III. RESEARCH METHODS

This chapter contains research design, population and sample of the research, the procedures of collecting data, instrument of the research, data collecting technique, try out test, scoring system, data analysis and hypothesis testing.

3.1 Research Design

This research is a Co-relational study. The researcher used Ex Post Facto design because she wanted to investigate whether morphological awareness significantly correlate with the vocabulary size of EFL Indonesian senior high school students. There was no treatment in this research. Hatch and Farhady (1982: 26) stated "Ex post facto design is often used when the researcher had control over the selection and manipulation of the independent variable".

Ex post facto design is as follows:

T1 ⟶ T2

(Hatch and Farhady,1982: 27)

Note:

T1   : The test of morphological awareness

T2   : The test of vocabulary size

3.2 Population and Sample of the Research

3.2.1   Population

The population of this research was the students of the third grade of SMA Al –
Azhar 3 Bandar Lampung in academic year 2011/2012. There were seven classes
of the third grade, each class consists of about 40 students and the population
consists of 287 students.

3.2.2   Sample

The researcher used simple random sampling to take the sample. As Setiyadi
stated "The way in taking sample is not important as long as it can create situation
where every individual in population has chance to be chosen as sample"
(Setiyadi, 2006: 39-40). The writer chose one class by using lottery. The
procedures are: Seven names classes written in rolled papers are put into a glass.
Then, the glass was shaken two times and one name of classes that came out was
selected as samples.

3.3 Data Collecting Technique

The data of this research consisted of two parts. Part 1 was the total score of the
students' vocabulary size (120 items). Part 2 was the total score of Morphological
Awareness with its subtests: Morpheme Identification Awareness and
Morphological Structure Awareness (40 items). The tests were administered over
two days to minimize fatigue. The first day of testing consisted of the
Morphological Awareness Test. The participants received direction for each part

only on the day the particular test was done and they were allowed to complete the tests in one on each test day. The second day of test included the Vocabulary Level Test. Finally, the link between vocabulary size and morphological awareness was assessed, with possible implication for morphological awareness as a predictor of vocabulary learning.

3.4 Research Instruments

To answer the research question of morphological awareness and its relationship to vocabulary size, two widely used tests are adapted to the purpose of the study: Morphological Awareness Test with its subtests: Morpheme Identification Awareness and Morphological Structural Awareness and Word Definition Matching Format as Vocabulary Level Test.

3.4.1 Morphological Awareness Test

The morphological awareness test is adapted from McBride-Chang *et al*. (2005), and was used to test students' ability to reflect and manipulate morphemic units in English. This test is of interest to the researcher as it encompasses both the aspects of word formation rules. Some of the items of the test are created by the researcher, and others are taken from McBride-Chang et al. (2005) test. The test is divided in two sections: Morpheme Identification Awareness and Morphological Structure Awareness. This test requires students to make use of linguistic knowledge to derive new meanings. Skill in manipulating language, variously referred to as generativity, creativity, or productivity of language, may be

important in learning new meanings within one's language (Chang et al., 2005:
421).

3.4.1.1 Morpheme Identification Test

The Morpheme Identification test measures students' ability to analyze and
breakdown complex words into smaller meanings and enables them to recover the
meaning of complex words. It is compromised of 20 test items. In this study, the
students' were given a set of complex words and were asked to segment them into
smaller meanings as they can identify in each words and with it students can guess
the meaning of the word intended that appropriate with the sentence given. Below
are the directions and one sample item of the Morpheme Identification Test.

Please segment the following words into meaningful chunks to infer the meaning
in order to find appropriate word to complete the sentence given!

Cycling to school has one……………it makes you feel hot and sweaty.

a. disadvantageous   *c. advantage*

b. disadvantage   *d. advantageous*

The correct answer is *b. disadvantage*. The students can analyze the meaning by
breaking it down into its meaningful components. *Disadvantage* can be
recognized as *dis-advantage.* Prefix *dis-* give negative meaning of word
advantage. It is suitable word to fill the blank, because feeling hot and sweaty are
one of the disadvantage of cycling to school.

3.4.1.2 Morphological Structure Test

The Morphological Structure test measures students' productivity, which is the ability to synthesize morphemes to create new meanings. The test consists of 20 items. Some of the items are created by the researcher. The items have 10 derivational affixes and 10 inflectional affixes. All of items are embedded in a sentence frame so as to examine whether the participants can derive different forms of the base word rapidly and accurately when being primed with that base form in sentence context have. That is to say, this test examines the students' knowledge of lexical structure and the relations among words and within words and their constituents. Again, all of the items contain neutral morphemes.

The participants were presented with a frame sentence that contains the usage of the target morpheme, and then ask to complete the sentence. It is expected that the participants use the frame sentence to complete the sentence. Each morpheme in a test item receives one point. Here an example for derivation and inflection items:

1. *Early in the morning, we can see the sun coming up. What could we call this?*

The correct response for this item is *sunrise*. The word "sunrise" is the combination of word "sun" and "rise".

