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TRANSFER OF TRAINING
IN
BILINGUALS

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A thesis

Submitted in Partial Fulfillment of the Requirements of
the Degree of Master of Arts in the Psychology
Department of the
American University of Beirut

Beirut, Lebanon

June, 1967



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ACKNOWLEDGEMENT

The writer wishes to express thanks to all the staff of the department of Psychology, at the American University of Beirut. Their continual advice and guidance, both formally and informally has made this research project more meaningful professionally and personally.

Special thanks are due to Professor Dalrymple-Alford, Chairman of the Committee - for his continuous assistance, to the other members of the Committee, Professor L. Melikian and Professor C. Consalvi. Thanks are also due to all Persian students at the American University of Beirut, who served as subjects in the experiments.

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ABSTRACT

The results of an experiment by Kolers (1964) on transfer in bilinguals provided no evidence for transfer on the task of alphabet-inversion. The conclusions drawn from this experiment were questioned in another study by Dalrymple-Alford (1967) where the design used by Kolers was improved and a different task was employed. There was evidence for intra-and inter-lingual transfer of training.

The present study was another attempt to study this phenomenon among bilinguals. Using the task of word-construction with three-letter combinations, 40 Persian-English bilinguals were tested. On the basis of their performance on the same task, in Persian and English, Ss were assigned to four different conditions such that interlingual transfer from Persian to English and from English to Persian could be studied. There was no evidence for the inter-lingual transfer of this skill. This was accounted for in terms of some deficiencies in the experimental design, a failure to establish a considerable improvement in the skill during practice trials, the inhibitory effect of a set established through the medium of one language on the performance in the other language, the nature of the task, and the possibility that Ss in this experiment were mostly coordinate bilinguals.

CHAPTER I

INTRODUCTION

The recent interest in the field of bilingualism has led to the study of the problem of transfer in bilinguals. Since interest in this field is new, very little has been done in this area, and no general statement can be made as to whether transfer of training occurs between the bilingual's two languages, or as to the underlying mechanisms if this transfer does occur.

Transfer of training refers to cases where the learning of, or training in one task carries over to the second task. Some writers have distinguished between transfer, which means the carrying over of a behavior from one task to another, and transfer effect, which is defined as the effect of one behavior pattern upon the learning of another task (Hall, 1966, p. 472). The phenomenon of transfer is one of the salient characteristics of human learning and it has been studied extensively in relation to different human skills such as motor skills, problem-solving, and also in the field of education. Early work in the area of transfer had its origin in an examination of the concept of "formal discipline". A number of traditional educators assumed that the individual was endowed with a number of faculties, such as reasoning,

memory power, perception, and that the effect of practice with one type of material would result in a general strengthening of that faculty and possibly would transfer to other faculties too (Hall, 1966, p. 477).

In the field of bilingualism, transfer of training deals with this question: when a bilingual develops a verbal or cognitive skill through the medium of one of his languages, is this skill accessible in the other language or does it remain linguistically specific? Once it is known that verbal skills are not linguistically specific, there remains the problem of explaining what specifically is transferred across a bilingual's two languages and what mechanisms underly this transfer. Still questions have to be answered as to whether transfer is a general phenomenon that takes place for any verbal skill, or whether it occurs in the case of certain verbal and cognitive skills only.

These problems deserve attention and careful experimental investigation since their answers are crucial in the psychological understanding of language organization and functioning in general, and in an understanding of the relationship and functioning of a bilingual's two languages, in particular. What are the effects on the functioning and strength of one language of the numerous verbal and cognitive skills that a bilingual acquires through the medium of the other language? Does the ease of functioning in one

language have any effect on the functioning of the other language or is every language equipped only with those skills that have been developed through its own usage?

Psychological investigations are still entangled with the basic problem of presence or absence of transfer in bilinguals. The aim of the present work is to present the knowledge accumulated from past experiments, and to investigate transfer in a specific situation, in a group of bilinguals, in the hope of making a contribution to the greater understanding of this problem. A general background in the area of bilingualism, the result of studies dealing with the relationship of the bilingual's two languages and of studies dealing specifically with transfer in bilinguals will be reviewed in the next chapter.

CHAPTER II

REVIEW OF THE LITERATURE

Psychological approaches to the study of bilingualism have been chiefly concerned with principles underlying the psychological organization of bilingual's two languages, functional dependency or separation of the two languages, and "the effect upon verbal behavior and thinking of the acquisition and usage of two systems of signs." (Ervin et. al., 1954, p. 142).

The theory proposed by Ervin and Osgood in 1954 views bilinguals as being distributed along a continuum, with pure compounds and pure coordinates at the extremes. This position is based upon Osgood's mediational theory, according to which the meaning of a sign (e.g. a word) is identical to the representational mediation process that the sign elicits in the organism. The term representational mediation process means that the response given to the sign is not equivalent to the response made to the object that is represented by the sign; the response to the sign only partially represents the total response made to the actual object and therefore representational. And the response to the sign, which is an internal response in the organism, mediates between the presentation of the sign and the organism's external response. When this theory is extended to explain bilingualis, a "Compound" bilingual is defined as the one who has two systems of

signs for the same meaning. A "Coordinate" bilingual however is the one who possesses two sets of signs which are comparatively less equivalent, and in some cases the actual referents of a sign in the two languages are not identical, the differences being more connotative rather than denotative (Ervin et. al., 1954).

These two types of bilingualism come about as a result of different language experiences. Learning a second language through the medium of the first one, i.e. through translation, is conducive to the formation of compound bilingualism, while learning the two languages in contextually separate situations such as in different cultures, (for example, English exclusively at school and Arabic at home), leads to the formation of coordinate bilingualism.

Experimental studies have provided, in most cases, differential linguistic manifestations for these two types of bilinguals. These differential manifestations seem to imply also two different kinds of organizational relationship between the bilingual's two languages, for compound and coordinate bilinguals. In the case of a compound bilingual, the two languages seem to function in a more unified and related manner, while for a coordinate bilingual the two languages seem to be more independent and unrelated.

Using Osgood's semantic differential technique with a group of French-English bilinguals Lambert (1961) found that coordinate bilinguals showed significantly greater difference in meanings of translated equivalents than did the compound bilinguals;

the former group also showed significantly more associative independence of translated-equivalents in their two language than did the compounds. Also in a learning task the interpolation of the translated-equivalents of the list of the words to be memorized facilitated the learning task for the compound group while it had detrimental effect on the performance of the coordinate group. However the two groups did not differ in switching from one language to the other. From these results Lambert concludes that the coordinate bilinguals, in contrast to the compound bilinguals, appear to have more functionally independent language systems.

