How do the scores correlate with those of English?

### **I.3 Objective of the Study**

By doing this research, I want to figure out:

1. Whether or not such correlation exists.
2. What kind of correlation it is.
3. How the scores correlate with those of English.

### **I.4 Significance of the Study**

Hopefully, this research will enlarge and broaden our horizon about language acquisition, in general and particularly about the similarity of abilities in natural sciences, mathematics and in language development, especially English as second language acquisition. The

result of this research may become one of some considerations in teaching English as foreign language.

Finally, as the main goal of psycholinguistic observation, this research is expected to give a contribution to those who want to do further research about **lateralization of language** in the brain.

### **I.5 Scope and Limitation**

In this research, I use psycholinguistic study as a tool to seek the answers that I state in *Statement of the Problem*. The study of brain and language is covered in psycholinguistics, especially in neurolinguistics - the subdivision of psycholinguistics.

The subjects of the research are the first grade students of state senior school in Surabaya, for the very reason that they are still at their early stages in receiving lessons and that they do not specialize in certain subjects yet.

The reason for choosing the state senior high schools is because these schools apply the same curriculum from government. Thus, the materials, which

they receive, are the same and so makes the population homogenous.

The location of the study is Surabaya. I choose Surabaya because it is the second biggest city in Indonesia, and has a great number of state senior high schools. Other reason is that Surabaya is a heterogeneous society, so the theory of lateralization, which will be explained later in section I.6, can be generally applied.

The scores of courses in natural sciences, mathematics and English are selected, because from the scores computed by using statistical test, I can get the answer whether there is any correlation or not. The courses of natural sciences, mathematics and English correspond respectively to analytic reasoning, arithmetical and language as described later in I.6.

## **I.6 Theoretical Framework**

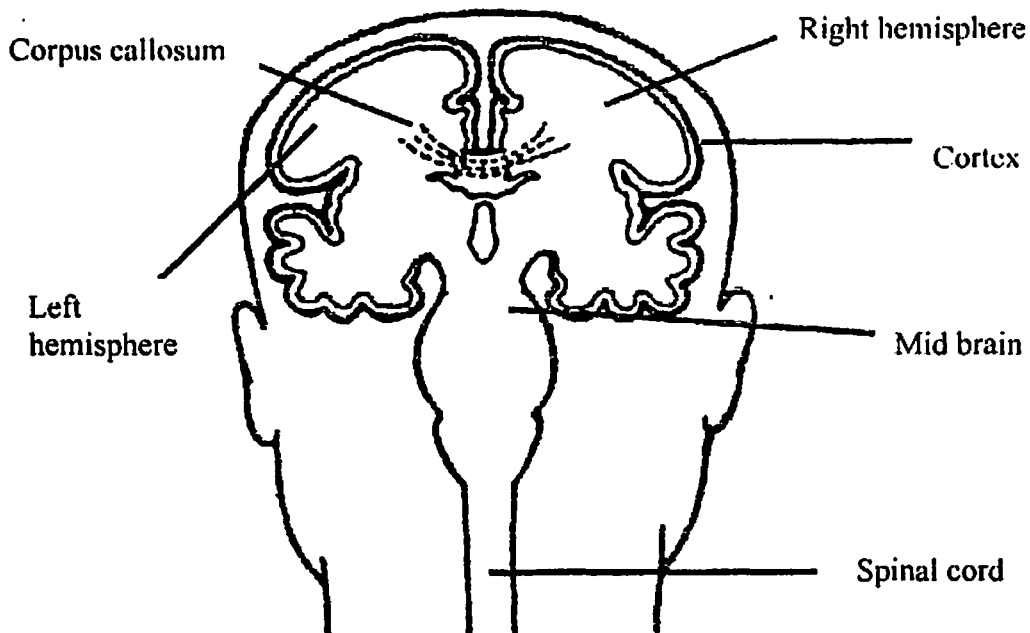
The outside surface of the brain consists of a thin wrinkled mantle of the gray tissue made of millions of neuron that is known as cortex. Many of the cognitive



abilities that differentiate humans from other mammals reside in the cortex. It is not because of the volume, but of the amount of the fold in the cortex.