2. *John is playing. Yesterday he did this. What did he do yesterday?*

The correct response for this item is *played.* The changing from "playing" to "played" show that there is grammatical change/inflectional process from simple present progressive tense to past tense.

3.4.2 Vocabulary Size Test

The way of measuring student's vocabulary size was based on word frequency count. The Word definition Matching Format (WDMF) which arranged by Prof. Dr. Cucu Sutarsyah, M.A was used as the kind of the vocabulary level test. The test was prepared particularly for measuring the breadth of students' vocabulary knowledge. The primary aim of this test is to investigate students' vocabulary size based on certain levels.

The vocabulary levels include the base form and derived form of words, and called word family. The first 1000 and the second 1000 word level included the most frequent words of General English and are taken from word frequency count of GSL (Bauer & Nation, 1993). These words have frequency higher than 332 occurrences per 5 million running words. The second 1000 word level has frequency of 331 or less. These vocabulary levels, the first and the second 1000 level are considered suitable as the basis for vocabulary for learning English as a foreign language.

The third 1000 word level consists of words not in the most frequent words of GSL, but which are frequent in upper secondary levels and university texts from wide range of disciplines (Nation, 1990). The other level, which is called University Word List (UWL), represents one type of specialized vocabulary. The additional words from UWL, which seem to be more difficult, are included to see how much the students are able to master words that are commonly used at university level. This level can also be used to see if the learners have mastered academic vocabulary. These words most occur in most university text from wide

range of disciplines. All the words lists are arranged alphabetically with their word family.

Each section of the test consists of six English words and three definitions as test items. The Indonesian language was used in the definitions of English words being tested in order to avoid another factor that interfere the process of testing. The chief goal of this vocabulary test was to measure the breadth of vocabulary knowledge. Therefore, if we make English definitions, we seem to test other unintended aspects. This type of test was developed for it is easy to make and easy to mark. It offered little chances of guessing correctly.

Moreover, this kind of test can also be used to test a large number of words in a short time and allow learners to make use whatever knowledge they have to get the meaning of words. Although there were three words being tested, in fact, six words were tested in each section. If a student does not really know the meaning of a word in the six items of a section, he or she may guess by comparing the six items and find the closest answer. In other words, the test-taker should identify the six words that are provided in each section of the test.

The problem of measuring of vocabulary level test by using frequency count method was that the results are limited by the size of frequency count (Nation, 1990). Perhaps a student will know words outside the levels being tested. For example, we take the largest number of frequency count from 30.000 word level. Therefore, if a student is tested up to 30.000 word level and gets every answer correct, it does not mean that he or she is credited to have vocabulary level larger than 30.000 words. However, this problem may not be so serious, if such a test is

used with learners of English as a second language who are not very advanced level of proficiency (Nation, 1990).

The scoring was based on correct answer, that is, one correct answer is scored 1; one wrong answer is scored 0. The students' vocabulary size was gained by counting the number of correct answers to be divided by the number of items in every vocabulary level test. From this, we can find the proportion of correct answers. Then, we can estimate the students' vocabulary size by multiplying it with the population; 1000 words for each level with additional 800 words from UWL. For example, the test consists of 30 items. Therefore if the student gets 24 correct answers in the first 1000 level test, he/she estimated to have:

$$\frac{24 \times 1000}{30} = 800 \text{ words.}$$

Therefore, the students' vocabulary size is considered to have 800 words in the first 1000 word level, etc. to get the final score, the total vocabulary size of the four levels is divided by 3800 then was multiplied with 100, because the maximum vocabulary size for all levels would be 3800. For example, the vocabulary size is 3600, so the final score is:

$$S = \frac{3600}{3800}100$$

$$= 94,7$$

3.5 Criteria of Good Test

In this research, to prove whether the test has good quality, it must be tried out first. The test can be qualified as 'good' test if it has sufficient validity and reliability, level of difficulty and discrimination power.

3.5.1 Validity

The test can be said valid if the test measures the object to be measured and it is suitable with the criteria (Hatch and Farhady, 1982:250). To measure whether the test has a good validity, this research used content and construct validity.

a. Content validity was extended to which a test measures representative sample of the subject matter contents, the focus of content validity was on adequacy of the sample and simply on the appearance of the test (Hatch and Farhady, 1982: 251). It means that the test should be correct and represent the materials that were taught such as noun, verbs and adjectives. To get the content validity, the test for vocabulary size was adapted from students' book. Then the test was determined according to the materials that were taught to the students. In other words, the researcher made the test based on the materials in the 2006 English Curriculum for the third grade of Senior High School students. The items in the test of morphological awareness included four of the word types (root words, inflected words, derived words and literal compounds). The researcher made the instrument related to vocabulary of content words (noun, verb, adjective).

