Interlingual transfer of training¹

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Absence of inter-lingual transfer of training in the skill of alphabet-inversion has been interpreted as supporting the view that cognitive skills developed in one language remain language specific. Deficiency in experimental design makes this conclusion questionable. Using a design permitting less equivocal interpretation of the data, both intra- and inter-lingual transfer was found.

The view that experiences obtained through one language are encoded in that language and are not directly available in the other has been recently put forward by Kolers (1963) and receives support from the low degree of commonality he found between associations given by individuals to translation-equivalent words. The results of a study he reports later (Kolers, 1964) suggests that a somewhat similar state of affairs exists for cognitive skills. He gave bilinguals practice inverting the alphabet of one of their languages and then tested for transfer of the practice to the other. The amount of transfer observed was found to vary with the extent to which the two alphabets involved shared phonetically similar sequences (e.g., el, em, en in English and lam, mim, nuum in Arabic). He concludes that while improvement in making particular responses transferred, the alphabet-inversion skill as such did not. To accept this result as supporting the view that such cognitive operations when learned within one linguistic system remain language specific and are not transferred to the other language of the bilingual, it is necessary to demonstrate that intra-lingual transfer of the skill does take place. After all, it may be that the factors preventing transfer of the skill across languages also affects transfer within a single language, in which case lack of inter-lingual transfer cannot be ascribed to separateness of experience gained through each language. Kolers (1964) reports experiments not involving bilinguals that suggest that intra-lingual transfer of the alphabet-inversion skill does not occur. The significance of his results on inter-lingual transfer is therefore questionable. The study reported below attempted to remedy this.

Method

The S's task was to give the letter immediately preceding a given letter in the alphabet concerned. One group of Ss was practiced on a set of 10 English letters (b-k) before being tested for transfer to a different set of English letters (q-z). A second group was practiced on a set of 10 Arabic letters (ta-seen) before transfer was tested on the English set, q-z. To separate transfer effects, if any, from initial differences between groups on the q-z set, both groups were given pretests on this set.² This necessitated

the use of a control group who only did the pre- and post-tests on the q-z set so that the possible effects of pretest on posttest performance could be eliminated. The three letter sets used did not have phonetically similar sequences.

Four-page booklets were prepared, one for each trial. On each page was the appropriate set of 10 letters arranged randomly in a column. The same five booklets were used in the same order for the pre- and post-test trials which were identical for all Ss.

The sequence of conditions for the three groups may be summarized as follows: Group 1: five pretest (English) trials, 24 practice (English) trials, five post-test (English) trials; Group 2: five pretest (English) trials, 24 practice (Arabic) trials, five posttest (English) trials; Group 3: five pretest (English) trials, five post-test (English) trials. The distinction between pre- and posttests for Group 3 is a formal one since the 10 trials were given one after the other without break. In the case of Groups 1 and 2, Ss were briefly informed at the end of the pretest and at the beginning of the posttest of the change in the set of letters they would be working on. Apart from this the 34 pretest, practice, and posttest trials followed directly one after the other.

On each trial the S's task was to write down the letter immediately preceding (in the alphabet) each of the letters in the booklet. All letters were to be responded to in this way in the order in which they appeared on the pages. Performance was assessed in terms of the number of correct responses made during the 30 sec. allowed for each trial (i.e., booklet).

The 36 Ss were Arabic-English bilinguals studying at the University. An equal number of males and females were assigned to each of the groups.

Results and Discussion

The results are summarized in Table 1. Differences between posttest scores of the three groups were tested for significance using analysis of covari-

Table 1. Mean Number of Correct Responses per 30-sec. Trial

Group	Pretest	Practice ¹		Post-test ²
		P _a	P _b	
1 English practice	7.67	10.93	14.72	10.20 (10.78)
2 Arabic practice	8.88	6.62	14.75	11.67 (10.86)
3 No practice	7.98	—	—	8.92 (9.14)

1. P_a, P_b are the means for the first five and last five practice trials, respectively.

2. Post-test means adjusted for differences in pretest means are given in brackets.

ance procedures (Winer, 1962) with pretest scores as the covariate. (Posttest means adjusted for differences in pretest scores are given in Table 1.) There was a significant difference between the posttest performance of the three groups ($F=4.95$, $df=2/32$, $p<.05$). Comparison of adjusted means revealed no significant difference ($p>.05$) between the two practice groups (1 and 2), but both of these were found to have significantly higher scores ($p<.05$) than Group 3 (no practice).

Before these differences may be ascribed to positive transfer in the case of Groups 1 and 2, one must establish that there was something to transfer, i.e., that there was real improvement during the practice trials. This was assessed in terms of the mean number of correct responses per trial over the first five (P_a) and last five (P_b) practice trials. Analysis of variance revealed that P_b was significantly greater than P_a ($p<.001$) for both groups, but that the improvement ($P_b - P_a$) for Group 2 (Arabic practice) was greater (the interaction F was significant beyond the .1% level).

A stronger case for attributing the posttest superiority of Groups 1 and 2 over Group 3 to transfer and not simply to specific proactive interference in the case of Group 3 can be made if it can be shown that the post-pretest differences are correlated with the amount of improvement ($P_b - P_a$) over the practice trials. The product-moment correlation coefficient was +.68 for Group 1 and +.59 for Group 2, both significantly greater than 0 at the 5% level (two-tailed test).

From these results it can be concluded that a practiced skill may transfer both within and across languages, i.e., that the skill does not remain language

specific. It is possible that the absence of interlingual transfer of skill in Kolers' study may be due to the procedure he used. Since the correct responses always came in the same order in his study, it is likely that the Ss learned the response sequence during the early trials. Subsequent trials would then have involved recall rather than the alphabet-inversion skill which consequently would have little opportunity for improving. Hence, as far as the skill was concerned, there was little to transfer. The only improvement one could expect when the S was switched to the second alphabet was that arising out of the similarity between the correct response sequences, and this is what Kolers' results indicate.

References

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Notes

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2. Kolers used five bilingual groups. Half the Ss in each group was given training on the alphabet of their native language before being tested on English. It was the other way round for the other half of the Ss. The transfer measure was based on the difference between the initial performance of one subgroup and the final (test) performance of the other. A necessary assumption is that the two subgroups were initially of equal ability. Kolers makes no mention of any attempt to match the subgroups and since they consisted of only three Ss each, it is unlikely that random allocation of Ss would have resulted in subgroups of comparable ability.