Research Methodology

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Contents

Preface **5**

Chapter One. Defining the Research Question **7**

Chapter Two. Describing Variables **16**

Chapter Three **28**

Chapter 4: Writing the Research Proposal and Report **42**

Chapter 5 ..... **57**

Chapter 6: Describing Interval and Ordinal Values **75**

Chapter 7: Locating Scores and Finding Scales in a Distribution ... **90**

Chapter 8: Probability and Hypothesis Testing Procedures ... **108**

Answer Keys **119**

Preface

Without doubt, some of the requirements of students of applied linguistics include handling field researches, using suitable formulas after data collection, and validating the results they obtain. Fortunately, the books that guide students as to what they are supposed to do, or what formulas they can use have proliferated over decades. However, some students who plan to prepare themselves for final exams or tests on research methodology may work better with instructional materials offered in capsulated forms.

The present book is, therefore, a summary compilation of some key notes on the important concepts of the first 8 chapters of Evelyn hatch and Anne Lazaraton Research Manual (1991) that seem to be suitable particularly for undergraduate EFL students who may be novice in the field of practical research. Each summary chapter of the book has been prepared by a separate contributor to whom we are so much appreciative of their wholehearted aid.

Each chapter follows a set of review tests that help readers check their knowledge of research and find where they stand. The test materials are of different types: multiple test items, true-false statements, and essay type questions for which an appendix chapter has been provided at the end of the book where readers can find the answers to the tests or questions.

Last but foremost, were it not for the collective efforts of EFL doctoral students of Ferdowsi University of Mashhad enrolled on Bahman,1390, we would doubtlessly not able to proceed in preparing the present book. Hence, our sincere thanks go to the following contributors: Saeedeh Behrooznia, Farahnaz Pourandalibi, Vahideh Vahedi, Fahimeh Saboori, Maryam Seyyedrezaie, Fatemeh Mohaghegh, Golnaz Abdollahian, Mahshid Hejazi, Hosna

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Chapter One

Defining the Research Question

-Definitions
- Characteristics of a Research
- Research Questions
- Hypotheses
- Internal Validity
- External Validity

Research: A systematic approach to search for answers to questions.

Characteristics of a Research:

1. **Systematic** : based on rules, principles and regulations
2. **Logic**: in formulating a question, in choosing a systematic way, in interpreting the results and making conclusions and generalizations.
3. **Reproductivity**: Making generalization and avoiding repetition
4. **Replicability**: Repeating the same study with another group in a different situation for further confirmation
5. **Generativity:**

Goals of a Research:

1. Description
2. Prediction
3. Improvement
4. Explanation

RESEARCH QUESTION

Sources of Research Questions:

1. Journals in our field our field
2. What we have already known already
3. Our unanswered questions and ideas
4. Hot and current topics of the field

Three Types of Research Questions:

1. **Descriptive question:** finds out the frequency, duration and intensity of an event or the frequency, duration and range of a behavior performed by a subject.
2. **Correlational question:** asks about the degree of relationship between two or more factors (variables).
3. **Cause-Effect question:** seeks to find causal relationship between the X and Y.

Scope of Research Questions:

- The question should be narrowed down as much as possible. It should be specific enough to meet the criterion of manageability.

- The word “HOW” in the question is a qualitative word. Qualitative words are not appropriate to be included in the research question.
- The research question should be stated in a way that it addresses a quantitative phenomenon. It should be more narrowed down.
- The research question should be realistic.

Feasibility/Manageability of research question:

Feasibility or manageability of research is determined by time, access, quantity, quality of access, cost of research, and being enough narrowed.

Types of Researches:

1. **Exploratory:** research which generates new information.
2. **Confirmatory:** research which confirms old information in a new way.

Research Hypothesis:

Hypothesis: a tentative and suggested answer to a research question.

- A hypothesis is formed in a form of statement.
- A hypothesis is a kind of generalization about the relationship between two or more variables.