Content validity can be examined from table of specification. The table presents the material that the writer applied in the test. If the measuring instrument has

represented all the ideas that connected with the material that will be measured, that instrument has fulfilled the aspects of content validity.

> Table 1. Number of Sample in each level of vocabulary size test.

Level	Population	Sample/Item	Proportion
1st 1.000	1000	30	25 %
2nd 1.000	1000	30	25 %
3rd 1.000	1000	30	25 %
UWL	800	30	25 %
Total	3800	120	100 %

> Table 2. Table of Specification (Vocabulary Size Test).

No	Word Class	Number of items	Percentage
1	Verb	1.,2.,3.,5.,6.,8.,11.,12.,13.,15.,18.,19.,20.,21.,23.,26.,27.,31.,33.,35.,36.,37.,42.,43.,45.,46.,56.,62.,63.,65.,67.,69.,75.,77.,78.,79.,80.,81.,82.,83.,84.,86.,89.,90.,91.,93.,95.,96.,97.,98.,100.,101.,103.,104.,106.,107.,108.,109.,110.,112.,113.,114.,115.,116.,119.	54%
2	Noun	7.,9.,14.,16.,17.,22.,24.,25.,29.,30.,32.,34.,39.,40.,41.,44.,47.,48.,49.,51.,53.,54.,55.,57.,58.,59.,61.,68.,70.,71.,73.,74.,87.,88.,92.,94.,99.,102.,111.,117.,118.	34%
3	Adjective	4.,10.,28.,38.,50.,52.,60.,64.,66.,72.,76.,85.,105.,120.	12%
	Total	Numbers 120	100%

b. Construct Validity focuses on kind of the test that is used to measure the ability. It is used for the research which has many indicators. According to Setiyadi (2006: 26), if the instrument just measures one aspect, for example vocabulary; the construct validity can be measured by evaluating all items in the test. Construct validity is concerned with whether the test is actually in line with theory (Shohamy, 1985: 74). Regarding the construct validity, it measures whether the construction has referred to the theory, it means that the test construction has already in line with the objective of the learning (Hatch and Farhady, 1982: 251).

Construct validity can be found by relating the instruments with the theory of what it means to know certain knowledge skills. In this case, the writer measured students' morphological awareness and their English vocabulary size. Therefore the instrument for measure morphological awareness was Morphological Awareness test which assess the ability to create literal compounds, inflected, and derived words. For English vocabulary level test, the writer chose the test of breadth of vocabulary knowledge which defines as the size of learners' vocabulary (how many words are known) (Freebody (1981) in Read (1993). The vocabulary level includes the base form and derived form of words, and called word family. In this research, the writer used the vocabulary that is supposed to be comprehended by the third grade students of senior high school. If there is a significant correlation between aspects of instrument of language test, it means that construct validity has been fulfilled.

3.5.2 Reliability

Reliability is the consistency of a test. In other words, how far it can measure the same subject at separated time, but it shows the same result relatively (Setiyadi, 2006: 16). Reliability can be defined as the extent to which a test produce consistent results when administered under similar condition (Hatch and Farhady, 1982). Reliability of the tests was estimated by using split-half technique. To measure the coefficient of the reliability between odd and even group, this research used the person product moment formula as follows:

$$r = \frac{\sum XY - \frac{(\sum x)(\sum y)}{n}}{\sqrt{\left[\sum x^2 - \frac{(\sum x)^2}{n}\right]\left[\sum y^2 - \frac{(\sum y)^2}{n}\right]}}$$

Where:

r   : coefficient of reliability between odd numbers and even numbers items

x : total numbers of odd numbers items

y : total numbers of even numbers items

n   : numbers of students who take part in the test

x^2 : square of x

y^2 : square of y

$\sum x$: Total score of odd number items

$\sum y$: Total score of even number items

(Arikunto, 1997:69)

The criteria of reliability are:

0.80 - 1.00 : very high

0.60 - 0.79 : high

0.40 - 0.59 : average

0.20 – 0.39 : low

0.00 – 0.19 : very low

Then this research used "Spearmen brown`s prophecy formula" to know the coefficient correlation of whole items. The formula is as follows:

$$rk = \frac{2r1}{1+r1}$$

Where:

rk : the reliability of the test

$r1$: the reliability of half of the test

(Hatch and Farhady, 1982:246)

3.5.3 Level of Difficulty

Difficulty level relates to how easy or difficult the item is perceived from point of view by the students who take the test. This is important since test items, which are too easy, tell us nothing about differences is discarded. To evaluate the level of difficulty, this research used the following formula:

$$LD = \frac{R}{N}$$

Where:

LD : level of difficulty

R   : the number of students who answer correctly

N   : the total number of students following the test

The criteria are:

<0.30   = difficult

0.30-0.70   = average

<0.70   = easy

(Shohamy, 1985; 79)

3.5.4 Discrimination Power

The discrimination power (DP) refers to the extent to which the item differentiates between high and low level students on the test. According to this criteria, a good item is one which good students do well on and bad students fail.

