

**TESTING POSITIVE AND NEGATIVE
LANGUAGE TRANSFER
THROUGH THE USE OF FACTOR ANALYSIS**

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* ABSTRACT *

This paper attempts to verify the results of the first study in this series (Hamed El Nil El Fadil, 1988) which extracted two factors from the scores obtained by 1.544 subjects in their attempt to form five wh-questions. This first factor was interpreted as testing positive language transfer and the second factor as testing negative language transfer. In the present study 361 subjects, all native speakers of Arabic, were asked to answer a completion test. The scores obtained on the twenty nine morphemes to be completed were factor analysed. Two factors seem to have been extracted. The first factor seems to obtain significant loadings from the morphemes found in English and Arabic, while the second factor seems to obtain significant loadings from the morphemes found in English, but not in Arabic. The first factor was called positive language transfer factor, whereas the second factor was called negative language transfer factor. The paper concludes that factor analysis can be used in second language acquisition research to confirm or disprove a number of psychological constructs which are based on mere observation or speculation (Selinker, 1974; Rutherford, 1982).

1 - Introduction :

This study is the second in a series of studies intended to use the statistical technique of factor analysis in testing positive and negative language transfer. The first study (Hamed El Nil El Fadil, 1988) factor analysed the scores obtained by 1,544 subjects in their attempt to form five wh-questions. The factor analysis, which involved eight variables, produced two factors. One of the factors had its highest loadings from the morphemes found in both Arabic and English, whereas the other factor had significant loadings from the morphemes used in English but not in Arabic. The first factor was therefore tentatively called positive language transfer factor, while the other factor was also tentatively called negative language transfer factor.

However, that first study suffered from at least two shortcomings. On the one hand it had analyzed the scores obtained in the use of only eight variables. On the other hand, the factor of negative language transfer had significant loadings from only two morphemes. Hence it is necessary to repeat the same investigation for a number of reasons. Firstly, it is necessary in factor analytic research to repeat the factor investigation because factors are known to be fluid and can therefore change even when using the same test (Kerlinger, 1973).

Secondly, it may be important to note that prior to this study (Hamed El Nil El Fadil, 1988) most of the findings related to the influence of the first language on the learning of a second or foreign language were by and large based on observation and speculation (Nemser, 1974, p. 60). No attempt seems to have been made to measure positive and negative language interference through the use of factor analysis. This kind of statistical analysis will show us the items of a test which co-vary with one another and which can therefore be assumed to be measuring the same ability.

Hence, it is important as well as interesting to verify the results of the first study by analysing a larger number of variables, so that eventually it may be possible to establish in a more solid and concrete manner negative and positive language transfer as psychological constructs.

2 – Objectives of the Study :

The objectives of this study were to determine;

- 1 – The psycholinguistic factors which underlie the process of learning English as a foreign language (EFL)by native speakers of Arabic.
- 2 – The nature of these factors and
- 3 – The extent to which these factors could be controlled

These three problems are directly related to the influence of the first language of the learners on the learning of a foreign or second language.

3 – Hypothesis of the Study :

More specifically this study will attempt to verify the following three hypotheses :

- 1 – A factor analysis of the scores obtained by the subjects (who are all native speakers of Arabic) in answering a completion test will produce two factors, one of positive language transfer and the other of negative language transfer.
- 2 – The factor of positive language transfer will have significant loadings from the scores obtained by the subjects in supplying the morphemes used both in Arabic and English. These are the morphemes of groups 1, 2, 3 and 4. (See Table 1).
- 3 – The factor of negative language transfer will have significant loadings from the scores obtained by the subjects on supplying the morphemes used in English but not in Arabic. These are the morphemes of groups 5, 6, 7 and 8. (See Table 1).

4 – Subjects :

The subjects of this study were 361 male and female preparatory school pupils who are all native speakers of Arabic. The subjects were randomly drawn from four different government schools in Doha. The capital city of the State of Qatar. Two of the schools were boys schools and the other two were girls schools. Table 1.2 shows the distribution of the subjects.

The researcher is of the opinion that the subjects of this study are homogeneous and uniform, because not only are they all native speakers of Arabic, but they were also exposed to the same English language course.

This is because all State schools in Qatar use a unified and centrally controlled English language course, viz. the Crescent English Course which was produced by oxford University Press.

