

Hypothesis in Language Learning Research

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Abstract: Hypothesis is very often inevitable in research activities. Hypothesis is of at least three kinds, each of which should not be confused. A study trying to measure the relationship between variables can predict the finding based on theory or logical common sense. This prediction is called *theoretical hypothesis*. In testing hypothesis quantitatively, the theoretical hypothesis should be transformed into *statistical hypothesis*, which takes the form of Null hypothesis and its alternatives. It is the Null hypothesis that is to be tested to justify its rejection or otherwise its acceptance. In qualitative study, the result of first data analysis is called temporal *empirical hypothesis* that should be validated with more data. This cycle of rechecking the result with more data is done again and again until the hypothesis becomes the final conclusion.

Key words: theoretical hypothesis, empirical hypothesis, and statistical hypothesis.

Drawing a research hypothesis is very often inevitable in a research project involving either quantitative or qualitative data. The type of hypothesis is different from one research activity to another research activity, or from research involving quantitative data from the one involving qualitative data. In other words, there are more than one types of hypothesis, each of which has its definition and function that should not be confused by the researcher. Misplacing one hypothesis from another hypothesis shows that the researcher does not have clear understanding of what hypothesis actually is.

When a researcher predicts the finding of his/her research based on a

theory or based on a logical common sense, he is drawing a *theoretical hypothesis*. Another researcher who draws a temporary conclusion, a conclusion that he/she will validate with more data, is drawing an *empirical hypothesis*. While a researcher is computing data for his/her research, he wants to be objective, he does not want to be biased. Therefore, he/she will have to state a null hypothesis with its alternative(s). This kind of hypothesis is called *statistical hypothesis*, which is different from the other two hypotheses.

THEORETICAL HYPOTHESIS

In a research project applying quantitative approach or which relies the expected finding on quantitative data (data that have to be quantified in the process of analysis), a researcher who is trying to measure the relationship between two or more variables must predict the answer to the problem or the finding of the research based on theory or based on logical common sense. This prediction must have theoretical as well as logical truth in it. This theoretical and logical prediction is called a hypothesis (Tuckman, 1999:89; Borg & Gall, 1983:78). More precisely, Ary, Jacobs, and Razavieh (1979:72) defines the theoretical and logical hypothesis as

“.....a tentative proposition suggested as a solution to a problem or as an explanation of some phenomena. It presents in simple form a statement of the researcher’s expectation relative to a relationship between variables within the problem”.

For example, in a research aimed at testing the effect of sex toward the achievement in language learning or in math learning, the researcher can predict that theoretically and logically female students would make better achievement in language learning than male students of the same level. In the same way he/she can predicate that theoretically and logically, male students would make better achievement in math learning than female students of the same level.

When a study does not try to measure the relationship between two or more variables, or when it involves only one variable, a hypothesis cannot be provided. In other words, not every research problem has to be followed with a research hypothesis. Forcing oneself to provide hypothesis for every research problem would result in the difficulties during the

process of statistical computation of the data, as every hypothesis should later be transformed into a statistical hypothesis for the purpose of testing. So, a hypothesis which cannot later be transformed into a statistical hypothesis is a wrong hypothesis (Ary, Jacobs, and Razavieh, 1979: 77). In the same way, a hypothesis which already takes the form of statistical hypothesis, not for the purpose of testing, is also wrong because it does not reflect theoretical and logical prediction of the answer to the research problem.

Tuckman summarizes three criteria to meet in stating a hypothesis correctly. A good hypothesis statement should (1) conjecture about the direction of the relationship between two or more variables, (2) be stated clearly and unambiguously in the form of a declarative sentence, and (3) be testable; that is, it should allow restatement in an operational form that can then be evaluated based on data (Tuckman, 1999:73).

Following are examples of good hypothesis statements derived from the related research problems.