In another study of bilinguals, Jakobovits and Lambert (1961) showed that compound - coordinate bilinguals differ in the effect of semantic satiation (the decrease in the strength of the meaning of a word, as measured by Osgood's semantic-differential technique). In line with their prediction, the compound bilinguals displayed a marked cross-linguistic satiation. In the case of coordinates, it was expected that there would be no cross-linguistic satiation. However, the coordinates displayed a "generation" of meaning in the second language. This was an unexpected result, and it implies that although for a coordinate bilingual the two languages are not linguistically independent, the relationship of the two languages is not the same as the

relationship of the two languages for a compound bilingual. The relationship seems to be more complex in the case of coordinates.

At present there is evidence that for some types of bilinguals, there is more functional independence between languages. Whether the compound-coordinate distinction is valid or not, there is still other experimental evidence that sometimes for a group of bilinguals the content of the two languages differ, even if these differences can not directly and clearly be related with compound-coordinate distinction. The above conclusion was reached in the study by Ervin (1964) on language and TAT content in bilinguals. Responding to the same picture, on two different occasions, in French and in English, the content of the two stories differed according to the language used. Do these results imply that experiences coded through one language remain specific to that language? That the meaning of the same stimulus (in this case a TAT picture) differs for a bilingual according to the language that he uses while expressing the meaning of that stimulus?

If the results of Koler's experiment (1966) on interlingual word association could be taken as valid evidence for separateness of a bilingual's two languages, one would give positive answers to the above questions. In his experiment Koler suggested two alternative hypotheses concerning the organizational relationship of a bilingual's two languages. Either experiences are coded in common, and each of a bilingual's languages would

act as are independent tap for this common store, whereby experiences stored in one language are accessible directly in the other language, or verbally defined past experiences are stored in a form specific to the language through which the individual acquired the experience, in which case a bilingual would have a different store of experiences to refer to in each of his two languages. The first of these hypotheses he called 'shared' hypothesis and the second 'separate' hypothesis. Using the method of word association, with a group of French-English bilinguals he found evidence for the 'separate' hypothesis. Kolers concluded that "experiences and memories of various kinds are not stored in common in some supralinguistic form but are tagged and stored separately in the language subject used to define the experience to himself." (Kolers, 1963, p. 299). However, considering that the processes involved in a task of word association are not yet clearly understood, the results of Kolers' experiment can not be taken as valid evidence for the separateness of the bilingual's two languages.

Interestingly enough, results with quite a different implication were obtained by Kolers himself in an experiment dealing with short-term memory in bilinguals (Kolers, 1966). It was known from previous experiments that the probability of recalling a word from a list of unconnected words increased with its frequency of occurrence in that list. With this knowledge as a basis,

Kolers wanted to examine the probability of recalling a word when the frequency of its occurrence was split between the word itself and its translated equivalent. English-French bilinguals (20 native speakers of each) were tested under three conditions: when the list of words consisted of equally frequent pairs of translated equivalents; when the list consisted of pairs of non-translated words, and when half of the list consisted of translated pairs and half of non-translated pairs. The results indicated that if the frequency of occurrence of a word is equally divided between the word itself and its translated-equivalent the effect is the same on the bilingual's short-term memory as when all the repetitions were in one language. Kolers points out that contrary to his previous experiment (1963) where he argued that a bilingual has separate encoding routines and storage systems for experiences represented with his two languages, the present study appears to favor the 'shared' hypothesis for the relationship between a bilingual's two languages. That is, the basis for encoding of the items is their semantic or referential similarity, and not their morphemic properties. From the results of this experiment (Kolers, 1966), it was inferred that when the same concept was presented to the subject in each of his two languages, the two presentations summated in their effects on the bilingual's short-term memory. The same findings were supported in another study by Kolers (8) on Reading and Talking Bilingually. In this study Kolers investigated the effect of linguistically mixed text, i.e. code switching,

on comprehension, reading aloud, oral precis, and the effect of practice with linguistically mixed texts and providing the subject with the necessary vocabulary on oral precis. It was found that comprehension of a text is independent of the linguistic form of the text while reading aloud and oral precis were effected by the linguistic form of the text. Subjects required more time to read aloud a linguistically mixed text and give a mixed oral precis of a text. However when the subjects were provided with some kind of the text when they spoke in mixed form, supposedly eliminating the time spent on finding the proper words in each language, subjects made more frequent switches from one language to the other; the length of a 'phrase' in one language became shorter. The rate of output did not increase because the switches became more frequent and switches take time. From these results and the fact that reading aloud was worse with mixed text, it was concluded that "encoding and decoding of language are not symmetrical operations." (Kolers, 1966, p. 376). The interesting finding however, was that code switching had no detrimental effect on bilingual's comprehension of that text. This meant that the bilingual subjects could derive information from a linguistically mixed text as well as they could form a unilingual text. This finding was taken as support for "the belief that words are perceived with respect to their symbolic or conceptual relations, and not their linguistic form as templates or things in themselves.

These results confirm and extend the earlier findings of an essentially semantic storage of concepts in short-term memory." (Kolers, 1966, p. 372). In another experiment (A'amiry, 1967) it was also found that bilinguals do not differ in their reaction time to unilingual and linguistically mixed instructions. 20 Arabic-English bilingual university students were required to press one of six buttons as quickly as possible in response to a written signal. The signal indicated the colour of the button and on which side it was. Thus the task was essentially the same as that of Lambert (1955). There were four conditions - (a) both position and colour indicated in Arabic, (b) both position and colour indicated in English, (c) position indicated in Arabic but colour indicated in English, (d) position indicated in English but colour indicated in Arabic. While there was a (non-significant) tendency for responses to Arabic signals to be faster, there was no indication that mixed language signals were responded to more slowly. The results are in agreement with those of Kolers (1966) on the comprehension of mixed language texts.

So far we have some evidence that in some respects the bilingual's two languages have equal access to an essentially common semantic storage. However, meaning and related verbal operations such as translation are only few ways by which a bilingual can retrieve information acquired through the use of the other language. The question is, however, whether operations such as

cognitive skills which do not involve translation, or a set of transformation rules which are learned through the medium of one language system, remain linguistically specific or, learned in the language, such skills can be demonstrated in the other bilingual's language. Transfer of cognitive skill is another way through which the relatedness or separateness of a bilingual's two languages could be studied. From the available knowledge concerning the relationship of a bilingual's two languages one would expect that the development of one skill through the medium of one language should either have some facilitative effect on the development of the same skill in the other language or it should be available in the other language without any practice being necessary.

The first experiment dealing specifically with transfer of cognitive skill was made by Kolers (1964). Using the task of alphabet-inversion (in this experiment English, and the alphabet of the native language of the subject), five groups of bilinguals were tested. Half of the subjects in each group had practice with the alphabet of their native language and were then tested on English alphabet. This was reversed for the other half of the group. Transfer was measured by the comparison of the initial performance of one subgroup with the final performance (test) of the other. There was no evidence for transfer of the alphabet-inversion skill and the improvement displayed by the subjects was related to the similarity of sound sequences in the two languages concerned.

