

CHAPTER III

RESEARCH METHODOLOGY

This study attempts to find out the correlation between language aptitude and English second language learners' mastery of conditional sentences. The methodology used to achieve the aim of the study is also elaborated in this chapter. It covers research design, site and subject of the study, data collection and instruments, data analysis, and clarification of key terms.

3.1 Research Design

This is a quantitative study because it deals with testing a hypothesis of the relationship between two or more variables. In order to investigate the correlation of language aptitude and English second language learners' mastery of conditional sentences, this study used Pearson product – moment correlation coefficient, which is symbolized by lowercase r , as one of the statistical concepts. The formula of Pearson product moment correlation coefficient is presented in *section 3.4*.

Besides investigating the relationship between language aptitude and English second language learners' mastery of conditional sentences, the study also investigates the relationship of language aptitude's three constituent abilities with the learners' mastery of conditional sentences. In doing so, the study uses multiple correlation formula since it uses to calculate more than two independent variables and one dependent variable, in this case is language aptitude as well as its constituent abilities as independent variables and English second language learners mastery of conditional sentences as dependent variable. The formula is presented in *section 3.4*.

Kranzler & Moursund state that “the values of correlation coefficients range from -1.00 to +1.00...” (1999, p. 54). If the value represents a positive result, it means the correlation or the relationship between the two variables is positive, while negative result indicates a negative correlation between those

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variables (Kranzler & Moursund, 1999). There is always a possibility that the value of correlation coefficient is 0.0 which means there is no relationship between two variables (Patel, 2009).

For multiple correlations which is symbolized by uppercase R , Bluman (2012) states that “The value of R can range from 0 to +1; R can never be negative” (p. 578). It means that if the value of R is closer to +1, then the correlation is stronger; if the value of R is closer to 0, then the correlation is weak (Bluman, 2012).

3.2 Site and Subject of the Study

Twenty students of a state university in Bandung from the Faculty of Language and Arts Education volunteered to involve in the study. They took English Language and Literature as their major in the University. Currently, they are from sophomore of grade 2012. The subject of the study consisted of 5 male students and 15 female students. The range of their ages is from 18 to 19 years old. They have studied English formally since they were in elementary school and then broaden their knowledge of the language in college by majoring in English Language and Literature.

3.3 Data Collection and Instruments

The data were collected by using two main instruments, the Modern Language Aptitude Test (MLAT) as the selected language aptitude test and test on conditional sentences in order to find out the English second language learners' mastery of English conditional sentences.

3.3.1 The Modern Language Aptitude Test

The study used the sample of standardized language aptitude test called the Modern Language Aptitude Test (MLAT) developed by Carroll and Sapon in 1959 (Winke, 2013). The sample can be obtained from Language Learning and Testing Foundation website. According to Carroll and Sapon (1959), the test consists of five parts; they are Number Learning (Part I),

Phonetic Script (Part II), Spelling Clues (Part III), Words in Sentences (Part IV), and Paired Associate (Part V).

Table 3.1

The Modern Language Aptitude Test from Language Learning and Testing Foundation

Subtests	Number of Questions
Number Learning	4
Phonetic Script	5
Spelling Clues	4
Words in Sentences	6
Paired Associates	6
Total	25

There were 25 questions in total. Part I consisted of 4 questions, Part II consisted of 5 questions, Part III consisted of 4 questions for each part, Part IV and Part V consisted of 6 questions for each. The samples of this study were expected to answer those questions within less than 20 minutes. The right answer of the test scored 1, while the wrong answer scored 0.

Part I and V are used to measure the learners' Rote Memory ability, Part II and III are used to measure Phonetic Coding ability, and Part IV is used to investigate the Grammatical Sensitivity (Carroll, 1990). Table 3.2 below summarizes the measurements of Carroll's language aptitude components based on MLAT's subtests

Table 3.2

The Measurements of Carroll's Language Aptitude Components based on the MLAT's Subtests (Carroll, 1990)

Carroll's Language Aptitude Components	The MLAT's Subtest				
	Part I Number Learning	Part II Phonetic Script	Part III Spelling Clues	Part IV Words in Sentences	Part V Paired Associates
Rote Memory	✓	–	–	–	✓
Phonetic Coding	–	✓	✓	–	–
Grammatical Sensitivity	–	–	–	✓	–
Inductive Language Learning	–	–	–	–	–

Even though Inductive Language Learning ability is one of four constituent abilities in Carroll's language aptitude theory, but the measurement for the ability is not included in the Modern Language Aptitude Test since the ability was quite difficult to measure when the MLAT was developed for the first time in 1950s (Carroll, 1980).

3.3.2 Test on Conditional Sentences

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The test consisted of 10 essays and 10 matching exercises regarding conditional sentences in various types which have been stated in *Chapter II*. The questions were gathered from ESLibrary.com. The given time to answers the entire questions on the test was 20 minutes. The form of the test was written test. Each participant collected 1 point for giving the right answer, while the wrong answer caused them in getting no point.

Table 3.3
Test on Conditional Sentences

Types of Conditional Sentences	Number of Questions
Zero Conditional	3
First Conditional	4
Second Conditional	6
Third Conditional	7
Total	20

3.4 Data Analysis

In order to find the correlation between language aptitude and English second language learners' mastery of conditional sentences, the study went through several procedures to analyze the data. Gathering the data from both the Modern Language Aptitude Test (MLAT) and test on conditional sentences was the first step to do in the study. Secondly, the study calculated the sum of both MLAT and the test. MLAT as the selected language aptitude test presented as X variable, while the second language learners' mastery of conditional sentences presented as Y variable.