Table 1 a

The distribution of the subjects.

| | MALE | | FEMALE | | TOTAL |
|--------------|--------------------------------|-----------------------------------|----------------------------------|--------------------------------|------------|
| | Qatar Preparatory School | Musherib Preparatory School | Khalifa Preparatory School | Qatar Preparatory School | |
| 7 | 31 | 28 | 30 | 32 | 121 |
| 8 | 30 | 32 | 32 | 33 | 127 |
| 9 | 27 | 29 | 28 | 29 | 113 |
| TOTAL | 88 | 89 | 90 | 94 | 361 |

Since English is taught in the State of Qatar from Grade 5, the subjects from Grade 7 had about two and a half years of English when the test was given to them. The subjects in Grades 8 and 9 had about three and a half years of English and when the test was four and a half years of English respectively when the test was given to them.

Table 1
The eight groups of morphemes.

| Group No. | The Morphemes |
|-----------|------------------------------------|
| 1 | Name, year, father, day, time |
| 2 | ask read, come, visit |
| 3 | and in. for, from |
| 4 | I. he |
| 5 | 3rd s 's', ing. ed. en, Plural [z] |
| 6 | at, a, to |
| 7 | me, him, my |
| 8 | am, is, has, have |

5 – Preparation and administration of the test :

A simple completion test was used as an elicitation technique. Since the main purpose of this study is to investigate the influence of the first language of the learners on their ability to use certain English morphemes, it was necessary to provoke the subjects to produce the morphemes required for investigation (Pit Corder, 1981. P. 61).

The following procedure was used in the preparation of the test Firstly, the researcher wrote a text of about 150 words on a fictitious character. In order to cater for male and female subjects, a male name was used in the males, test and a female name was used in the females' test. Secondly, thirty five morphemes were originally deleted from the test. Twenty one of these

morphemes are used in both English and Arabic and were therefore intended to test positive language transfer. The other fourteen morphemes are used in English but not in Arabic and were therefore intended to test negative language transfer. Thirdly, all these morphemes were discussed with some English language teachers who are native speakers of Arabic. And agreement was reached that the twenty one morphemes that were to test positive language transfer are used in both English and Arabic and that the other fourteen morphemes, with the exception of the morphemes in group 7, are used in both English and Arabic. but they are realized differently in the two languages. Fourthly, the test was tried out on a small number of pupils in the preparatory schools, and their responses were checked. In the light of this check certain changes had to be made on the test when a correct answer other than the expected one was given. The grammatical or function words did not seem to be very problematic, because the context could easily determine the function word required. Therefore none of the function words was changed. However, the content words proved to be more problematic because even after many changes had been made, it was still discovered that a missing noun or verb could be substituted for by a number of possibly acceptable responses. This problem was solved partly by changing or dropping some items and partly by accepting any correct response and not only the expected one. The final items of the test were left at twenty nine, fifteen of which were intended to test positive language transfer and fourteen to test negative language transfer. Finally, the test was given out to a random sample of the pupils in Grades 7, 8 and 9.

6 – Data Analysis :

Each of the subjects' responses was marked by the researcher according to an elaborate marking scheme based on the scoring techniques used by Burt and Dulay (1980) and Hamed El Nil El Fadil (1988). Since it was necessary to have continuous data in factor analysis, a five point scale was used. According to the marking scheme, a test item could have a score of 1, .75, .50, .25, or zero. For example, the second item in the test was scored in the following manner :

- 1 – One point was awarded to the correct response ' am '.
- 2 – .75 was given for any other copular in the correct tense, i.e. ' are ' or ' is '.

- 3 – .50 was awarded for the use of ' was ' or ' were '.
- 4 – .25 was awarded for any other morpheme and.
- 5 – zero was awarded for a non-response.

When the scoring was completed, each of the subjects' twenty nine scores, plus their sex and school grade, were entered into a (2250) – computer, Since the available SPSS x program could factor analyse only eight variables, the twenty nine morphemes were grouped to form eight variables. The grouping was based on the notions of positive and negative language transfer being tested as well as on class form. Where these two criteria conflicted, the grouping was made on the basis of the hypothesised positive and negative language transfer. There was no conflict between these two criteria for the morphemes in groups 1, 2, 5 and 7. However, there was conflict between the two criteria for the morphemes in groups 3, 6 and 8.