However the experimental design and the task used by Kolers makes the interpretation of his results difficult. First, the nature of the task did not allow adequately for the development of any skill. As Kolers himself points out, it seemed that what subject's were developing during the practice trials was a faster rate of repeating an inverted list of alphabet and subsequent trials involved recall rather than the skill of alphabet-inversion. And when the subjects switched to the second language the only improvement was that arising out of the similarity between the correct response sequences. Also, a necessary assumption is the two sub-groups which were compared for the measure of transfer were initially of equal ability. In Kolers' experiment the subgroups were not matched and with only three subjects in each subgroup, it is unlikely that random allocation of subjects have resulted in subgroups of equal ability. Also, there was no measure of intra-lingual transfer, a necessary step for drawing conclusions about the relationship of the bilingual's two languages from inter-lingual transfer (Dalrymple-Alford, 1967). In a study of the same topic by Dalrymple-Alford (1967), an attempt was made to remedy the deficiencies of Kolers' experiment (1964) and the design and the task used in the experiment allowed a less equivocal interpretation of the data. Thirty six Arab-English bilinguals were tested under three conditions. The subject's task was to give

the letter immediately preceding a given letter in the alphabet concerned. Group I was practiced on a set of 10 English letters (B-K), and was then tested on a different set of English letters (Q-Z). Group II was practiced on a set of 10 Arabic letters (ta-seen), and was then tested on the English set, Q-Z. Both groups had a pre-test in English so that transfer effect, if any, could be separated from initial differences between groups on the Q-Z set. Group III, the control group, only did the pre-and-post-tests on the Q-Z set, so that the possible effect of pre-test on post-test could be eliminated. The results of the experiment clearly showed evidence for intra-and-inter-lingual transfer of skill, i.e. once a skill is developed through the medium of one language, it does not remain linguistically specific; it is transferred both within and across languages.

In another experiment by Young and Saegert (1966) it was shown that associations formed within the context of one language can facilitate or interfere with the formation of new associations in a second language (Young, 1966, p. 162). A group of English-Spanish bilinguals learned two serial lists - one in English and one in Spanish. Half of the subjects learned the English list first, and the other half the Spanish list. Within these groups three transfer paradigms were employed. For one group the second list was the translated equivalent of the first, with the same serial order, for another group the second list translated the first,

but the serial order was different and the third group was a control group. The results of the experiment indicate that the amount of transfer was approximately the same from English to Spanish as from Spanish to English. About 50% transfer was obtained in the 'same order' condition, and about 13% negative transfer was obtained in the 'Random order' condition. However, the task employed in this experiment is more a case of serial learning than acquiring a cognitive skill.

It is evident that little has been done in the area of transfer in bilinguals. Strictly speaking there is only Dalrymple-Alford's experiment (1967) which has employed a task that allows for the development of a skill, with an experimental design which allows for drawing a clear conclusion concerning the presence or absence of transfer in bilinguals. It is the aim of the present work to study the phenomenon of transfer, in a group of Persian-English bilinguals, using the task of word construction, which seems to be a more meaningful verbal task compared to tasks dealing with alphabets and serial learning, in an experimental design which remedies the deficiencies of the design used by Kolers in his study of transfer in bilinguals (Kolers, 1964).

CHAPTER III

THE PROBLEM AND METHOD OF INVESTIGATION

Using the task of constructing words containing specific three-letters combinations, in either Persian or English, the problem of transfer of skill was studied in a group of Persian-English bilinguals. Since Dalrymple-Alford (1967) obtained evidence both intra-and interlingual transfer of training, using an appropriate task and improving the design of the experiment by Kolers (1964) on transfer, the following was hypothesized:

Hypothesis: Improvement in a cognitive skill (word-construction in this experiment) through the use of one language will be demonstrated in the bilingual's second language.

However, before drawing any conclusion concerning inter-lingual transfer of skill, it will be necessary to show that the improvement in a cognitive skill in one language will be demonstrated when the subject is engaged in the same task but with different materials, in the same language.

METHOD

Subject's task:

On each trial, the subject was presented with a three-letter combination, either in Persian (P) or English (E) as the condition would demand, and was asked to write as many words as he could that included the given combination. He was also instructed that the word could be any word acceptable in that language (E or P), excluding compound words; proper nouns were also accepted and there was no specific order that the letters in the combination had to appear in the word.

The letter combinations were presented to the subject, written in block letters on white cards. The subject was allowed fifteen seconds to look at the combination, before he was instructed to start. Every trial lasted one minute and the letter-combination was in front of the subject throughout the trial. At the end of one minute the subject was instructed to stop, the card was removed, and he was presented with the next combination. Performance was assessed in terms of the number of correct meaningful words constructed during the one minute allowed for each trial.

For every condition of the experiment (to be described later), separate booklets were prepared for every subject. For every trial a new page was used.

The subjects in this experiment were all Persian-English bilinguals, and students at the University. There were 25 Males and 15 Females.

Procedure:

Matching groups: In the first part of the experiment, the subjects were tested on five combinations in English and five in Persian. Total number of words produced for English and for Persian combinations was obtained for every subject. The subjects were then assigned to four different groups (10 in each group) such that Groups A and B were matched on their English and Persian proficiency (using the total number of words produced in each language as the basis for matching), and Groups C and D were also matched on their English and Persian proficiency in the task. The result of the Wilcoxon Signed Rank test showed that neither Groups A and B, nor Groups C and D differed in their English or Persian performance in the task. The combinations used for matching are given in the appendix.

The sequence of conditions for the four groups may be summarized as follows:

Group A: 20 practice (Persian) trials - 5 post-test (English) trials.

Group B: 20 practice (English) trials - 5 post-test (English) trials.

Group C: 20 practice (English) trials - 5 post-test (Persian) trials.

Group D: 20 practice (Persian) trials - 5 post-test (Persian) trials.

the same English letter-combinations were used during the post-test trials of Group A and the first five practice trials of Group B. The

same was the case with the Persian letter-combinations used during post-test trials of Group C and the first five practice trials of Group D.

The distinction between practice and post-test for Groups B and D is a formal one since all the trials were in the same language for each group and the 5 post-test trials followed immediately after the practice trials. In the case of Group A and C, Ss were briefly informed at the end of the practice of the change in the language of the letter-combinations they would be working on.

In both parts of the experiment, the Ss were tested individually and the Ss had no knowledge that the second part of the experiment consisted of the same task as the one in the matching part. For every S, there was a minimum period of two weeks between the matching part and the actual experiment.