- Problem* : Do students with higher IQ tend to achieve better in learning a foreign language than those with lower IQ?
- Hypothesis* : Students with higher IQ tend to achieve better in learning a foreign language than those with lower IQ.
- Problem* : Do students learning a foreign language achieve better from a directive foreign language teacher than those from a non-directive foreign language teacher?
- Hypothesis* : Students learning a foreign language achieve better from a directive foreign language teacher than those from a non-directive foreign language teacher.
- Problem* : Does the repetitious use of prompting in instructional language learning materials impair the effectiveness of those materials?
- Hypothesis*: Students using language learning materials with repetitious use of prompting do not learn as effectively as those using language learning materials without repetitious use of prompting. (Tuckman, 1999: 29, 73)

STATISTICAL HYPOTHESIS

Unlike theoretical hypothesis aimed at predicting the outcome of the research, statistical hypothesis is a statement that has to be made by the researcher while computing the data to allow statistical hypothesis testing (Tuckman, 1999: 88). This statistical hypothesis is transformed from the theoretical hypothesis and should, therefore, not be mentioned after the statement of the research problem in Chapter 1 of the research report or thesis. In fact, it does not have to be reported in any chapter of the research report or thesis. It is usually found in Statistics books which describe the process of computation, more specifically in the process of hypothesis testing. Statistical hypothesis always takes the form of null hypothesis, represented as *H₀*, followed with its alternative(s), alternative one hypothesis, represented as *H₁*, and alternative two hypothesis, represented as *H₂*. It is this *H₀* that is to be tested in the statistical analysis.

For example, from the theoretical hypothesis mentioned earlier about the effect of sex toward achievement in language learning, the hypothesis which states that *female students would make better achievement in language learning than male students of the same level* can be transformed into a statistical *H₀* statement, *there is no difference in achievement between female students and male students in language learning* (represented as Mean Score of Female students - Mean score of male students = 0). From this *H₀*, the alternative *H₁* can be formulated as *Mean score of female students is significantly bigger than that of male students*, and its alternative *H₂* as *Mean score of male students is significantly bigger than that of female students*.

Statistical analysis tests whether there is enough statistical evidence to reject *H₀*. If enough evidence is found, then the researcher rejects the *H₀*. In the absence of enough statistical evidence, the researcher accepts the *H₀*. In other words, statistical analysis allows the researcher to test *H₀* and to determine whether the evidence suggest rejecting or accepting it. If the statistical analysis results justify rejecting the *H₀*, then they provide support for its alternative hypothesis (Tuckman, 1999: 284). If the statistical analysis results do not justify rejecting *H₀*, then *H₀* is accepted, which means that there is no support for its alternative hypothesis.

In the case of testing the effect of sex towards achievement in language learning, *H₀* would refer to the belief that the average score of male

students is about the same as that of female students. Even if the average score is different, let's say the mean score of the female students is higher than that of male students, it is believed that the difference occurs by mere chance variations. If the measurement is to be repeated, the difference in the average score might disappear. Testing *H₀* refers to testing that believe.

If the statistical hypothesis testing results do not show strong evidence to reject that belief (*H₀*), then that belief (*H₀*) is not to be changed and is then taken as the finding. That belief of equality between the two means (*H₀*) will change only if the statistical hypothesis testing results show strong evidence to reject it. Rejecting *H₀* means that there is a strong reason to believe that the difference is not mere chance variations, it is a real difference (Vockell & Asher, 1995:316-319). This means support to the alternative hypothesis.

EMPIRICAL HYPOTHESIS

A language learning researcher ((as illustrated by Bogdan and Biklen, (1998:64) in their hypothetical study for descriptive illustration)) is trying to study *effective* language teachers. His general topic and focus is developing *a theory on effective language teachers*. He starts his research by deciding to choose a teacher who can represent a real effective language teacher as his subject. After observing several language classrooms and interviewing several experienced language teachers, language learners, school headmasters, and some parents whose children are learning language in their classrooms, he gets recommendation to select one teacher who is believed to have the right authority to represent or meets the expected criteria of an effective language teacher as his subject of the study.

He then conducts an in-depth interview in a long, open-ended, tape recorded discussion with the selected *effective* language teacher. As a supplement to the interview, he also visits the teacher's schools and observes her in action. From that initial interview and observation, he develops a loose descriptive theory of language teacher effectiveness. This theory is his first conclusion of the study which is still temporary as it is based on initial interview and observation. This is his first temporary empirical hypothesis.