As has already been mentioned, the morphemes in groups 1, 2, 3 and 4 will test positive language transfer while the morphemes of Groups 5, 6, 7 and 8 will test negative language transfer. It is unnecessary to point out that there are corresponding forms in Arabic for the morphemes in the first four groups of morphemes, but there are no corresponding forms in Arabic for the morphemes in the last four groups. One point must be mentioned here about the morphemes in group 7. Although there are forms in Arabic corresponding to the personal pronouns ' me ' ' him ', and ' my ', they are realized in Arabic as bound and not free morphemes as in English. This point will be discussed in greater detail later.

Finally, four Principal – Components analyses were run on the eight groups of scores. The first analysis was run on the scores obtained by the whole population of subjects. The second, third and fourth analyses were carried out on the eight groups of scores obtained by the subjects in Grades 7, 8 and 9 respectively.

7 – Results and discussion :

Tables 2, 3, 4 and 5 present the results of various rotated Princppal-Components factor analyses of the eight groups of scores

obtained by :

- 1 - The whole population fo subjects.
- 2 - The subjects in Grade 7.
- 3 - The subjects in Grade 8.
- 4 - The subjects in Grade 9.

It may be observed from these four tables that two factors seem to have been extracted. However, there is a slight difference in the number of variables having significant loadings on each of the factors in the four tables. It may be observed from Tables 2 and 5 that Factor P seems to take significant loadings (values of 50 + were considered to be significant) from five groups of morphemes, and Factor N seems to take significant loadings from three groups of morphemes. However, it may also be observed from Tables 3 and 4 that both factors, P and N, seems to take significant loadings from four groups each.

Table 2

A Principal-Components rotated factor matrix for eight groups of scores (comprising 29 morphemes) obtained by the whole population of subjects in answering the completion test (N = 361).

| SCORES | | FACTOR P | FACTOR N |
|-----------|--|----------|----------|
| Group 1 : | [name, facther, day] [time, year] | .86 | |
| Group 2 : | [ask, read, come,] [visit] | .82 | |
| Group 3 : | [and, in, for, from] | .79 | |
| Group 4 : | [l, he] | .77 | |
| Group 5 : | [3rd s 's', ing. ed, en] | | .53 |
| Group 6 : | [at, a, to] | | .64 |
| Group 7 : | [me, him, my] | .51 | |
| Group 8 : | [am, is, have, had] | | .95 |

Table 3

A Principal-Components rotated factor matrix for eight groups of scores obtained by the subjects in Grade 7 (i. e. 1st year preparatory school) (N = 121).

| | SCORES | FACTOR P | FACTOR N |
|-----------|----------------------------|----------|----------|
| Group 1 : | [name, facther, day] | .62 | |
| | [time, year] | | |
| Group 2 : | [ask, read, come,] | .72 | |
| | [visit] | | |
| Group 3 : | [and, in, for, from] | .79 | |
| Group 4 : | [I, he] | .77 | |
| Group 5 : | [3rd s 's', ing. ed, en] | | .61 |
| Group 6 : | [at, a, to] | | .76 |
| Group 7 : | [me, him, my] | | .59 |
| Group 8 : | [am, is, have, had] | | .88 |

Table 4

A Principal-Components rotated factor matrix for eight groups of scores obtained by the subjects in Grade 8 (i. e. 2nd year preparatory school) in answering the completion test (N = 127).

| | SCORES | FACTOR P | FACTOR N |
|-----------|----------------------------|----------|----------|
| Group 1 : | [name, facther, day] | .85 | |
| | [time, year] | | |
| Group 2 : | [ask, read, come,] | .73 | |
| | [visit] | | |
| Group 3 : | [and, in, for, from] | .78 | |
| Group 4 : | [I, he] | .71 | |
| Group 5 : | [3rd s 's', ing. ed, en] | | .57 |
| Group 6 : | [at, a, to] | | .78 |
| Group 7 : | [me, him, my] | | .59 |
| Group 8 : | [am, is, have, had] | | .85 |

Table 5

A Principal-Components rotated factor matrix for eight groups of scores obtained by the subjects in grade 9 in answering the completion test (N = 113).

| SCORES | | FACTOR P | FACTOR N |
|-----------|---|----------|----------|
| Group 1 : | [name, father, day] [time, year] | .79 | |
| Group 2 : | [ask, read, come,] [visit] | .74 | |
| Group 3 : | [and, in, for, from] | .62 | .40 |
| Group 4 : | [I, he] | .66 | .38 |
| Group 5 : | [3rd s 's', ing. ed, en] | | .62 |
| Group 6 : | [at, a, to] | | .60 |
| Group 7 : | [me, him, my] | .32 | |
| Group 8 : | [am, is, have, had] | | .83 |

The fact that the four factor analyses suggest that two factors seem to have been extracted presents strong evidence in support of the first hypothesis.