Independent measure of difficulty: The aim of this part was to provide an index of the level of the difficulty of the combinations, and also a basis for deciding whether the Ss had developed the skill (of word-construction) during the practice trials. Accordingly, the combinations used in the actual experiment were given one to each person. The Persian combinations were given to 30 Persian students at the university. The English combinations were given to 30 Arabic-English bilinguals also students at the university. The same procedure and instruction used in the experiment was also

followed in this part. Considering the nature of the task employed in this experiment improvement in the skill does not necessarily mean improvement from trial to trial. The presence of improvement in the skill can be inferred if any S taking part in the experiment constructs more words than the control group (of Persian or English) who had one trial each only.

CHAPTER IV

RESULTS AND DISCUSSION

In the first place it was necessary to show that the Ss had developed a skill during the practice trials. Figures 1, 2, 3, and 4 show the performance during practice and post-test trials of the four groups, as compared with the performance of the control group on the same combinations. It can be seen from the graphs that the performance of the experimental groups is considerably better than the control groups. In all four conditions, the curves follow approximately the same level of difficulty except that the experimental groups have produced many more words. One feature of these graphs is that the control groups had initially a lower level of performance than the experimental groups. This may be because Ss used in the control groups had an initially lower efficiency in English and Persian than the Ss in the experimental groups. It should also be noted that the data for the control group is less reliable than that for the experimental group. Every value in the graph for the experimental group, is the average of 50 trials (ten Ss, 5 trials each), while for the control group every point represents the sum total of five trials (one trial with each S).

It also seems that the subjects in the experimental group did not show considerable improvement during practice trials, since the difference between their performance and that of the control group

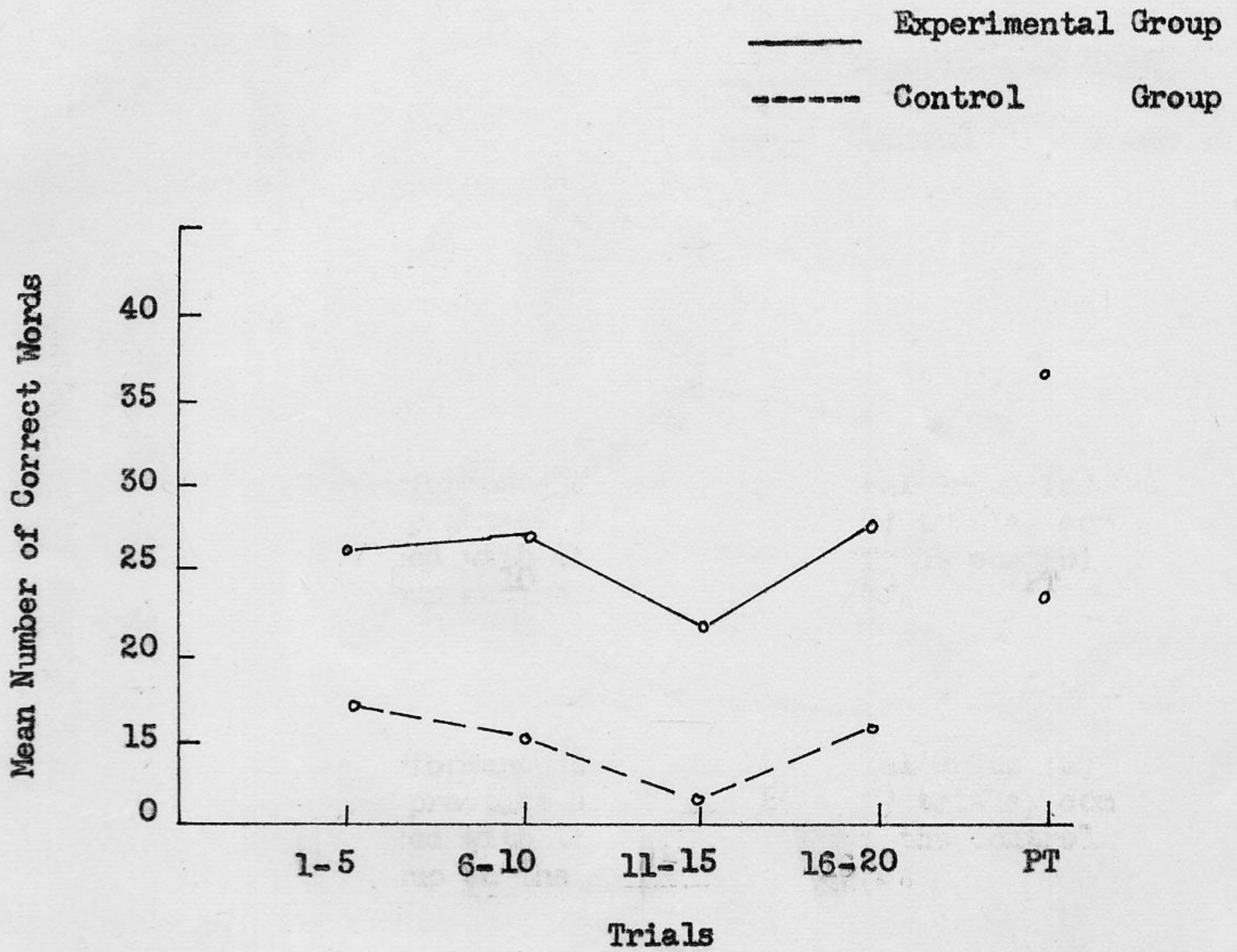


Fig. 1. - Performance of the Experimental Group (A) on practice and post-test (PT) trials, compared with the performance of the control Group on the same combinations.