Types of Hypotheses:

1. **Non-directional :** predicts no relationship between the factors under investigation = Null Hypothesis= **H0**
2. **Directional Hypothesis:** predicts a relationship between the factors = alternative hypothesis= **H1**

Directional Hypotheses can be negative or positive.

Internal and External Validity

According to Cambpell and Stanley (1963) each research should have both, internal and external validity.

1. **Internal Validity:** has to do with interpreting findings of a research within the study itself.

Some threats to internal validity:

a. Subject Selection Effect

In the experimental method, the subjects are selected randomly. Thus a selection effect may be produced by the manner in which the Ss are selected.

b. Maturation Effect

Refers to any process that involves systematic changes over time, regardless of specific events.

c. History Effect

Refers to whatever happens to the Ss of the study, outside the experimental environment and if these events influence the dependant variables, the outcome of research will be altered because of outside factors.

d. Instrumentation Effect

It is important that the test instruments or observations used in research are both valid and consistent and be valid. Validity of the operational definitions of key terms in research will determine kind of evidence that is collected to support or reject the hypotheses (Hatch & Lazaraton,1991, p.36).

e. Task Direction Effect

Tasks must be carefully planned and piloted and aimed at the subjects and length of instructions which are considered as important issue, as well.

f. Adequate Data- Base

Validity of measures has to do deals with the number of times, a particular time is observed or tested.

g. Test Effect

The experimental method requires a pretest and posttest. Pretest can have effect on performance during treatment and on future tests, if that test begins with a pretest (Hatch & Lazaraton, 1991 p. 40).Therefore, the pretest gives some awareness about the experiment to the Ss.

2. **External Validity :** Refers to the extent to which the outcome of research would be applied to other similar situations. That is, the findings should be generalizable. In another meaning, it deals with interpretation of findings and generalizing them beyond a conducted study (Hatch & Lazaraton, 1991, p.33). Moreover, If a study does not enjoy internal validity, it has no external validity, and thus, findings cannot be generalizable.

Self-Assessment Exercises

Exercise A

Put 'T' for true and 'F' for false statements.

1. Qualitative words should be removed from research question as far as possible.
2. Descriptive questions lead to cause-effect relationships.
3. Correlation questions ask about the relationship between two or more factors.
4. A hypothesis is a tentative answer to the research question.
5. The internal validity of research refers to whether the results are due to the treatment or not.
6. When the findings can be applied to other situations, it is said that the re-

search has external validity.

7. History effect refers to events happening to subjects throughout the manipulation of the independent variables.
8. In some studies, due to the length of the study, some of the Ss may not continue participating in the research. This phenomenon is called maturation.
9. One factor which influences the external validity of research is the selection of the subjects.
10. To increase the external validity, the conditions of the experiment should approximate those of the real world.
11. Some factors influence internal validity while others influence both internal and external validity.
12. The selection of the Ss affects the external validity only.
13. One way to control some of the threats to internal validity is to employ a control group.

Exercise B

Choose a, b, c, or d which best completes the item

1. In order for a research study be valid, it should have…

   a.internal validity b. external validity

   c. internal and External validity d. a controlled set of measurements

2. The factor which is related to both internal and external validity of research is…..

   a. instrumentation b. dependant variables

   c. maturation d. subject selection

3. Supposing time, access and costs of a research refers to the research…..

a. generativity
b. feasibility
c. validity
d. productivity

4. If a hypothesis indicates no relationship between X and Y it is called a …

a. directional hypothesis
b. non-directional hypothesis
c. null hypothesis
d. positive hypothesis

5. Which one does not include the research goals group?

a. description
b. explanation
c. prediction
d. feasibility

6. Which one refers to systematic characteristic of a research?

a. Based on rules, principles and regulations
b. Formulating a question, in choosing a systematic way
c. Making generalization and avoiding repetition
d. Repeating the same study with another group for a different situation further confirmation

7. One requirement of a good research study is to …….. the influence or effect of extraneous variables.

a. minimize
b. maximize
c. control
d. remove

Exercise C

Complete the following sentences with appropriate words in the below part (correlational, tentative, directional, null, descriptive, manageability)

1. A question about the sentence of events or a particular behavior is a descriptive question.
2. A hypothesis is a/an tentative answer to the research question.
3. In formulating a research question, factors such as interest, relevance and manageability should be taken into account.
4. A researcher who is interested in the context of the relationship between two factors should formulate a/an correlational question.
5. A directional hypothesis predicts a positive or a negative relationship between two factors.
6. When no direction is predicted between two factors, the researcher makes a/an null hypothesis.

