Natural language mediators in paired associate learning¹

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Abstract

Ss learned paired CVCs using a modified study-test method. After presentation of pairs, two tests were given, where the second questioned about any natural language mediators (NLMs) Ss used to learn pairs. NLMs played an important role in learning correct responses. In addition, after the first correct recall items learned using NLMs were more often correct on later trials than those without NLMs.

Problem

Recent experimentation in paired-associate learning has again begun to stress the importance of natural language mediators (NLMs) in verbal learning. In the context of paired-associates NLM will be used to signify any type of association, ranging from one word, to sentences, to sound similarities that S employs to learn paired items. That Ss use such natural language mediation has been reported by Reed (1918), Clark, Lansford, & Dallenbach (1960), Underwood & Schulz (1960, pp. 296-300), and Bugelski (1962). Each of these studies, however, has ascertained the use of NLMs by questionnaires given at the completion of the experimental learning. The purpose of the present experiment was to study the feasibility of questioning Ss at various stages of learning paired associates concerning the use of NLMs.

Method

Twenty undergraduates from an introductory psychology course at the University of Illinois were randomly divided into two equal groups. Group I learned a list of eight CVC word pairs. Each S was given a total of eight trials. On a learning trial (R), S was given the eight pairs, one at a time, each typed on a 3 by 5 card. The presentation rate was 5 sec., interitem and intertrial intervals were 0.5 and 30 sec. respectively. Then, on a test (T) trial each stimulus was presented for 5 sec. and S was told to give the correct response. Following T a second test (Q) trial was given. Only the stimulus items were presented and S was asked to give both the response and how he connected the pair. He reported any NLMs employed, or if he had guessed or whether he could report no reason. All of S's responses on Q were tape recorded. The pairs were randomly ordered for each R and T trial.

Group II had the same R-T-Q sequence except that they learned a new list for each sequence. The first list learned by this group was the same as that learned by Group I. On Q these Ss were given the correct response if they were incorrect on T. Eight lists of CVC pairs were constructed. The average association

value (Archer, 1960) of the stimuli was 11%, and that for the responses was 100%.

Results

Results will first be presented for Group I. The data from the T trials gives the number of correct responses over trials. Ss' reports on Q were placed into four categories: (1) NLM, i.e., cases where S gave the correct response on T and Q and reported an NLM; (2) no NLM, i.e., cases where S gave the correct response on both T and Q but reported no NLM; (3) guesses, i.e., cases where S reported he guessed or where he gave a correct response on T but gave an incorrect or no response on Q; (4) no response on either T or Q.

The relation between total number of correct items over all Ss on each trial and the number of NLMs, no NLMs, and guesses is shown in Fig. 1. Significant increases in total number correct, $F = 33.63$, $df = 7/63$, $p < .01$; total number of NLMs, $F = 21.06$, $df = 7/63$,

Fig. 1. The number of correct recalls on Test 1 (T), number of NLMs, No NLMs and Guesses as a function of practice trials.

$p < .01$; and total number of no NLMs, $F = 3.50$, $df = 7/63$, $p < .01$, reported over trials were found. The number of guesses remained constant over trials ($F = 1$). For the 73 items given correctly on the last T, NLMs were reported for 75% of them. All Ss reported using NLMs for at least some of the items, however, there were large individual differences, the number of NLMs reported on the last trial varied from two to eight among Ss.

To evaluate the performance on items learned with and without NLMs on later trials, a tabulation was made of correct items, the T in which they were first given correctly, whether or not a NLM was present on the Q following this T, and whether or not the response was given correctly thereafter. The results are presented in Table 1. The items were categorized in two ways: (1) whether the response was correctly given on all test trials after it was given correctly once on a T, and (2) what category of response was given on the Q following the first correct T. Since the comparison of interest was the use of NLMs vs. non-use of NLMs the no NLM and guess categories were pooled and a χ^2 test run. Pooling the categories produced a significant χ^2 ($\chi^2 = 4.50$, $.02 < p < .05$), which indicates that performance after the first correct trial is better for items for which a NLM is reported on the Q following.

A similar analysis was performed for Group II (see Fig. 1). No significant increases over trials were found for number correct, number of NLMs, number of no NLMs or number of guesses. An analysis concerning the effectiveness of NLMs, similar to that of Group I, was performed. However, since E prompted S on Q if the response was not recalled, it was difficult to evaluate the effects of NLMs and the analysis is not presented.

Table 1. Performance on Test 2 (Q) after first correct recall on Test 1 (T) for Group I

	Correct after first T right	Miss after first T right
NLM	27.0	5.0
No NLM	11.0	8.0
Guess	6.0	5.0

Discussion

It is apparent from the results that NLMs played an important role in the learning of the correct responses, since in both groups almost 70% of the correct responses were learned using NLMs. Items for which a NLM can be reported after they are first given correctly are more often correct on later learning trials than those for which no NLM is reported. This finding agrees with the results reported by Reed (1918) for paired-associate learning.

The verbal reports show that Ss actively attempt to apply various strategies of forming NLMs in order to learn the items and also that they try many plans in order to find one that appears to work the best. The use of NLMs has been relatively neglected in verbal learning, with few experimenters voicing any concern over S's use of NLMs. Consequently, they have remained an uncontrolled variable in most studies. The present results demonstrate the importance of NLMs as aids in learning and gives indication that in experiments using lists of varying difficulty or meaningfulness, the results differences in learning rate may be a function of ease of forming NLMs in the different lists. Further research is necessary to determine the factors important in ease and rate of formation of NLMs and their effects over various retention intervals.

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