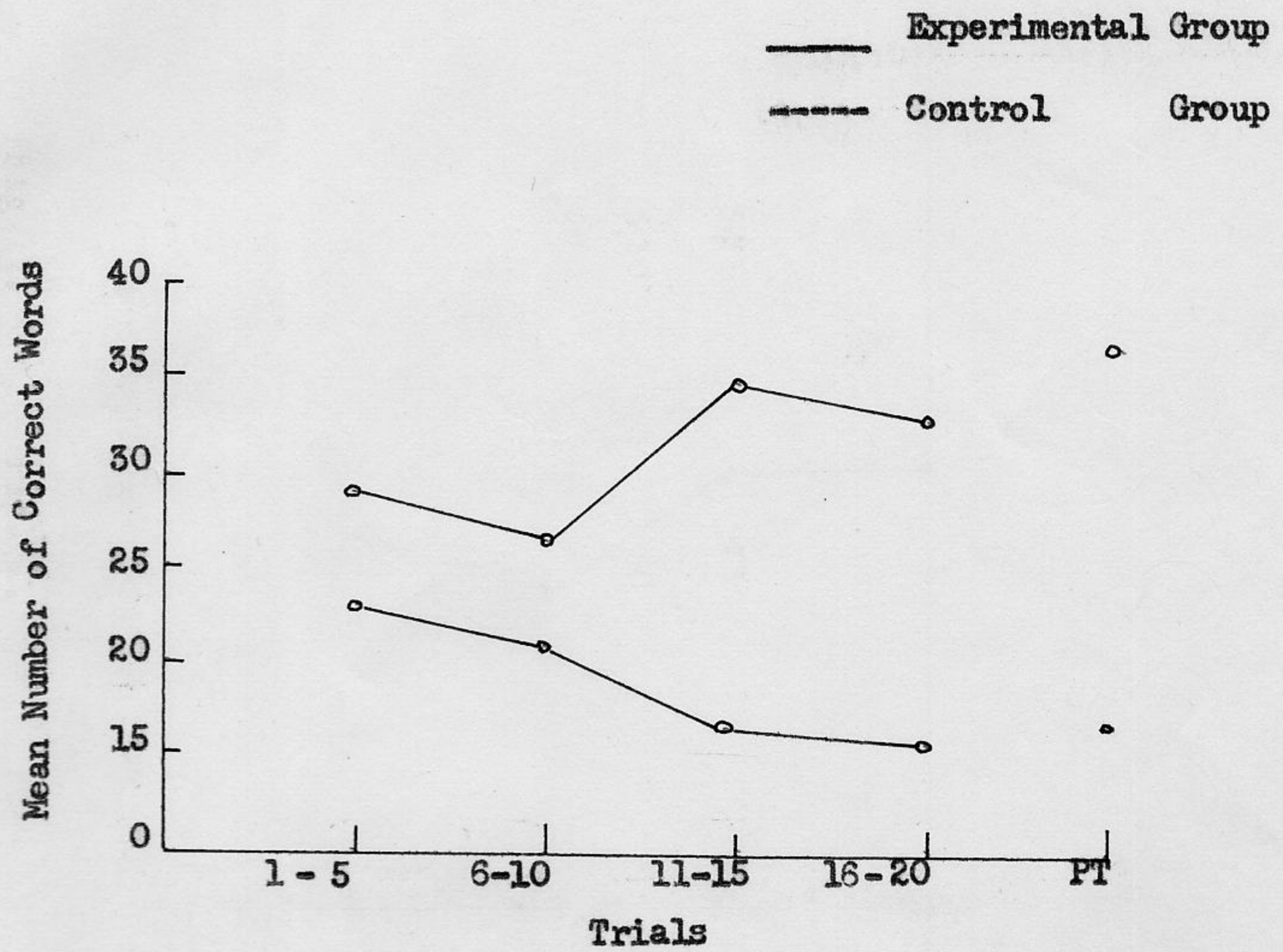


Fig. 2. - Performance of the Experimental Group (B) on practice and post-test (PT) trials, compared with the performance of the control Group on the same combinations.

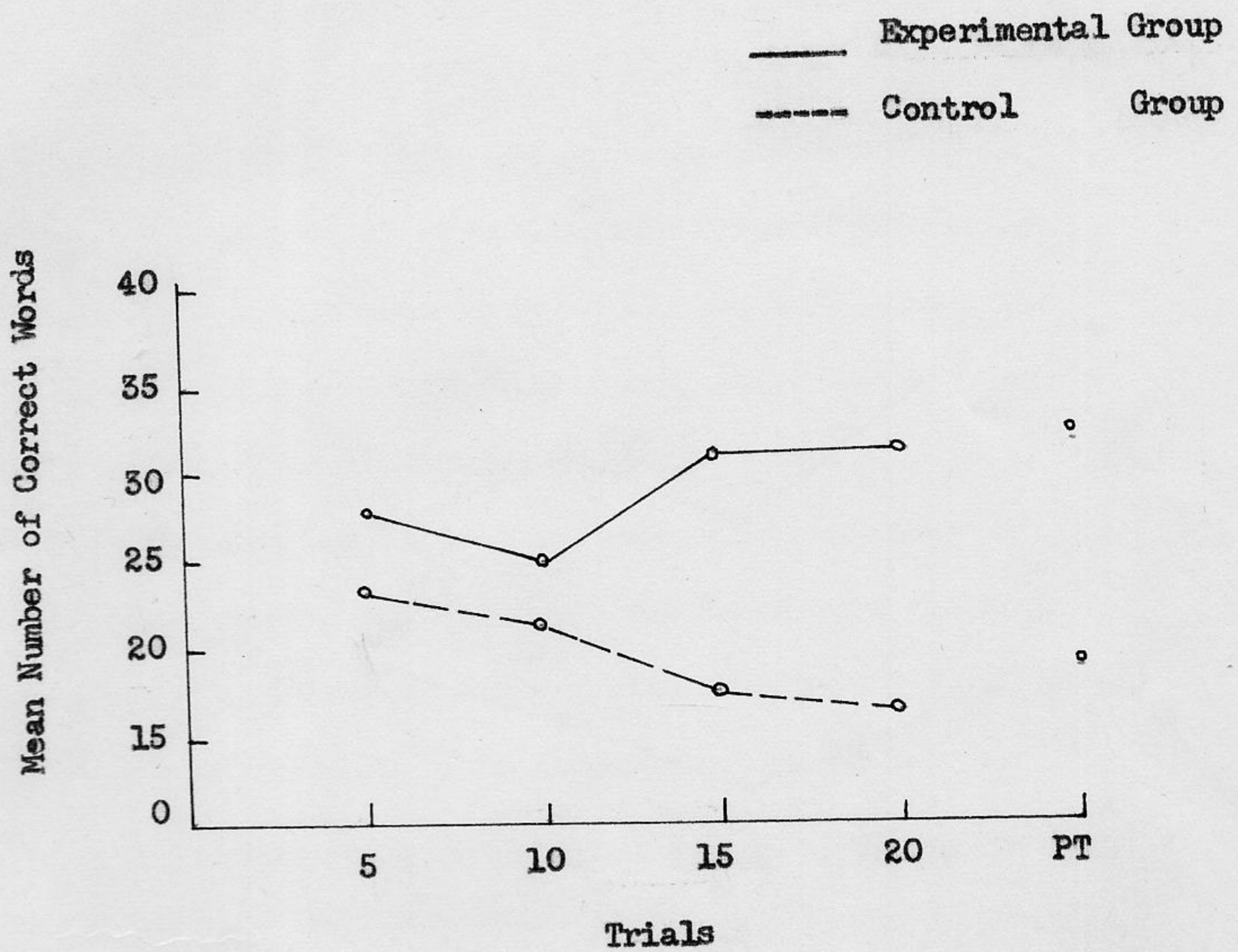


Fig. 3. - Performance of the Experimental Group (C) on practice and post-test (PT) trials, compared with the performance of the control Group on the same combinations.