Exercise D

Answer the following questions

1. What are the characteristics of a good research question?
2. What is the difference between a null hypothesis and a directional hypothesis?
3. What type of directional hypotheses can a researcher make?
4. To what extent should a research question be narrowed down?
5. How manageability or feasibility of a research is determined in formulating a research question?
6. What are the goals of a research?

7. What are the characteristics of a good research?
8. What are the sources of a research question?

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Chapter Two

Describing Variables

A ***variable*** can be defined as an attribute of a person, a piece of text, or an object

which "varies" from person to person, text to text, object to object, or from time

to time. As an example: One characteristic on which human performance varies is the ability to speak a variety of languages. Some people are monolingual, while others are bilingual, and others multilingual.

Variables can be very broad or very narrow. They can be assigned to groups of people as well as individuals. In a written text, a *text type* might be *a variable (its length may vary)*. In test of reading, *letter size* or *font style* might be *a variable*.

Variable Vs. Level: In a research project, we may wish to look at consider levels within a variable. For example the variable is *ESL student*. This variable may be divided into proficiency levels such as beginner, intermediate, and advanced, thus, this variable would then have three levels.

We can limit or expand the range of variables levels. For example, in an object shape, we can say that a shape either is or is not a triangle. The range

is *yes/no (*+ or - triangle*)*, in two levels. We can enlarge the scope to include various shapes of triangles, in which case *triangularity* is no longer *yes/no* but *no* and all the individual triangle forms, several levels. Again, we can narrow the variable to *right triangle* and the range, once more, is *yes/no*.

The function and the measurement of variables are important because they determine exactly what kinds of statistical tests will be appropriate in analyzing the data.

Measurement of Variables: Variables will be quantified in different ways depending on whether we want to know *how often* an attribute is present or *how much* of the variable to is attributed to the person, text, or object.

Nominal Scale Variables: A *nominal* variable, as the name implies, names an attribute or category and classifies the data according to presence or absence of the an attribute. While you can use a yes/no notation in recording this information, it is customary (but not required) to assign an arbitrary number to each possibility instead. So, if the a variable is *a native speaker of French,* two levels of the variable will be: 1) a it might represent *yes,* and 2) *no. The numbers are codes to represent levels of* the *a nominal variable and have no arithmetic value.*

Ordinal Scale Variables: Sometimes we have identified variables, but have no easy way of developing a measurement to show *how much* of the variable to is attributed to a person, text, or object. For example, if the variable is *happy,* this is not to be treated as a nominal variable. *However, we can say that a person is very unhappy~~unhappy~~happy~~very happy. These can be assigned numbers from 1 to 4. In this case, the numbers do have arithmetic value. Someone with* a *ranking of 4 is happier than someone with* a *1*. *The 4*, *however, does not say how much happiness* to *is attributed to a person. Instead, it places the Ss in a rank order with respect to each other.*

Ordinal measurement, then, describes a rank order measurement. The rank

order can be of two types. First, one could take all Ss and rank them in relation to each other, so that with 100 Ss the rank order would be from 1 to 100. Another possibility is to rank Ss on a scale. Each S is placed on the scale and then all Ss who rated 5 are higher than the group rated 4, and so forth. Each Scan is ordered in relation to others, then, in two ways-first, an absolute rank; and-second, a ranking of persons who score at a similar point on a scale. In the first, each individual is ranked and in the second, groups are ranked.

