Transfer with bilinguals¹

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Transfer was investigated in a group of 48 bilingual high school juniors. Each S learned two serial lists—one in English, the other in Spanish. Half the Ss learned the English list first; the second half learned the Spanish list first. Within both of these groups three transfer paradigms were employed. In the Same Order condition the second list was a translation of the first with the items arranged in the same order, in the Random Order condition the second-list items were translated from the first but were rearranged in a random order and the third condition was a control. The results indicated that amount of transfer was approximately the same from English to Spanish as from Spanish to English. About 50% positive transfer was obtained in the Same Order condition and about 13% negative transfer was obtained in the Random Order condition.

Relatively little systematic work has been done investigating transfer effects from one language to another. Lambert, Havelka, & Crosby (1958) investigated such transfer using a retroactive facilitation design. In their experiment, bilingual Ss learned and recalled a list in English. It was found that three trials of interpolated learning in French facilitated recall. In another study Young & Webber (in press) using paired associates, measured transfer with two different transfer paradigms. In general they found transfer in the predicted direction.

Method

Each S learned two serial lists—one in English, the other in Spanish. Half the Ss learned the English list first and the Spanish list second and for the second half the order of learning was reversed. Three transfer conditions were employed: Same Order—in which the second list contained items translated from the first and in which the arrangement of the translated items was the same as the first-list items; Random Order—in which the items translated from the first list were randomly rearranged in the second; and Control—in which the second-list items were unrelated to the first. Thus, the basic design can be thought of as a 2 by 3 factorial with order of language learning and condition of transfer being the major variables. In addition, two samples of items, and equal numbers of males and females were used in each condition to bring the full design to a 2 by 3 by 2 by 2 factorial. A total of 48 Ss ($N = 2$ per cell) was used in the experiment.

The serial lists were each composed of 12 common nouns and were presented by a Webcor tape recorder at a 3-sec. presentation rate with a 9-sec. intertrial interval. The interlist interval was approximately 3 min. to allow time to change tapes and to give addi-

tional instructions. The anticipation cue employed was "Ready?" (or "¿Listo?" in the Spanish lists). Learning criterion was one errorless recitation. Meaningful and formal similarity were as low as careful inspection would allow. Within a language and sample the Ss learned a common second list with the differences between the three conditions being defined by manipulation of the first list.

All Ss used in the experiment were high school juniors and learning was done in a small room at the participating high school. Assignment of Ss to groups was done on the basis of a predetermined random order. Each S rated himself on a number of variables related to language learning and fluency.

The items employed in the experiment were selected from a group of 84 Spanish nouns. This group was first presented to an independent group of 28 Ss (also via tape recorder) who were asked to write down the English equivalent. The 24 items missed by more than two of these Ss were eliminated leaving a 60 item pool from which the lists were constructed.

Results and Discussion

The means of the ratings of speaking ability in Spanish and English (on a 1 to 7 scale) were 3.88 and 4.27, respectively. This difference was not significant with $F = 2.33$, $df = 1/24$, $p > .10$. The Ss reported that they had spoken Spanish for more years than English with means of 16.15 and 14.46, respectively, $F = 7.83$, $df = 1/47$, $p < .01$. However, the Ss apparently were English dominant in as much as 40 of the 48 Ss indicated they preferred to think in English, $\chi^2 = 20.02$, $df = 1$, $p < .01$.

The trials to learn the first list were analyzed and it was found that the Spanish lists were more difficult to learn than the English lists. The means of the Spanish and English lists were 18.33 and 14.04, respectively, $F = 7.41$, $df = 1/24$, $p < .04$. These results are in agreement with previous research by Young & Webber (in press).

There was also a significant interaction between the language learned and the samples of items within the language, $F = 15.51$, $df = 1/24$, $p < .01$. That is, for the Spanish lists Sample No. 1 was more difficult than Sample No. 2 while for the English lists the second sample was more difficult than the first. These results would suggest either that lists translated from one language to another do not necessarily maintain their relative difficulty or that a bias in the random assignment of Ss to groups had occurred. No other Fs were found to be significant in the analysis.

The means of trials to learn the second list are presented in Table 1. It can be seen that the Spanish

Table 1. Mean Trials to Learn the Second List as a Function of Language and Transfer Paradigm

Second List	Same Order		Paradigm Random Order		Control	
	M	S	M	S	M	S
Spanish	7.38	2.92	17.00	9.84	15.00	7.17
English	5.13	1.88	10.88	5.94	9.63	5.42

lists were again more difficult to learn than the English lists, $F=10.00$, $df=1/24$, $p < .01$. The means for the Spanish and English lists are 13.13 and 8.54, respectively. It is also apparent that transfer paradigm was significant, $F=10.42$, $df=2/24$, $p < .01$. In addition, the amount of transfer shown was quite consistent with 47% and 51% positive transfer being obtained in the Same Order conditions of the Spanish and English groups, respectively. Similarly, 13% negative transfer was obtained in both Random Order conditions. However, use of orthogonal comparisons indicates that the Same Order condition differs from the Random Order and Control conditions with $F=20.00$, $df=1/24$, $p < .01$ while the Random Order and Control conditions do not differ from each other, $F < 1.00$.

Paradigms analogous to the Same Order and Random Order paradigms of the present study have been previously investigated using all English lists. Irion (1946) investigated transfer from a list of adjectives to a second list composed of the synonyms of the first-list adjectives. In one condition the synonyms were arranged in the same order as in the first list and in a second condition the synonyms were arranged in a random order. In contrast to the results of the present experiment, Irion found no difference between these two paradigms during second-list learning. The two experiments differ in several ways and any one

of these may account for the difference in results. For example, the Ss in the Irion experiment received five trials of first-list learning and a relatively low degree of learning such as this might reduce the amount of transfer measured in second-list learning. The most obvious difference, of course, is that one experiment employed words in two languages while the other used words from only one. Since there has been relatively little research investigating transfer in the bilingual, the effect such a difference in procedure might have on, say, the discriminability of lists in an experiment cannot be determined until further research has been done.

In any event the results of the present experiment indicate that within a bilingual context the Same Order condition is a paradigm of positive transfer and, to a lesser extent, that the Random Order condition is a paradigm of negative transfer. Thus, it can be seen that associations formed within the context of one language can facilitate or interfere with the formation of new associations in a second language.

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