Brain is divided into two symmetrical **hemispheres**, which are called the **left hemisphere** and **the right hemisphere**. The activities of the two cerebral hemispheres are controlled by corpus callosum (see Figure I.1). The hemispheres are often referred to as separate brain, for they show considerable functional distinctness. The left hemisphere controls the right side of the body and the right hemisphere controls the left side of the body. This operation is called **lateralization**, which is the process of localizing particular function in one hemisphere (O'Grady, et al., 1989:254).

This also occurs in specialized linguistics and perceptual skills. The left hemisphere has responsibility for language, whereas the right hemisphere controls visual and spatial skills. In general, each hemisphere functions to control cognitive function. Table 1.1 shows particular cognitive function controlled by the left and right hemispheres.



**Figure I.1** Human Brain

(Source: O'Grady, et al., 1989.)

In 1860s, Paul Broca found a damage to the specific areas of the left hemisphere resulted in disturbance of spoken language. Comparable damage to the corresponding areas of the brain typically had no effect. Based on the research, Broca stated that our ability in speaking was focused in the left hemisphere (Subyakto, 1992:109).

**Table I.1** Hemisphere Dominance

Source: O'Grady et al., 1989.

Left Hemisphere	Right Hemisphere
Language	Perception of non-linguistic sound
Analytic reasoning	Music
Temporal ordering	Visual and spatial skills
Reading and writing	Holistic reasoning
Arithmetical	Pattern recognition

The evidence of Wada's test in 1949 (Graham, 1990:7) that he injected sodium amytal into the left carotid artery also supports this. The effect was that there was temporarily disturbance in individual's ability of speaking and perceiving speech.

According to the description above, I classify natural sciences consisting of biology, chemistry and physics in the same category as analytic reasoning, mathematics course the same category as arithmetical, and finally, English the same as language. Three of these courses are controlled by the same hemisphere; the left one, so I might say that there is a possibility of the existence of correlation among them.

## I.7 Method of the Study

To get a precise result about the correlation among the scores, the data is analyzed by using a quantitative analytic method or statistical computation.

### I.7.1 Definition of Key Term

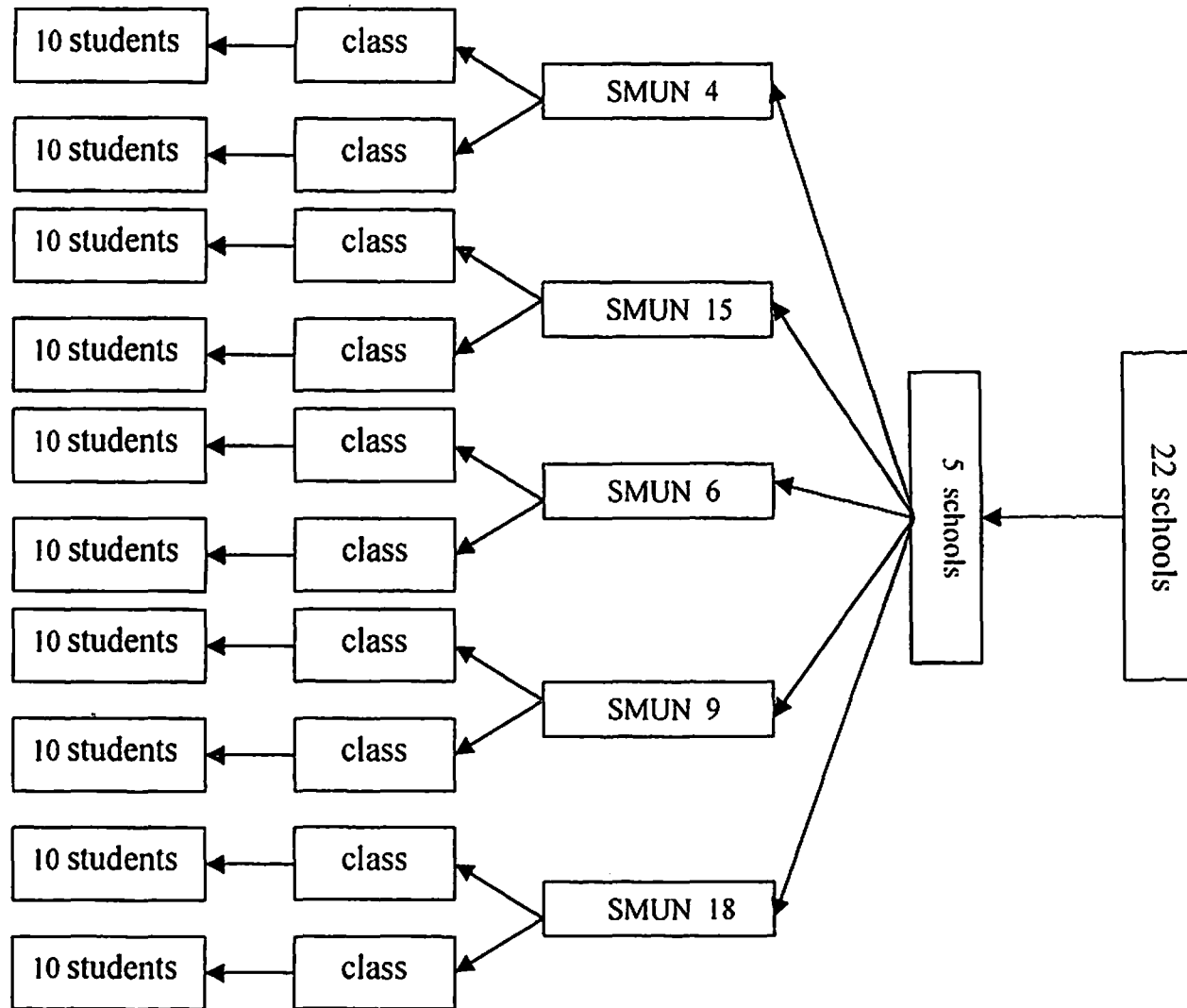
1. Lateralization is the localization of cognitive and perceptual function in particular hemisphere of the brain (O'Grady et. al., 1989:254).
2. Right hemisphere is a right side of human brain which controls the abilities such as music, holistic reasoning, etc.
3. Left Hemisphere is a left side of human brain which controls the abilities such analytic reasoning, language, etc.
4. Correlation is an associative relationship between two or more variables.