Although it is true that the scales in ordinal measurement have arithmetic value, the value is not precise. Rather, an ordinal measurement orders responses in relation to each other to show strength or rank. To the extend the scales are wider, more precision in rating is encouraged, and thus they approach equal intervals.

Interval Scale Variables: Similar to ordinal scale measurements, interval scale data tell us *how much* of the variable to is attributed to a person, text, or object. The difference is that the measurement is much more precise. The intervals of measurement can be described. Each interval unit has the same value so that units can be added or subtracted. In equal-interval measurement, we expect that each interval means an equal increment.

Ratio Scale Variables: Ratio scale is exactly the same as interval scale but with a difference that is the zero on the scale means: does not exist. In another way, ration scale has a true zero point as well as equal intervals. For example a weight of zero does not exist. However, temperature is a ratio scale, since zero exists (i.e., zero on the Celsius scale refers to the freezing point not water ceases to exist). Other examples can be money, IQ and distance.

By now it should be clear that the way you measure variables will partly depend on the variable itself and its role in the research, and in part on the options available for precision of measurement. In the operational definition of a variable planning precisely regarding how the variable is to be measured, becomes a considerable matter by a researcher. There are often appropriate reasons to opt for one type of measurement over another. It is not always the

case that more precise interval measurement is a better way of coding a variable. The measurement should be appropriate for the research question. For example, if we want to classify bilingualism according to the languages it is spoken, then nominal measurement is appropriate.

Frequency Data Vs. Score Data: Another way to think about differences in measurement is to consider whether the study measures *how much* on an interval or ordinal scale or whether it measures *how often* something occurs--the frequency of nominal measurement. For most novice researchers, it is easy to identify a nominal, ordinal, or interval measurement, but somehow the distinction becomes blurred in moving to studies where nominal measurement is now discussed in terms of frequency, and ordinal, and interval measurement are grouped together to show *how much* of a variable to is attributed to a *S.* This distinction is important because it will determine the appropriate statistical analysis to use with the data.

The difference between nominal variables that yield frequency data, ordinal, and interval variables that yield score data is sometimes identified as *non-continuous* vs. *continuous* measurement (or discrete vs. continuous measurement). *Continuous* data are types of data scored along either an ordinal or interval scale. *Non-continuous* data are not scored but rather tallied to give frequencies. Nominal data, thus, may be referred to as non-continuous variables. *Discrete* and *categorical variables* are other synonyms for *nominal variables* that you may encounter in research reports. To summarize:

Frequency data show **how often** a variable is present in the data. The data are **non-continuous** and describe **nominal** (discrete, categorical) variables.

Score data show **how much** of a variable is present in the data. The data are **continuous** but the intervals of the scale may be either **ordinal or interval** measurements of **how much.**

Functions of Variables: To understand how the variables in a study relate to one another, we need to be able to identify their functions. These functions grow out of the research question. That is, they depend on the connection we believe exists between the variables have been chosen for the study. Sometimes we expect that two variables are connected or related to each other, although we do not consider one variable as affecting or causing a change in the other. It is especially important to understand the function of variables in order to select the most appropriate way to analyze the data.

Dependent Variable: The dependent variable is the major variable that will be measured in the research. For example, if you wanted to study the construct *communicative competence* of a group of students, then the dependent variable is the construct and it might be operationalized as your students' scores or ratings on some measures of communicative competence. The measurement would be part of the operational definition of communicative competence for your study. This variable *(communicative competence)* is the dependent variable. We expect functions on the dependent variable will be influenced by other variables. Namely, it is "dependent" in relation to other variables in the study.

Independent Variable: An independent variable is a variable that the researcher assumes may relate to or influence the dependent variable. In a sense, the dependent variable "depends on" the independent variable. For example, if you wanted to know something about the communicative competence of your students, the dependent variable is the score for communicative competence. You might believe that male and female students differ on in this variable. You could, then, assign sex as the independent variable which affects the dependent variable in this study.

A) Moderator Variable: Sometimes researchers distinguish between ma-