To prove or disprove the other two hypotheses, it is necessary to interpret these two factors. As has already been observed, each of the factors in Tables 3 and 4 seems to take significant loadings from four factors each. For example. Factor P in Table 3 seems to take significant loadings from the morphemes of group 1 (.62), group 2 (.72), group 3 (.79) and group 4 (.77). It may also be observed from Table 4 that Factor P seems to take significant loadings from these same four groups of morphemes, with only some difference in the values for each group. It may, however, be remembered that the second hypothesis maintains that the first factor will take significant loadings from the groups of morphemes found in both English and Arabic, namely from the morphemes of groups 1, 2, 3 and 4. Therefore, it may be suggested that the loadings on the first factor as portrayed in Tables 3 and 4 present strong evidence in support of the second hypothesis. Consequently, Factor P may tentatively be called positive language transfer factor.

It may again be observed from Table 3 that Factor N seems to take significant loadings from the morphemes in group 5 (.61), group 6 (.76), group 7 (.59) and group 8 (.88). Similarly, the results presented in Table 4 suggest that Factor

N seems to take significant loadings from these same groups of morphemes. It may again be recalled that the third hypothesis maintains that the other factor will take significant loadings from the morphemes in groups 5, 6, 7 and 8. Consequently, it may be suggested that the loadings on Factor N, as observed in Tables 3 and 4, present strong evidence in support of the third hypothesis. Since the morphemes in groups 5, 6, 7 and 8 are found in English and not in Arabic, it may be suggested that Factor N is measuring negative language transfer. And, hence, it may tentatively be called negative language transfer factor.

However, the picture presented in Tables 2 and 5 is not as neat and tidy and is therefore more difficult to interpret. This is due to the observation that the results portrayed in Tables 2 and 5 suggest that Factor P seems to take significant loadings from five groups of morphemes (1, 2, 3, 4 and 7) instead of four, whereas Factor N seems to take significant loadings from three groups of morphemes (5, 6 and 8), instead of four groups viz. 5, 6, 7 and 8. It may be observed that this discrepancy was caused by the observation that the morphemes in group 7 seem to have significant loadings on Factor P rather than on Factor N. This suggests that the scores obtained by the whole population of subjects as well as the subjects in Grade 9 in supplying and using the morphemes in group 7 viz. ' me ' , ' my ' and ' him ' correlated more strongly with the scores obtained by the whole population of subjects and the subjects in Grade 9 in their attempt to supply the morphemes in the first four groups, i. e. the morphemes used in English and Arabic. This was contrary to expectation. And this makes it difficult to interpret Factor P as portrayed in Tables 2 and 5 as a pure measure of positive language transfer because it also takes significant loadings from a group of morphemes that were intended to test negative and not positive language transfer. It may therefore be quite interesting to attempt to explain this apparent discrepancy. An attempt will first be made to explain the discrepancy observed in Table 5 (Grade 9) since it is easier to explain. This explanation might also be applied to the results in Table 2.

It may be recalled that Table 5 presents the factor analysis of the scores of the subjects in grade 9. Since the subjects in Grade 9 had more years of English than the subjects in Grades 7 and 8, and therefore more knowledge of English, it may be argued that their ability in supplying and using correctly the morphemes of group 7, viz. ' me ' , ' my ' and ' him ' , was as good as their ability to supply the morphemes in groups 1, 2, 3 and 4 with which they seem to covary. However, this argument falls down on at least two points. On the one hand, why is the

subjects' knowledge of English reflected on the morphemes 'me', 'my' and 'him' and not on any of the other morphemes in groups 5, 6 and 8? This weakness becomes all the more serious when we remind ourselves of the contention that 'me', 'my' and 'him' being small functors, are more likely to covary with other small functors than with the class of nouns and verbs found in the first four set of groups. On the other hand, the proposition that the forms common to the target language and the native language will be learnt faster than the other forms is open to criticism, (See Burt and Dulay, 1980. Dulay and Burt, 1972, 197).