After he has sketched out his temporary theory of effective language teacher, he picks a second effective language teacher to interview. In picking the following effective language teachers to interview, he used *snowball* sampling technique; that is, he asked the first person he interviewed to recommend others. He interviewed the second subject in a similar open-ended manner, with holding the theory (first Hypothesis) he developed from his first initial interview. After the second interview, he rewrites and modifies the theory (the first hypothesis) to fit the new case. He continues choosing and interviewing new people, modifying the theory (previous hypothesis) to fit the new case. He proceeds in this manner, picking new subjects, enlarging the theory (the temporary hypothesis) until no longer comes across any case that does not fit the theory (the hypothesis). At the end, he takes the final hypothesis as the conclusion or the finding of his study about *language teacher effectiveness* (Bogdan & Biklen, 1999:64).

The narration on the process of qualitative research on language teacher effectiveness above shows us another type of hypothesis (Tuckman, 1999: 417) different from the earlier mentioned theoretical as well as statistical hypothesis. This type of hypothesis is not based on theory, nor is it for the purpose of statistical data computation, it is a temporary hypothesis based on data analysis. This hypothesis after going through several modification to fit several cases becomes the final conclusion of the study.

Following is another illustration to clarify empirical hypothesis. A study on the order of acquisition on English reflexive pronouns among Spanish children learning English as a Second Language in the United States reveals that the children first acquire the form: *myself*, *yourself*, *herself*, *ourselves**, *hisselves**, and *theirselves**. The first three reflexive pronouns *myself*, *yourself*, and *herself* are correctly learned in this first temporary conclusion but the second three reflexive pronouns *hisselves**, *ourselves**, and *theirselves** are overgeneralized from the possessive pronouns *my*, *your*, *her*, *his*, *our* and *their* that they have learned before plus the word *self*. Then in the next stage in the sequence of acquisition of the reflexive pronouns, the children learn : *myself*, *yourself*, *herself*, *himself*, *ourselves**, and *themselves**. This second stage of the sequence in the acquisition of reflexive pronouns is the improvement of the first stage conclusion, cor-

recting the form *hisselves** and *theirselves** into *himself* and *themselves**. This second stage conclusion is still temporary, it is not final yet. Only in the next stage, then the Spanish children acquire the final conclusion *myself*, *yourself*, *herself*, *ourselves*, *himself*, and *themselves*, correcting the wrong forms *ourselves** and *themselves** to the correct forms *ourselves* and *themselves*.

The process of acquiring the rules of reflexive pronouns by the Spanish children learning English as the Second Language in the United States that takes stages shows that learning the rules of reflexive pronouns for these children does not take once for all. It starts from the first exposure to the actual use of the expressions involving those reflexive pronouns, then is followed spontaneously with subconscious analysis by the children resulting in the first stage conclusion: *myself*, *yourself*, *herself*, *ourselves**, *hisselves**, and *theirselves**. The first stage conclusion is verified and revised through the second cycle which again starts with further exposure and ends in subconscious analysis resulting in the second stage conclusion: *myself*, *yourself*, *herself*, *himself*, *ourselves**, and *themselves**. The second stage conclusion is again verified and revised through the third cycle which again starts with further exposure and ends in subconscious analysis resulting in the last stage conclusion: *myself*, *yourself*, *herself*, *himself*, *ourselves*, and *themselves*.

This process of acquisition of the rules of reflexive pronouns by the Spanish children learning English as a Second Language in the United States is just like the process of data analysis in qualitative research that involves a temporary empirical hypothesis, which is revised into the next temporary empirical hypothesis, until the hypothesis becomes the conclusion (Dulay, Burt, & Krashen, 1982:215)

REVIEW ON HYPOTHESIS STATEMENTS IN THESIS

Following is discussion on how hypotheses are stated in theses on language learning. Some theses state good and clear hypotheses, some state wrong hypothesis, and still others state hypotheses which are not elaborated enough.