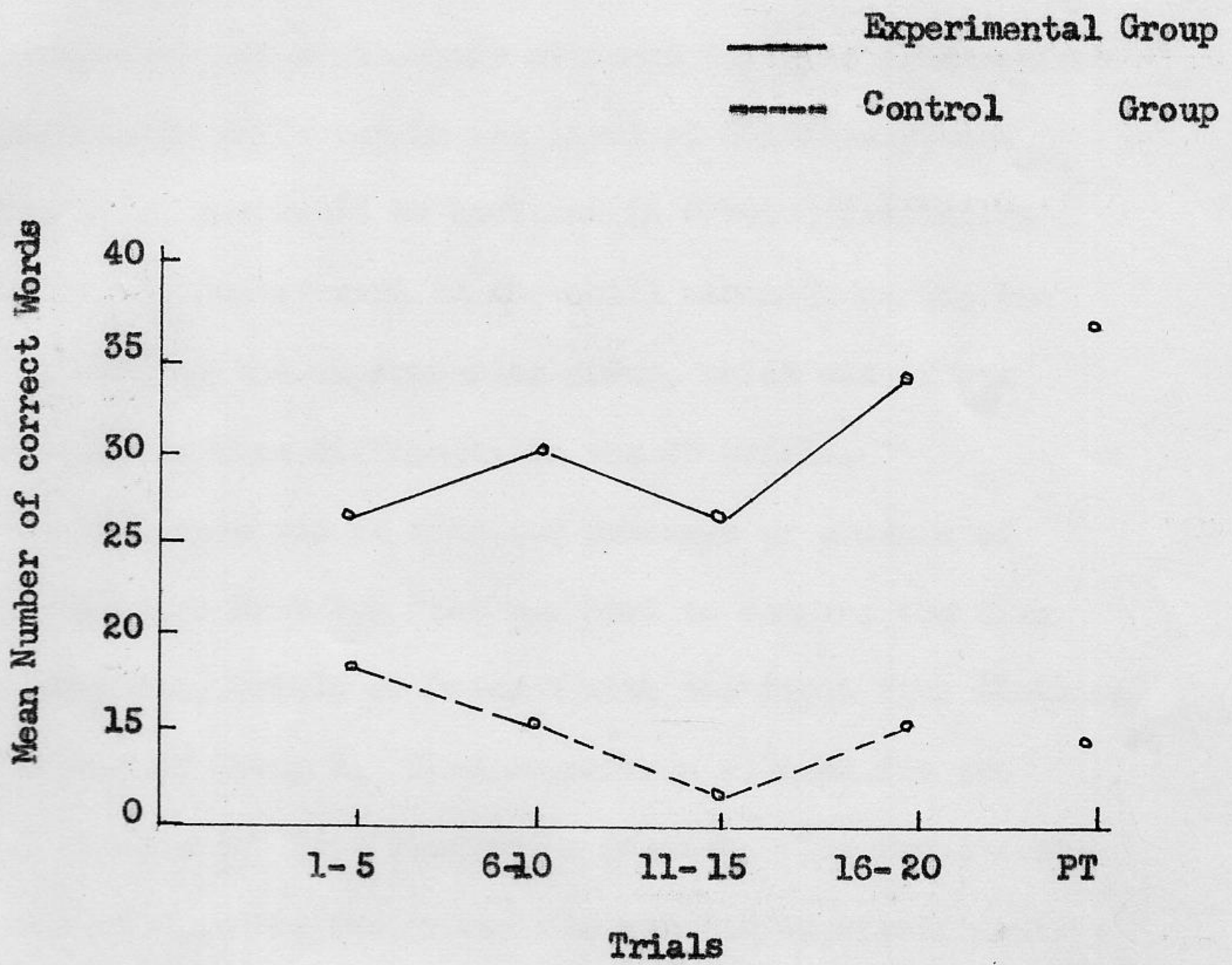


Fig. 4. - Performance of the Experimental Group (D) on practice and post-test (PT) trials, compared with the performance of the control Group on the same combinations.

remains almost constant during practice trials. The initial difference in performance between these two groups implies that the Ss in the experimental group reached their maximum level of performance after fifteen trials, that is, the practice effect due to the ten trials in the matching part, and the first five trials of the actual experiment. Also the performance of the control group does not provide any evidence that the combinations were significantly different in the level of difficulty, and considering this, one would be hesitant in drawing conclusion that considerable improvement in the skill was made during the practice trials, by the experimental group, which was offset by any increase in item difficulty in the 20 trials.

The next step was to test for presence or absence of transfer. Wilcoxon Rank Sum Test was used to compare the five post-test (English) trials of Group A with the first five (English) practice trials of Group B. This comparison allowed for the assessment of transfer from Persian to English. The results of the test showed that the two groups did not differ significantly; although the differences were in the expected direction, i.e. the post-test scores of Group A were higher than the first five practice trials of Group B. For interlingual transfer, from English to Persian, the first five (Persian) trials of Group D were compared with the post-test (Persian) trials of Group C. The results of the Wilcoxon Rank Sum Test was not significant in this case either

and accordingly it was concluded that there was no transfer from English to Persian. However, in this case too, the difference were in the expected direction: Post-test performance of Group C was higher than performance on the first five practice trials of Group D. Figures 5 and 6 are graphic presentations of the performances which were compared for interlingual transfer: Figure 5 for interlingual transfer from Persian to English and Figure 6 for interlingual transfer from English to Persian.

