Mediated serial learning¹

John P. Houston

UNIVERSITY OF CALIFORNIA, LOS ANGELES

Abstract

This study demonstrated a mediation effect in serial learning. Prior to learning an A-B-C-D serial list Experimental Ss learned an A-B', C-D' paired-associate (PA) list in which B and D were the primary word associates of B' and D'. A Control group learned an A-X, C-Y PA list and then the same serial list. Serial learning was superior in the Experimental condition. It was suggested that the serial learning was mediated by an A-B'-B sequence in which A elicited B' and B', in turn, evoked its primary associate B.

Problem

While mediated PA learning has long been the object of extensive experimental investigation few studies have been concerned with the operation of mediating associations in serial learning. Jensen & Rohwer (1963) failed to find any differences between mediated and nonmediated serial learning when, in the mediated condition, Ss were provided with simple sentences linking the words in the serial list. On the other hand, Houston (1964) reported a positive mediation effect when the mediating associations were established through prior paired-associate learning. This supplementary study was designed to demonstrate a similar effect under slightly modified conditions. Prior to the learning of an A-B-C-D serial list Ss in the mediated condition learned an A-B', C-D' PA list where B and D were the primary word associates of B' and D'. It was presumed that the serial connections would be mediated by an A-B'-B sequence in which the serial unit A would elicit B' which, in turn, would evoke its primary associate B. Every other serial connection is mediated in this design. A control condition learned a nonmediating PA list (A-X, C-Y).

Method

The Ss were 24 paid University of California students. Although the majority of the Ss had participated in prior verbal learning experiments none had engaged in studies involving serial learning or transfer. Ss were alternately assigned to the Experimental and Control conditions as they arrived in the laboratory for a total of 12 in each condition. Ss in the Experimental group first learned a five item mediating PA list and then a 10 item serial list while the Control Ss first learned a nonmediating PA list and then the same serial list.

Two serial lists were composed of two sets of 10 common nouns occurring at least 34 times per million in the Thorndike & Lorge (1944) word count. All nouns contained either one or two syllables and less than seven letters. Intralist word association strength, as indexed

by the Deese (mimeo) and Russell & Jenkins (1954) norms, was minimal. Apparent intralist meaning similarity was as low as careful inspection would allow. None of the words began with the same letter. Two orders of each set of 10 nouns were developed and each of these orders was assigned with equal frequency to the Ss in the two conditions.

Every other serial word (A, C) served as a stimulus for both the Control and Experimental PA lists. The Experimental PA responses (B', D'), chosen from the association norms, were words which evoked as their primary associates the succeeding serial units (B, D). The Control PA responses (X, Y) did not evoke the succeeding serial units but they paralleled the Experimental PA responses in that they were composed of the same numbers of letters, possessed the same first letters, were of the same part of speech, and were matched with the Experimental responses in terms of frequency of occurrence (Thorndike & Lorge, 1944). Four different orders of all PA lists were constructed to minimize serial learning. PA learning was carried for five anticipation trials on a Stowe memory drum at a 2:2 sec. presentation rate with a 4 sec. intertrial interval. After a 45 sec. interlist interval serial learning was carried to a criterion of one perfect trial. The serial list was presented at a 3 sec. rate with no intertrial interval. A line marked the end of the serial list.

Results and Discussion

The mean numbers of correct responses given by the Experimental and Control Ss during PA learning were 22.42 and 23.58, respectively. The difference between these means was not significant ($t, 1.49$; $df, 22$) indicating that the PA lists probably did not differ in terms of difficulty.

Mean numbers of trials to criterion on the serial list were 3.75 and 6.00 for the Experimental and Control conditions, respectively. Because the direction of the difference was predicted a one-tailed test of significance was employed. The difference was significant at the .05 level ($t, 1.83$; $df, 22$). The mean proportions of errors to the numbers of opportunities for error were in the expected order, .25 for the Experimental and .29 for the Control Ss, but they did not differ significantly ($t < 1.0$).

These results may be interpreted as further evidence for the existence of mediating effects in serial learning similar to those which have been demonstrated in PA learning. The present study has demonstrated, under somewhat different conditions, an effect similar to that reported by Houston (1964). These two studies differ in

at least two important aspects. First, in the present study every other serial connection was mediated while in the Houston (1964) experiment every association was mediated. Second, the positions of the assumed and the learned associations have been reversed; in the earlier study the connection between the preceding serial unit and the mediating unit was assumed from the association norms while, in the present study, the assumed association was between the mediating unit and the succeeding serial unit. The point to be made here is that the effect does not seem to be restricted to a single specific set of conditions.

It should be kept in mind, when interpreting these results, that the traditional mediated learning control groups, including the one employed in the present study, represent negative transfer situations and that mediation effects, as suggested by the McGehee & Schulz (1962) results, may represent reduced negative transfer rather than absolute facilitation.

References

- HOUSTON, J. P. Mediation in serial learning. *J. verb. Learn. verb. Beh.*, in press.
- JENSEN, A. R., & ROHWER, W. D. Verbal mediation in paired-associate and serial learning. *J. verb. Learn. verb. Beh.*, 1963, 1, 346-352.
- McGEHEE, N. E., & SCHULZ, R. W. Mediation in paired-associate learning. *J. exp. Psychol.*, 1961, 62, 565-570.
- RUSSELL, W. A., & JENKINS, J. J. The complete Minnesota norms for responses to 100 words from the Kent-Rosanoff word association test. *ONR tech. Rep.*, No. 11, University of Minnesota, 1954.
- THORNDIKE, E. L., & LORGE, I. A teacher's word book of 30,000 words. New York: Teachers College, Columbia University, 1944.

Note

1. This study was conducted during the tenure of the author's USPHS postdoctoral fellowship at the Institute of Human Learning, University of California, Berkeley.