Good and Clear Hypotheses

Following are examples of hypothesis statements that meet the criteria of good hypothesis. They state the expected relationship between variables involved, are testable, consistent with the existing body of knowledge, and stated simply and concisely (Ary, Jacobs, and Razavieh, 1979: 77-79)

The higher scores of the students' knowledge on topics are, the higher scores of their ability in writing a coherent expository discourse (Dwimaretno, 1996:5)

There is a significant positive correlation between frequency of watching TV serials and speaking ability (Ambarkati, 1991:15)

The high scores of students' experience in English songs tend to go together with high scores of students' English pronunciation (Sulistyaningtyas, 1996:3)

*As class level increases,
the average score for descriptive papers should also increase,
the average coherence score for descriptive papers should also increase,
the average complexity of sentences per paper should also increase,
the average number of sentences per paper should also increase,
the average frequency of grammatical errors per paper should decrease,
the average frequency of mechanical errors per paper should decrease.
(Latief, 1990:6-7).*

The average score for argumentative papers of the seniors should be higher than that of the juniors (Latief, 1990:7).

The average coherence score for argumentative papers of the seniors should be higher than that of the juniors (Latief, 1990:7).

*Students learning vocabulary through **distributed practice**--practice in learning vocabulary through several short sessions separated by one or two days-- achieve better than those learning vocabulary through **massed practice** --practice in learning vocabulary through a few long sessions separated by one week or two (Djiwandono, 2001: 195).*

Achievement in language learning by K1 students is significantly better than that by K2 students (Gosong, 1993:20).

Students who are taught with summarizing technique perform better in literal reading comprehension skill than those taught with non-summarizing technique (Junaidi, 1996:10).

The mean of vocabulary gain score of the group under individualized vocabulary instruction is higher than that of the group under teacher-centered instruction (Masduki, 1999:11).

*The total group of learners treated with individualized technique of instruction have better written performance of the English verb **have** and tense auxiliary **have** than the other total group treated with traditional full-class teaching (Harsono, 1993:16).*

Misplaced Hypothesis

Following are examples of hypothesis statements which are misplaced as they are null hypothesis instead of theoretical hypothesis which function should be to predict the answer to the problem of the study based on theory or logical common sense.

*There is no difference in **reliability** between Cloze Test and Multiple Choice Test which are based on different texts with the same level of readability in measuring reading Comprehension ability (Atmoko, 1991:5)*

There is no difference between the mean of vocabulary gain score of the group under individualized vocabulary instruction and the mean

of vocabulary gain score of the group under teacher-centered instruction (Masduki, 1999:10).

There is no difference in **discrimination index** between Cloze Test and Multiple Choice Test which are based on different texts with the same level of readability in measuring reading Comprehension ability (Atmoko, 1991:5)

There is no difference in **level of difficulty** between Cloze Test and Multiple Choice Test which are based on different texts with the same level of readability in measuring reading Comprehension ability (Atmoko, 1991:5)

Not Clearly Stated Hypothesis

Some hypothesis statements need elaborations to show the detailed plan of the research strategy in analysis. Following are examples of the hypothesis statements which need more elaborations.

There is a significant relationship between the use of syntactic clues and the use of semantic clues (Kusumarasdyati, 1996:7).

The mean of structure test resulted by *English for Beginners* is significantly better than the mean resulted by the *Bahasa Inggris 2a untuk SMP published by Balai Pustaka* (Waskito, 1994:10)

The mean of interview test resulted by *English for Beginners* is significantly better than the mean resulted by *Bahasa Inggris 2a untuk SMP published by Balai Pustaka* (Waskito, 1994:10)

Kusumarasdyati's hypothesis statement which refers to correlational data analysis technique could be made more operational into:

The more the students are able to identify the syntactic clues the better they are in identifying the semantic clues.

Waskito's hypothesis statements which refer to comparative data

analysis technique could be made more operational into:

The mean of the Structure test scores for the students who are taught using *English for Beginners* is significant higher than that for the students who are taught using *Bahasa Inggris 2a untuk SMP Published by Balai pustaka*.

The mean of the interview test scores for the students who are taught using *English for Beginners* is significant higher than that for the students who are taught using *Bahasa Inggris 2a untuk SMP Published by Balai pustaka*.