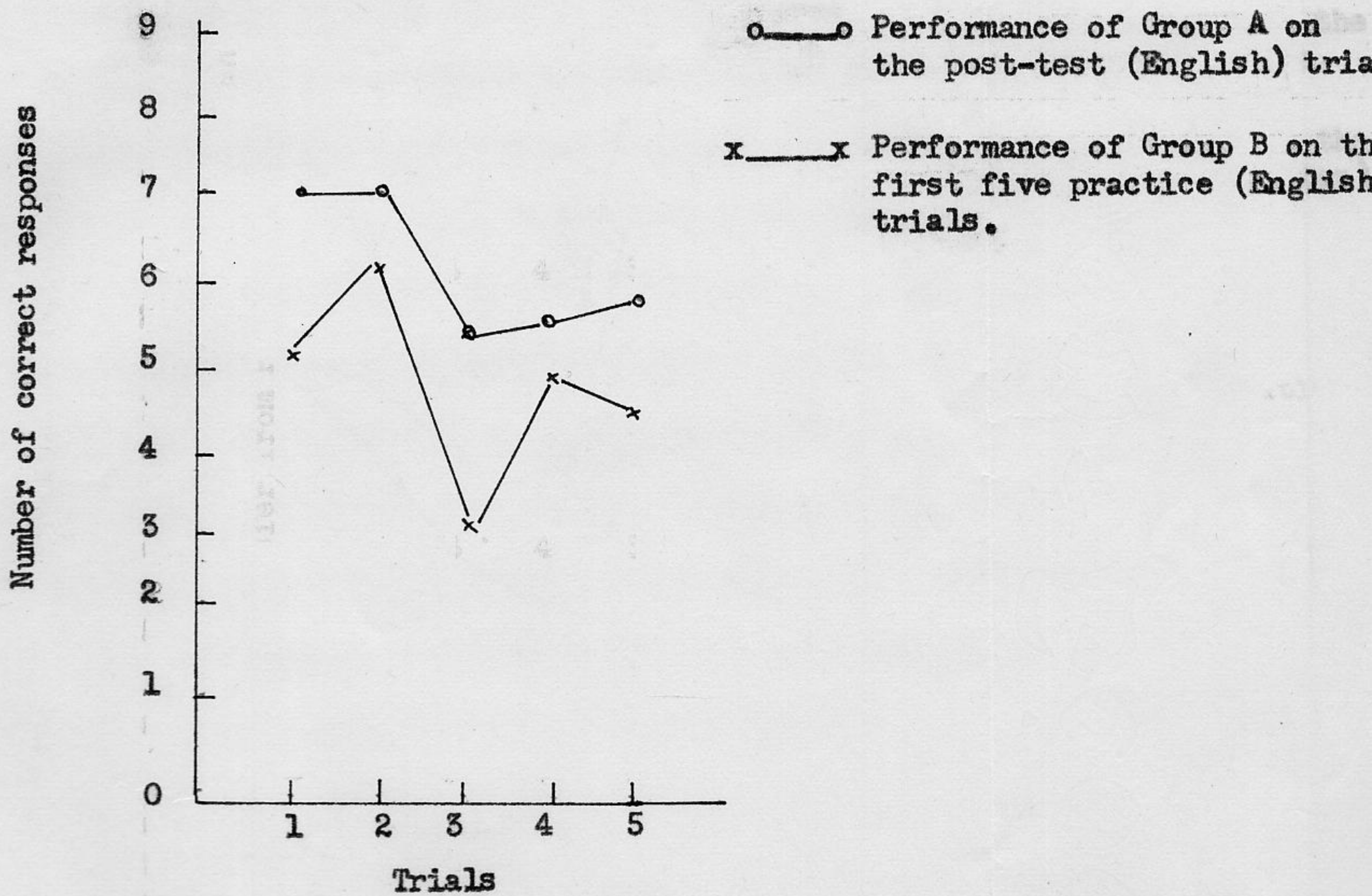


Fig. 5. - Performances compared for interlingual transfer from Persian to English

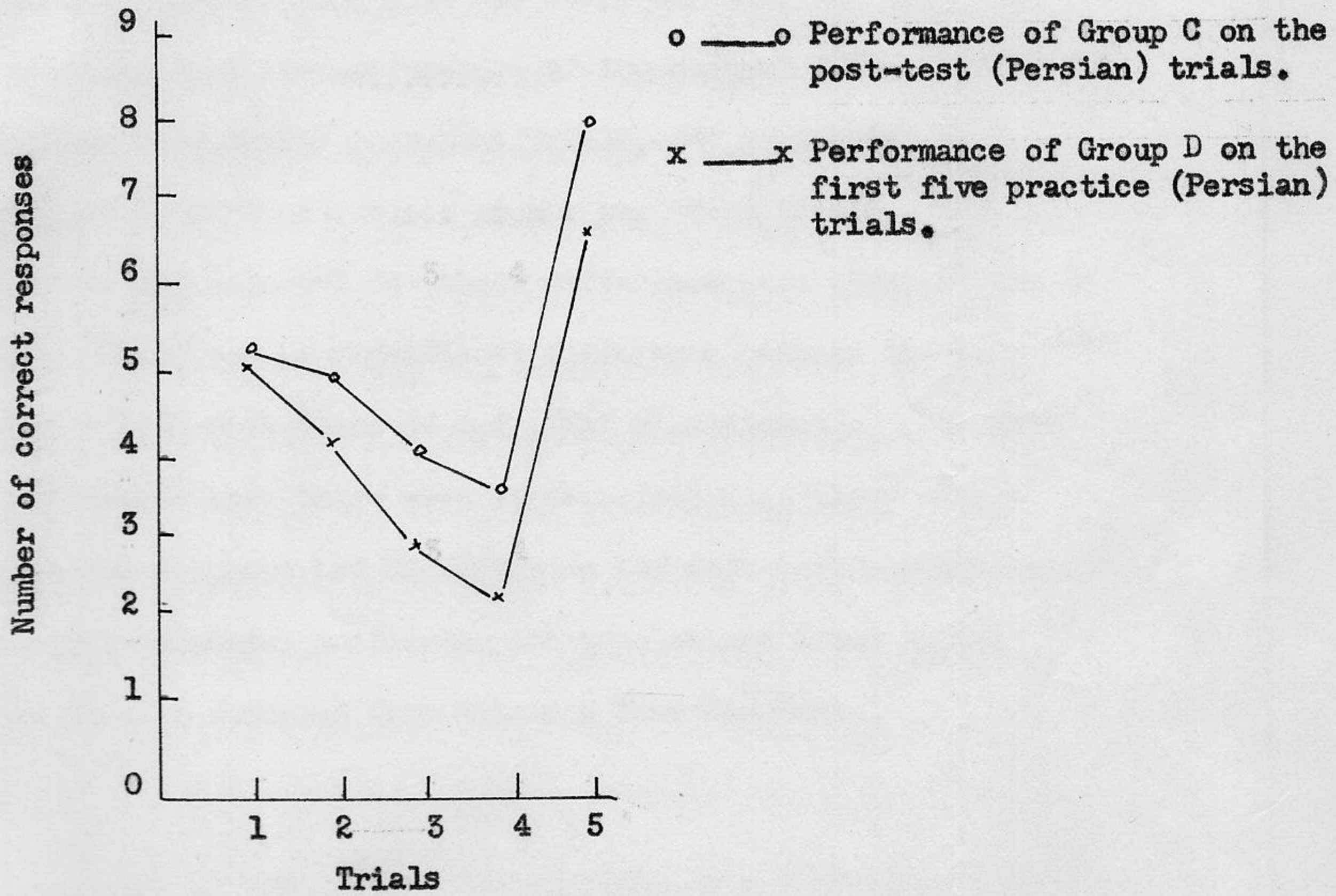


Fig. 6. - Performances compared for interlingual transfer from English to Persian

A one-way analysis of variance was used to double check the results obtained from Wilcoxon Rank Sum Tests. In this analysis the post-test performance of the four groups (English for Groups A and B, Persian for Groups C and D) were compared. The results are shown in Table 1. The analysis was done on the adjusted post-test scores; i.e. for every subject, the total score obtained from the performance of the control group on the combinations used during post-test trials, was subtracted from the total score of that subject on the post-test trials. The post-test scores adjusted for these differences are given in the appendix. There was no significant difference between the four groups ($F = 1.52$ with 3 and 36 d.f., Not significant). From this it was concluded that there were no transfer, i.e. the practice trials in one language had no effect on the post-test performances in the other language; confirming the conclusions drawn on the basis of results obtained from Wilcoxon Rank Sum Tests.