### 1.7.2 Population and Sample

The population of this research are the first-grade students of state senior high schools. Since the population can be hundreds or perhaps thousands, then, I choose some of the students of some of the 22 state senior high schools located in Surabaya. Another reason in choosing this population is that all the state schools have the same curriculum and because they are freshmen in their schools.

A number of samples is chosen for the reason that there are so many students involved in this research. The sample size is 100 students picked out of the population which is obtained by using multi-stage cluster sampling. It is believed that the data is valid because it is taken randomly, although in stages. From 22 schools, I pick out 5 schools; SMU Negeri 4, SMU Negeri 15, SMU Negeri 6, SMU Negeri 9, SMU Negeri 18. And the final stage is that from each class I have to choose randomly 10 students. Figure 1.3 shows the explanation of a mechanism in choosing samples.

Figure I.2 Mechanism of Multi-stage Cluster Sampling



### **I.7.3 Technique of Data Collection**

The data constitutes scores of courses; biology, physics, chemistry and English, as secondary data and is collected from the five educational institutes. These scores are taken from the first quarter tests (Catur Wulan I) for the reason that these scores are not graded up yet by teachers for certain tendencies.

### **I.7.4 Technique of Data Analysis**

After acquiring the secondary data, the first step is presenting the data in a table (see Table III.1). The second step is to label the scores of natural sciences as  $x_1$ , mathematics as  $x_2$ , and English as  $y$ , and also mention the value of  $x_1^2$ ,  $x_2^2$ ,  $y^2$ ,  $x_1y$ ,  $x_2y$  and  $x_1x_2$  as the components of correlation test procedures. The next step is that those components are calculated using correlation test. After the value of correlation coefficient is obtained, it is tested using a diagram so it can be known whether the hypothesis is rejected or accepted. Then, as

the final step, the result is interpreted applying with the theory of lateralization.

In short, the procedures of data analysis can be arrayed as follow:

1. Presenting the secondary data in table.
2. Labeling the scores of each course as  $x_1$ ,  $x_2$  and  $y$ , and altogether mentioning the value  $x_1^2$ ,  $x_2^2$ ,  $y^2$ ,  $x_1y$ ,  $x_2y$ , and  $x_1x_2$  in table.
3. Calculating the components of statistical test using multiple linear correlation
4. Examining the result of component calculation using a diagram (with Z value).
5. Interpreting the result.



## **CHAPTER II**

### **GENERAL DESCRIPTION OF THE OBJECT OF THE STUDY**