In spite of these two apparent weaknesses in the above explanation, the researcher still has strong reason to believe that the explanation given above may still be viable for a number of reasons. The first reason is related to the concepts of input and frequency of use, (See Deanne Larsen – Freeman, 1978, 1985, Gass, S and Madden, 1985). It may be argued that the three morphemes of group 7. i. e. 'me', 'my' and 'him' correlated more strongly with the morphemes that seem to measure positive language transfer because they were more frequently used in the course books. Of course, the only possible way of verifying this claim is to carry out a content analysis of the teaching materials of the Crescent Course for the first five years of the course, and then correlate the frequency of occurrence of each of the morphemes of this study with their acquisition order, to find out if there is a strong correlation between the frequency of occurrence and the acquisition order of the morphemes.

The second explanation is related to the concept of fossilization (Selinker, 1974). It seems that the three morphemes 'me', 'my' and 'him' are less fossilizable than the other morphemes testing negative language transfer, such as 'have', 'has', 'is' and 'am'. (See Table 1) This second explanation poses the question " why are these three morphemes less fossilizable than the other morphemes testing negative language transfer? " In order to answer this question, it is necessary to look into the system of pronouns in both English and Arabic.

Although both English and Arabic have a complex system of pronouns, there are some differences between the two systems. Whereas all English pronouns are free morphemes, Arabic pronouns can be free or bound morphemes, though they are, more often than not, used as bound morphemes. In order to understand this point, the following examples need to be studied :

1. I lent him my book

a) / Sallaftuhu kitaabi /

2. He lent me his book

b) / Sallafani kitaabahu /

It may be noticed that while each of the two English sentences consists of five words, their Arabic equivalents consist of two words each. It must be mentioned here that because Arabic is an agglutinative language, a verb can take many suffixes or affixes to express time, case, sex, etc. Both 'I' and 'him' of sentence one above are affixed to the Arabic root / slf /. However, without going into too much detail in explaining how the root / slf / differs in sentences a and b, and similarly how the root / ktb / also differs in sentences a and b, it may suffice to mention that whereas the pronouns 'I', 'he', 'him', 'my', 'me' and 'his' are realized as free morphemes, they are realized as suffixes and affixes in the equivalent Arabic sentences. Therefore it may be surmised that the difference between English and Arabic pronouns lies mainly in the manner in which they are realized. As has been mentioned earlier, although Arabic has free morphemes for personal pronouns, in actual sentence structure they are more often than not realized as bound morphemes. They are used as free morphemes for emphasis, but even then the verb must be inflected to indicate the person speaking or spoken to.

The purpose of all this has been to suggest that the problems caused by the difference in signalling a certain concept or structure can be overcome more easily than the problems caused by the complete absence of a concept or structure in the native language. There is strong evidence from Hamed El Nil Fadil (1986) to support this claim. In a cross-sectional study aimed at testing the influence of the learners' first language (i. e. Arabic) on their acquisition of six morphemes used in forming five wh-questions, Hamed El Nil El Fadil (1986) compared the subjects' acquisition of three morphemes viz, the wh-question words, the auxiliary 'did' and the personal pronoun 'you'. It may be necessary to point out here that the wh-question words exist in both Arabic and English, the auxiliary 'did' has no corresponding form in Arabic, and the personal pronoun 'you' is realized differently in the two languages. It was observed that about half the subjects (51.21 %) in Grade 6 who had studied English for about one and a half years seem to have acquired the correct use of the wh-question words and that by the final year of school, i. e. at Grade 12, all the subjects seem

have acquired the correct use of the wh-question words. It was also observed that only about 9.75 % of the subjects in Grade 6 seem to have acquired the correct use of the personal pronoun ' you ', but by the final year about 88.06 % of the subjects seem to have mastered the use of the personal ' you '. As far as ' did ' was concerned, no remarkable increase in the percent of subjects who acquired ' did ' seem to have been observed, because about 7.31 % of the subjects in Grade 6 seem to have acquired the correct use of ' did ' and only about 35.09 % of the subjects, by the final year, seem to have acquired the correct use of ' did '.