Table 1

RESULTS OF THE ANALYSIS OF VARIANCE ON THE ADJUSTED
POST-TEST SCORES OF THE FOUR GROUPS

Source	SS	d.f.	M.S.	F	Significance
Between Groups	472.1	3	157.4	1.52	not significant
Within Groups	3960.9	36	110		
Total	4433	39			

Therefore, our hypothesis concerning inter-lingual transfer of skill was not accepted.

Deficiency in the experimental design may be one factor which could explain the obtained results. First it may be that the Ss assigned to different groups, should have been matched in a more efficient way. That is the performance of a S on five combinations in each language was not an adequate way of assessing that S's efficiency in either languages. The nature of the control group could be another factor. Equal number of independent observations should have been made on each combination to provide a better basis for comparison with the experimental groups. That is every combination used for the experimental group should have been given to ten different Ss who did not take part in the actual experiment. Also the control group used for English letter-combinations consisted of Arabic-English bilinguals which makes it a better control group than the one for the Persian combinations which consisted of native speakers of Persian only. Ideally, the control group should have consisted of Persian-English bilinguals for both English and Persian letter-combinations. Finally, a more careful selection of letter-combinations could have allowed for a better way of assessing development of skill during practice trials, and for demonstrating intra-lingual transfer of skill, before testing for the transfer of this skill across languages. If every letter-combination, both in Persian and English, was constructed

such that all combinations were of equal difficulty, there would have been no need for a control group to provide an independent measure of difficulty for each combination, and the effect of practice could have^{been} measured through the gradual increase in the level of performance in successive trials. A different set of results may be obtained through the use of an experimental design that remedies the deficiencies of the present study.

The nature of the task employed in this experiment may also account for the present results. Namely that the better performance of the experimental group is a transient warm-up effect rather than an improvement in the skill. That is improvement in the skill of word-construction may not occur as result of practice as such; it may be that improvement in this skill depends on the tactic(s) of the S in constructing words with a given combination.

The results of our experiment can also be accounted for in terms of the inhibitory^{effect} of a set established through the usage of one language when the S is asked to perform in the other language, during post-test trials. Once a S is set, during practice trials, to construct words in one language, shift of language does not seem to be favorable condition for the skill to be demonstrated. Our explanation of the results on the bases of S's set is in agreement with the results obtained by Uznadze (1966) in an experiment on the formation of set in a verbal task. In his experiment the Ss were

first required to read aloud words written in Latin characters: for example 'ridal', 'daluf' and so on. The Ss were then given a series of Russian words, such that the letters in every word could be read both as Latin and Russian. The first series of words in Latin handwriting were used as fixing objects and the second series as critical objects. It was shown that all the Ss had developed a set based on reading Latin words, since they all persisted in reading the Russian words as if they were Latin. So once a subject is set to function in one language, the set remains active even when the S is asked to perform the same task but in the other language. This could well explain the obtained results, since most of our Ss reported that after the shift in language, during the post-test trials, they were still remembering words of the language used during practice trials, even though the letter-combinations presented were in a different language. That is during post-test trials, where the Ss had to shift language, they were still remembering words in the language used during practice trials which were irrelevant to the new stimulus-situation. And the set established during practice trials interfered with the construction of words in the language appropriate during post-test trials.

In the Experiment by Uznadze (1966), it was also shown that in the course of time the strength of set decreased and after presentation of some words, the Ss realized that they were Russian

words and started reading them correctly. Had a short period of time been allowed between the last practice trials and the beginning of post-test trials, or the number of post-test trials been increased, different results might have been obtained, since the inappropriate set would be expected to have weakened.

One must also consider the possibility that the Ss in this experiment were all coordinate bilinguals (all of them use Persian exclusively at home and English for educational purpose), for whom the two languages function relatively independently. In this case the improvement in a skill through the medium of one language would have little effect on the performance involving the same skill in the other language.

SUMMARY OF CONCLUSIONS

The results of the study did not provide any evidence for interlingual transfer of word-construction skill. The results were contrary to our expectations and possible suggestions were given to account for these results. It was suggested that some deficiencies in the experimental design, such as inadequate matching procedure, a control group based on less than the necessary number of Ss, the use of native speakers of Persian as the control group for Persian combinations as compared with the use of Arabic-English bilinguals for English combinations, and inadequate criterion for the selection of letters in the combinations could have led to the present results.

It was also suggested that some features of the task could account for the present results. The possibilities that improvement in this skill required more practice, or that practice as such does not lead to improvement in this skill were considered.

Also, based on the results obtained by Uznadze (1966), the results of the present study were accounted for in terms of the interference of a set established in one language with performing the same task in the other language, when the shift of one language to the other is immediate.

It was also suggested that most of the Ss who took part in the experiment were coordinate bilinguals, for whom the two

language function in a more independent way. In this case the improvement in a skill through the medium of one language may have little effect on the performance of the same skill in the other language.

APPENDIX

The following combinations were used for matching the groups.

	<u>English</u>	<u>Persian</u>
1.	URL	۲۱۵
2.	IRE	کوت
3.	EAB	دن س
4.	ERS	ابد
5.	EST	۱۲ح

The combinations used for practice (Persian) trials of

Groups, A Group D were the following:

تق و - ابد - نیت - عی ک - خدن - دن گ - چار - کگر
ندی - عی ک - تاد - ک - هاد - س ک - ل ح و - چرو - شان - ق ا و
س و

The first five of the above combinations were used for post-test trials of Group C.

The combinations used for practice (English) trials of

Groups B, and C were the following:

1. MUS, 2. LOF, 3. MGS, 4. HPE, 5. RTG, 6. UBF, 7. ECB,
8. NOP, 9. GUL, 10. HTE, 11. MNP, 12. QUE, 13. REG, 14. DEF,
15. OST, 16. ASD, 17. CLM, 18. BLT, 19. DFR, 20. TBO.

The first five of the above combinations were used for post-test trials of Group A.

The Persian letter-combinations for post-test trials of Group D were:

شخو، کخ، قزل، سون، جیو

The English letter-combinations for post-test trials of Group B were:

1. WST, 2. ABS, 3. PUR, 4. VAR, 5. VIR.

Table 2

THE ADJUSTED SCORES FOR POST-TEST TRIALS OF GROUPS
A, B, C, and D

Group A (E)	Group B (E)	Group C (P)	Group D (P)
6	16	9	40
25	17	17	7
13	22	16	44
24	18	8	44
26	22	22	22
1	31	23	14
* -5	16	10	19
9	10	8	8
20	30	9	9
12	20	8	11
T = 131	202	130	214

* This subject produced less words during the post-test trials than did the control group.

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