To know the discrimination power of the test, the writer used the following formula:

$$\mathbf{DP} = \frac{U - L}{\frac{1}{2} N}$$

Where:

DP   : discrimination power

U   : the proportion of upper group students

L   : the proportion of lower group students

N   : total number of students

The criteria are:

DP: 0.00-0.19   : Poor

DP: 0.20-0.39   : Satisfactory

DP: 0.40-0.69   : Good

DP: 0.70-1.00   : Excellent

DP: (-) negative   : Bad items, should be omitted

1. If the value is positive discrimination a large number of more knowledgeable students then poor students god the item in correct. If the value is zero, no discrimination.

2. If the value is negative, means that more low-students than high level students got the item correct.

3. In general, the higher the discrimination index, the better. In classroom situation most items should be higher than 0.20 indexes.

(Shohamy, 1985:81)

3.6   Scoring System

In scoring the students result of the test, this research used Arikunto`s formula. The ideal scores of tests were calculated by using the following formula:

$$S = \frac{R}{N} 100$$

Where :

S   : the score of the test

R   : the total of the right answers

N   : the total items

(Arikunto, 1997: 212)

3.7 Research Procedures

In conducting this research, the writer used the steps as follows:

1) Stating research problem

2) Determining the objectives

   The objective of this research was to find out whether there is any significant correlation between students' morphological awareness and their English vocabulary size.

3) Determining the population and sample

   In this stage, the population of this research was the students of the 3rd grade of SMA Al – Azhar 3 Bandar Lampung in academic year 2011/2012. There were seven classes; each class consisted of about 40 students with the total number 287 students. The writer used simple random sampling to choose the sample of the research. Class XII IPA 3 which consist of 40 students was chosen as sample of this research

4) Constructing research instrument

   The test consists of two parts:

   ✓ Part 1 Vocabulary Level Test (120 items).

   ✓ Part 2 Morphological Awareness Test (40 items)

5) Conducting Try Out

   The try out was conducted in the different class of the sample class in SMA Al – Azhar 3 Bandar Lampung. This was objective test with 50 items. The Try out was conducted to measure the reliability of the test. The aim of try out was to know the quality of the test which used as the instrument of the research, and determine which item should be revised for

the test. This research also used the result of the try out test to measure the level of difficulty and discrimination power, to find out the validity and reliability. Some items were dropped or revised since the quality was poor. This test was administered for 60 minutes.

6) Conducting the test

The test was administered over two days to minimize fatigue. The first day of testing consisted of the morphological awareness test. The second day of test included the vocabulary level test. The participants received instruction for each part only on the day the particular test was held and they were requested to complete the tests in one hour on each test day.

7) Analyzing the data

The data was analyzed by Pearson Product Moment Correlation which is computed by using SPSS 17 to investigate whether there is any significant correlation or not.

3.8 Data Analysis

This research focused on two variables, one dependent and an independent variable. This research was Co-relation study and to collect the data the writer used tests for those two variables. Morphological awareness is independent variable because it is assumed that morphological awareness has influence to the vocabulary size. The data from the Vocabulary Level Test is classified as a dependent variable because the vocabulary size is influenced by morphological awareness.

To investigate the vocabulary size of the participants, the results of the vocabulary level test were summarized by mean frequency and standard deviation across the three different levels with additional level from UWL. The scores obtain were added to get the total scores of those levels. After that, the correlations between both the Vocabulary Level Test total score and Morphological Awareness Test were analyzed. These correlations highlight the relationship between the vocabulary size and the morphological awareness of each participant. Drawing conclusion from the tabulated result of the tests administering is based on statistically analyzed using SPSS 17 (Statistical Program for Social Sciences).

After that, simple regression was done to find how far the contribution of self Morphological Awareness to their English vocabulary size with the formulation as follows:

$$R = r^2$$

Notes: R   = Regression

              r   = Coefficient correlation

3.9. Hypothesis Testing

To conclude a possible correlation between students' morphological awareness and their English vocabulary knowledge, the writer used the criterion of the hypothesis acceptance. To determine whether the first hypothesis is accepted or rejected, the following criteria for acceptance:

Ho= r value < r table

Hi = r value > r table

Notes:

H_0. There is no significant correlation between students' morphological awareness and their English vocabulary size. We can accept this hypothesis if r value is lower than r table.

H_i. There is a significant correlation between students' morphological awareness and their English vocabulary size. We can accept this hypothesis if r value is higher than r table.