Besides measuring the total scores of MLAT, the study also analyzed each part of the selected language aptitude test which represents the constituent abilities of language aptitude that proposed by Carroll and correlated them with the learners' mastery of conditional sentences as well by using the selected statistical concept.

After calculating the scores of both variables, measuring the value of correlation was the next step to do. To measure the value of correlation, the study conducted the formula of Pearson product – moment correlation coefficient. The formula is:

$$r = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$$

Where:

r = the value of correlation between two variables.

N = the number of participants or samples.

ΣX = sum of X scores.

ΣX^2 = sum of squared X scores.

ΣY = sum of Y scores.

ΣY^2 = sum of squared Y scores.

ΣXY = sum of the products of X and Y scores.

James Evans (1996) points out the absolute value of r which is represented in the table below:

Table 3.4

The Absolute Value of r (Evans, 1996)

The Absolute Value of r	Interpretation
0.00 - 0.19	Very weak
0.20 - 0.39	Weak
0.40 - 0.59	Moderate
0.60 - 0.79	Strong
0.80 - 1.00	Very strong

After finding the obtained r of the two variables, the next step was measuring coefficient of determination. Coefficient of determination which is

symbolized by lowercase r^2 can be defined as “the percent of the variation in the values of the dependent variable (Y) that can be "explained" by variations in the value of the independent variable (X)” (Taylor, 1990, p. 3). To obtain coefficient of determination, the study adopted the formula as follow:

$$CD = r^2 \cdot 100\%$$

Where:

CD = coefficient of determination.

r^2 = the obtained square of r

Calculating the significance of the correlation between X and Y variables was useful in order to give the study an idea of how far the relationship of those variables which was stated in the study. The study then created two possible hypotheses as the first step of defining the significance of the correlation between X and Y variables, they were $H_0: \rho = 0$ which means there is no relationship between X and Y variable or it can be called as null hypothesis and $H_1 = \rho \neq 0$ which means there is a possibility that relationship and the value of statistic is either greater or lower than 0. The Greek symbol of ρ (rho) represents the true correlation coefficient.

In order to figure out the significance of correlation coefficient, the study had to find the standardized t statistic for r by using the following formula:

$$t = r \sqrt{\frac{N - 2}{1 - r^2}}$$

Where:

t = standardized t statistic or t score.

r = the value of correlation.

N = the number of participants or samples.

r^2 = the obtained square of r

To find out the correlation of all language aptitude's three constituent abilities and English second language learners' mastery of conditional sentences, the study employs the formula of multiple correlations. The formula is:

$$R = \sqrt{\frac{r_{xy1}^2 + r_{xy2}^2 - 2r_{yx1} \cdot r_{yx2} \cdot r_{x1x2}}{1 - r_{x1x2}^2}}$$

Where:

r_{yx1} = the value of the correlation coefficient for variables y and x_1 .

r_{yx2} = the value of the correlation coefficient for variables y and x_2 .

r_{x1x2} = the value of the correlation coefficient for variables x_1 and x_2

According to Bluman (2012), the value of R is always higher compared to the value of individual correlation coefficient. He (2012) also states that the value of R "can never be negative" (p. 578). Table 3.5 below presents the interpretation of R .

Table 3.5

The Value of R (Punithavalli & Sharmi, 2013)

The Value of R	Interpretation
0.51 – 1.00	Strong association
0.26 – 0.50	Moderate association
0.00 – 0.25	Weak association

In order to figure out the significance of multiple correlations, the study used an F test for R by using the following formula:

$$F = \frac{R^2/k}{(1-R^2)/(n-k-1)}$$

Where:

R^2 = squared R .

n = the number of data groups.

k = the number of independent variables.

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The result of those measurements was presented to answer the research question regarding the correlation between language aptitude and English second language learners' mastery of conditional sentences. The correlation of three language aptitude components (*Rote Memory*, *Phonetic Coding*, and *Grammatical Sensitivity*) and the learners' mastery of conditional sentences were also investigated by using the same formulas. Furthermore, after concluding the result of the analysis, the suggestions for future studies were provided.

3.5 Clarification of Key Terms

In order to avoid any misunderstanding and misconception in the study, there are some clarified terms that commonly used in the study:

- Second Language

Second language is the language in addition to one's first language, although the language may be the third language and so on, to be applied (Saville-Troike, 2006). In this case, the second language refers to another language that acquired by the learners in the study.

- Language Aptitude.

Language aptitude can be called "language learning ability" (Dörnyei, 2005, p. 32). Aptitude itself can be defined as "capacity that enhances the rate and ease of learning" (Carrol, 1981, cited in Ellis, 1994, p. 495).

- The Modern Language Aptitude Test (MLAT).

An instrument designed to measure aptitude for foreign language learning in high school, college, and adult populations (McGuire & Scott, 2005, p. 2).

- Conditional sentences.

Conditional sentences can be explained as "a two-clause sentence in which the first clause states a supposition or hypothesis and the second clause states the results if that condition is met" (Elliott, 2006, p. 4).