Ambiguously Stated Hypothesis

Following are examples of hypothesis statements which need more elaboration to avoid ambiguity in the design of research to be applied.

The students' scores on Reading Comprehension test elicited with MCT format are **highly correlated** with their scores on Reading Comprehension test elicited with SAT format (Mahmud, 1996:4)

There is a **significant difference** in students' writing achievement of all course levels as shown by their average scores on the **expository** writing test (Mukminatien, 1997:13)

There is a **significant difference** in students' writing achievement of all course levels as shown by their average scores on the **narrative** writing test (Mukminatien, 1997:13)

There is a **significant difference** between the group with Bloom's taxonomy of cognitive levels of questions which put more stress on CAA types of questions and the group with KCA (traditional) types of questions on students' reading ability (Surjosoeseno, 1991:8)

There would be a **significant relationship** between students' paragraph knowledge and their ability to write an expository paragraph (Rohimah, 1992:6)

For the students with good English achievement, the frequency of general and local strategies used in reading an Indonesian text is different from that used in reading an English text (Suharmanto, 2000:16).

For the students with poor English achievement, the frequency of general and local strategies used in reading an Indonesian text is different from that used in reading an English text (Suharmanto, 2000:16).

For the students with good English achievement and poor English achievement the frequency of general and local strategies used in reading an Indonesian text is different from that used in reading an English text (Suharmanto, 2000:16).

The use of Indonesian as daily communication medium in students' family life is related to the achievement of those students in learning Indonesian at school (Gosong, 1993:20).

There is a difference in the students' writing ability between those who use clustering strategy and those who do not use mapping strategy, between those who use listing strategy and those who do not use mapping strategy, between those using outlining strategy and those using listing strategy, between those using listing strategy and those using outlining strategy, between those using outlining strategy and those using clustering strategy (Telaumbanua, 1992:16)

The term *highly correlated* by Mahmud or *significant relationship* by Rohimah and by Kusumarasyati in the above examples may lead to two possible interpretations; negatively correlated or positively correlated. A good hypothesis states clearly whether the correlation is going to be negative or positive, as follows.

The higher the students' scores on Reading Comprehension elicited with MCT format are, the higher their scores on Reading Comprehension elicited with SAT format are. (Positive correlation),

or

The higher the students' scores on Reading Comprehension elicited with MCT format are, the lower their scores on Reading Comprehension elicited with SAT format are. (Negative correlation).

The higher the students' paragraph knowledge is, the higher their ability in writing an expository paragraph (Positive correlation)

or

The higher the students' paragraph knowledge is, the lower their ability in writing an expository paragraph (Negative correlation).

The statement *there is a significant difference* by Mukminatun could be made more specific like *the higher the course level is, the better the achievement is. Or the seniors have better writing achievements than the juniors as shown by their average scores on expository writing test.* Suharmanto's statement *...is different from that of*, Surjosoeseño's and Telaumbanua's statement *There is a difference* does not predict theoretically which one is going to be better. Suharmanto states the hypothesis for good achievers, for low achievers, and for both the high and low achievers. The last hypothesis for *the high and low achievers* does not give clear reference who they are. Gosong's statement *..is related to..* again gives another example of hypothesis statement which does not show the direction of the relationship between the variables involved.

Wrong Hypothesis

Following are examples of hypothesis statements which are wrong as they are not easily transformable to statistical hypothesis.

Learning English at the elementary school age supports the ability of the students in learning the language at SMP (Ivonne, 1995:4)

The word *support* is not an operational statement for a hypothesis which tries to test correlational relationship between the variables involved. In fact, the word *support* is closer to the interpretation of causal relationship to correlational relationship between variables. A suggested better statement of hypothesis should read like this:

The longer and more intensive English course the elementary school age students experience, the better they will succeed in learning English at SLTP.

CLOSING

Hypothesis is of several types, each of which has to be stated according to its own function and placed accordingly. Several theses have shown ambiguous hypothesis statements, some have shown wrong hypothesis statements, some do not state hypothesis clearly, and still some others even misplace their hypothesis. Good, clear, and correct hypothesis statements are helpful to the researchers themselves as well as to the readers in guiding where the research is up to.

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