These three findings were interpreted to suggest an acquisition of difficulty order for the three types of structure viz. :

- 1 - Structures found in the native and target language.
- 2 - Structures found in the native and the target language but realized differently.
- 3 - Structures found in the target language but not in the native language.

It was suggested that the first type of structure was the easiest to acquire followed by the second and third types. It was also tentatively suggested that the subjects might have found it easier to change their initial hypothesis concerning type two structures, but found greater difficulty in changing their hypothesis concerning the third type of structure.

It may consequently be suggested here that the subjects in Grade 9 of the present study might also have been more successful in changing their initial hypothesis concerning the use of the morphemes ' me ', ' my ' and ' him ' of group 7, than in changing their initial hypothesis concerning the use of the morphemes in group 5, 6 and 8. This could also be explained as before, that learners find the forms which are realized differently in the native and the target language easier to acquire than the forms found in the target but not in the native language of the learners.

This may therefore explain why in the factor analysis the morphemes ' me ', ' my ' and ' him ', which are realized differently in English and Arabic, seem to have significant loadings on Factor P rather than Factor N, which seems to have significant loadings from the morphemes which are found in English and not Arabic. It will be suggested in the next section of this study that the technique of factor analysis can have promising and valuable use in the areas of foreign

language testing as well as in second language acquisition research.

8 – Conclusion and Implications :

From the results of the previous study (Hamed Elnil El Fadil, 1988) and the results of the present study, it may now safely be concluded that there exists in the process of learning English as a foreign language by native speakers of Arabic, at least two psychological constructs or factors.

The first factor which has significant loadings from the morphemes found in both English and Arabic, could be thought of as representing or measuring the linguistic knowledge which the learners have acquired in the process of learning their native language, i.e. Arabic, and which seems to have been useful when learning English as a foreign language. The second construct or factor has significant loadings from the items which are used in English, but not in Arabic. This second factor could also be assumed to be measuring the linguistic knowledge which is found in English, but not in Arabic. The first factor was called positive language transfer factor, or P Factor, while the second factor was called negative language transfer, or N Factor, It may be interesting to note that the first factor is the stronger of the two. This was also true of the first study (Hamed El Nil El Fadil, 1988). This may provide further evidence to the thesis that there is a lot in common between human languages, not only between languages of different families or origin, viz, Arabic and English, but also at the level of surface structure (Celce-Murcia and Hawkins, B, 1985, P. 1985, P62). This last point may induce us to pose the question of where to place the findings of this study in the rival camps of linguistics and language learning theories, viz. mentalist theories and mechanist theories. Since the researcher has argued elsewhere that the notions of language transfer and creative construction as well as hypothesis testing are not incompatible, this point will not be discussed further here, (See Hamed El Nil El Fadil 1986). However, it may be more worthwhile in the remainder of this paper to discuss the uses and the implications of factor analysis in the field of second language acquisition and perhaps more specifically in the field of contrastive analysis and first language transfer.

First, previous researchers in the field of foreign language learning from C. Fries (1985) through R. Lado (1957) to present day researchers have by and large based their theory of the influence of the mother tongue of the

learners on the learning of a second or foreign language on observation and speculation. Nemser (1974, P.60) makes the point that: "Contrastive analysis specialists, on the other hand, often primarily concerned with techniques for establishing inter-systematic correspondences, have been content for the most part to derive empirical support for their formulations from impressionistic observation and intuition". Indeed, the whole field of second language acquisition research seems to suffer from similar faults related to the validity of the instruments and methods used in data collection and data analysis, (Rosansky, 1976).

Even when researchers in second language acquisition go beyond the establishing of the acquisition order of morphemes and attempt the carrying out of theoretical explanations or hypothesize on the existence of certain psychological constructs, it may still be observed that the theoretical assumptions are based on observation and intuition. The researcher has in mind the admirable work of Pit Corder (1981). Larry Selinker (1974), Nemser (1974), and Rutherford (1982) among others. Let us take as an example the five central psycho-linguistic processes described by Selinker (1974, p. 35) as influencing the learning of a second language. One wonders if it would be possible to construct five separate test batteries to test each of the five central processes of:

- 1 - Language transfer.
- 2 - Transfer of training.
- 3 - Strategies of second language learning.
- 4 - Strategies of second language communication and.
- 5 - Overgeneralization.

And then factor analyse the test scores obtained on the five tests in order to find out if there is indeed any underlying relationship amongst the test items purporting to test each of these five psycholinguistic processes. This process is extremely important for the scientific proof of these five central psycholinguistic constructs. A similar process may also be carried out in relation to the theory of markedness (Rutherford, 1982) so as to discover if there is indeed an underlying relationship between marked forms on the one hand and unmarked forms on the other. It may be worthwhile at this point to quote Philip E. Vernon (1951, 1971, p. 1) who says: Casual observation and introspection are incapable of providing scientific proof of their

existence (i. e. the powers and faculties of the mind), and in consequence many past theories of human abilities and qualities and their organization were entirely fallacious'. One would not go as far as saying that the procedures employed by Selinker (1974) and Rutherford (1982) were unscientific, but undoubtedly their research will definitely benefit from the use of factor analysis, that is in determining in a more scientific and valid way the underlying psychological constructs in second and foreign language acquisition. Thus far one area where the use of factor analysis in second language acquisition research can be beneficial has been highlighted.

In addition to this, factor analysis can also pinpoint groups of morphemes that are more fossilizable than others and the relevance of this to the understanding of the phenomenon of fossilization cannot be over-emphasised. We have already discussed the morphemes 'my', 'me' and 'him', which were hypothesised to have significant loadings on the negative language factor but contrary to expectation, had significant loadings on the positive transfer factor. This was specially true of the factor analysis of the scores of the subjects in Grade 9. This was interpreted as indicating that the personal morphemes 'my', 'me' and 'him' were less fossilizable than the other morphemes which had significant loadings on the negative language transfer in all the four factor analyses. Several reasons were suggested to account for this finding, but perhaps the most plausible one may be the fact that the morphemes 'have', 'has', 'am' and 'is', as well as the other bound morphemes of group 5, are used in English but not in Arabic, whereas the personal pronouns are used in Arabic, but unlike English they are linguistically realized as suffixes and affixes, i. e. as bound morphemes. Hence it was tentatively concluded that completely different structures are more fossilizable than partially different structures. Consequently, it may also be helpful in assisting researchers in the discovery of the more fossilizable morphemes for any group of learners sharing the same native language.

A third area where factor analysis can be useful is the area of testing linguistic competence, where the focus is on the learners' control of the grammar of English. Before we elaborate on this point, it must be mentioned that factor analysis is already used in the field of testing as well as in the discovery of language aptitude and verbal abilities, (See Carroll, J. B., 1941,

1958 ; Carroll, J. B. and Sapon, S. M., 1959; Oller, J., 1979). Therefore, in addition to this, factor analysis can have more direct contributions in the construction or selection of test items. This will mainly be derived from the findings related to fossilization. It may be possible after carrying out a series of successive factor analyses of the scores obtained by learners from different levels of linguistic development in their use of a certain number of morphemes, to arrive at a difficulty hierarchy. It may then be possible to obtain from this difficulty hierarchy a scale of linguistic development. And it might be possible to construct tests based on this scale for a certain group of learners in order to determine in a more valid way their level of linguistic development.

A fourth area where factor analysis can be used is in the discovery of the types of learners who are more likely to resist negative language transfer and those who are less likely to do so. This can be done by relating various personality and other sociolinguistic variables to the two factors of positive and negative language transfer. This is statistically possible, because each of the two factors has factor scores and it is possible to correlate these factor scores with any other variables we can think of such as age, sex, level of learning, orientation and intensity of motivation, etc. One may, for example, use the Lambert and Gardner orientation index and then correlate the scores obtained in the orientation index (see Gardner and Lambert, 1972; Gardner, R. C., 1985) with the factor scores obtained on each of the P and N factors. Such investigations may help us in discovering the types of learners who are more susceptible to negative language transfer and those who are not. Again, the results obtained from such investigations may be useful in the selection of learners who are most likely to benefit from further studies in English. One further point in this connection seems to be in order. Though the present concern of some researchers such as Zobl (1980) with the discovery of the linguistic contexts which are more conducive to language transfer are quite valuable, it is also equally valuable to try to discover the types of learners who are more likely to resist negative language transfer and who are not and also attempt to discover measures which may help such learners to obviate the effects of negative language transfer. The implications of this to foreign language learning and teaching cannot be overemphasised.

However hopeful one might be of the uses of factor analysis in contrastive analysis and interlanguage studies, one must remember that linguistic

studies alone will not be able to solve all of the intractable problems encountered by second and foreign language learners, It is important to integrate the different branches of linguistics with one another (Gass, 1988) as well as with the education sciences (Hamed El Nil El Fadil, 1984) if we are ever to achieve better success in learning English as a foreign language.

*** REFERENCES ***

- Burt, M. K. and Dulay, H. 1980. On acquisition orders. In Felix, S. W. (ed.), *Second Language Development*. Gunter Narr Verlag Tubingen.
- Carroll, J. B. 1941, A factor analysis of verbal behaviour. *Psychometrica*, Vol. 6, No. 5. 279 – 307.
- Carroll, J. B. 1958. A factor analysis of two foreign language aptitude batteries. *Journal of General Psychology*, 59, 3 – 19.
- Celce-Murcia, M. and Hawkins, B. 1985. Contrastive analysis, error analysis, and interlanguage analysis. In celce-Murcia, M. (ed.), *Beyond Basics. Issues and Research in TESOL*. Newbury House Publishers, Inc..
- Corder, S.P. 1981. *Error Analysis and Interlanguage*. Oxford University Press.
- Dulay, H. C. and Burt, M. K. 1972. Goofing an indicator of children's second language learning strategies. *Language Learning* 22/2, 235–252.
- Dulay, H. C. and Burt, M. K. 1976. Creative construction in second language learning and teaching. *Language Learning*. Special Issue Number. 4, 65 – 79.
- Fries, C. 1945. *Teaching English as a Foreign Language*. Ann Arbor: The University of Michigan Press.
- Gardner, R. C. 1985. *Social Psychology and Second Language Learning* Edward Arnold.
- Gardner, R. C. and Lambert, 1972. *Attitudes and Motivation in Second Language Learning*. Newbury House Publishers.
- Gass, S. 1988. Integrating Research Areas: A framework for second language studies. *Applied Linguistics*, 9/2, 198–217.
- Gass, S. and Madden, C. G. 1985. *Input in Second Language Acquisition*. Newbury House Publishers.

- Hamed El Nil El Fadil. 1984. TEFL/TESL and the Education Sciences : Where the antipathy has led to. In Isam Abu Salim and Jonathan Owens (eds.), Proceedings of the Third Annual Linguistics Conference, 1–3 April 1984. University of Yarmouk, Irbid, Jordan.
- Hamed El Nil El Fadil. 1986. The acquisition of wh–questions by native speakers of Arabic. Paper presented at the 20th IATEFL Conference in Brighton, England, 1–4 April 1986.
- Hamed El Nil El Fadil, 1988. The extraction of positive and negative language transfer factors, Bulletin of the Faculty of Education, University of Qatar, Vol. 6. 37–49.
- Kerlinger, F. N. 1973. Foundations of Behavioural Research. Second Edition, Holt Rinehart Winston, Inc..
- Lado, R. 1957. Linguistics Across Cultures. Ann Arbor : The University of Michigan Press..
- Larsen–Freeman, D. 1978. An explanation of the morpheme accuracy order of learners of English as a second language. In Hatch, E. M. (ed.), Second Language Acquisition. Newbury House Publishers.
- Larsen–Freeman, D. 1985. State of the art on input in second language acquisition. In Gass, S. M. and Madden, G. C. (eds.) Input in Second Language Acquisition. Newbury House Publishers, Cambridge.
- Nemser, W. 1974. Approximative systems of foreign language learners. In Richarads, J. C. (ed.) : Error Analysis. Longman.
- Oller, W., Jr. 1979. Language Tests at School. Longman.
- Rosansky, E. J. 1976. Methods and morphemes in second language acquisition research. Language Learning 26/2, 409–425.
- Rutherford, W. E. 1982. Markedness in Second Language Acquisition. Language Learning, 32/1, 85–108.

- Selinker, L. 1974. Interlanguage. In Richards, J. C. (ed.), Error Analysis. Longman.
- Vernon, P. 1950. 1971. The Structure of Human Abilities London : Methuen & Co. Ltd.
- Zobl. H. 1980. The formal and developmental selectivity of L₁ influence on L₂ acquisition. Language Learning, 30/57.

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