# Pseudomediation: Is chaining an artifact?[1]

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**Abstract**

Mediated association in verbal learning has frequently been characterized by the facilitation produced in a three-stage paired-associate paradigm: A-B, B-C, A-C. Using an appropriate control group, the present experiment demonstrated facilitation in an A-B, B-C, A-E paradigm. It is argued that the usual mediation effect may be not due to mediated chaining but rather to a combination of bidirectional association and unlearning.

**Problem**

In the course of preparing a review of the literature on mediated association in verbal learning (Earhard & Mandler) it became increasingly obvious that previous writers, in accounting for the mediation effect, have neglected other known effects in paired-associate learning. The three-stage paradigm that has been typically used to illustrate and demonstrate mediational chaining consists of a list of A-B pairs, followed by training on B-C pairs, and tested with a list of A-C items. Such a paradigm assumes that in the testing stage A-C is facilitated because A implicitly elicits B, which in turn elicits C. The typical control paradigm for this effect consists of the stages: A-B, D-C, A-C, and the mediation effect is said to be demonstrated when the third stage of the mediation paradigm shows faster acquisition than the third stage of the control paradigm (cf. Horton & Kjeldergaard, 1961).

However, the mediation phenomenon is subject to an alternative explanation based on the mechanisms of bidirectional association and unlearning. Horton & Kjeldergaard (1961) have pointed out the importance of bidirectional or backward associations in the various mediation paradigms and Jenkins (1963) has cited relevant evidence. One can assume that when an S learns a list of A-B pairs, he is also acquiring the B-A associations. Secondly, Barnes & Underwood (1959) and others have shown that when Ss learn an A-B list and are then required to learn an A-C list, unlearning of the A-B association occurs as A-C learning proceeds. These mechanisms lead to two predictions: Stage II should show faster learning in the control paradigm and Stage III should show faster acquisition in the mediation paradigm.

Specifically, during Stage II the acquisition of a B-C list is subject to interference effects from Stage I, while the control list D-C is not. At the same time, the acquisition of B-C produces unlearning or forgetting of the B-A and, by implication, the A-B association acquired in Stage I. As a result there will be little interference in Stage III of the mediation paradigm with A-C items from implicit or explicit B items. In the control paradigm no learning of the A-B association occurs and B items can still interfere with the acquisition of A-C.

If this alternate explanation of the mediation effects holds, it should be possible to demonstate a "mediation" effect in a three-stage A-B, B-C, A-E paradigm where the effects postulated for the first two stages of the mediation paradigm hold but where mediation as conventionally conceived cannot affect the acquisition of the test list since a new response item is used.

**Method**

Two groups of 22 Ss each were used. Each group learned successively three lists of six paired associates. For the Experimental group the stages were: A-B, B-C, A-E; for the Control groups they were A-B, D-C, A-E.

All lists were constructed from a word pool of 30 low frequency English words; the 28 words used by Horton & Kjeldergaard (1961) plus "ingot" and "opine." Three different sets of random pairings were constructed with additional requirements that no pair of items had the same initial letter and no two words in any list started with the same initial letter. For any one list five different orders of pairs were constructed to minimize the effects of serial learning. Ss were assigned at random to one of the three sets of lists (different pairings). Lists were constructed in such a way that both the initial and the final lists were identical for Experimental and Control groups within each of the three sets of pairings.

The paired associates were presented by the anticipation method on a Stowe memory drum at a 2:2 rate with no intertrial interval. Ss pronounced both terms of a pair. Interstage intervals were as long as necessary to instruct Ss that they were to learn a new list. Instructions were standard paired-associate instructions with Ss being encouraged to guess.

All Ss learned the lists in all stages to a criterion of two correct trials. Three Ss were discarded because they required 35 trials or more to learn their first list.

**Results**

The data for all three stages were analyzed in terms of three dependent variables: Number of trials to a criterion of one correct trial (C1), Number of trials to a criterion of two correct trials (C2), and number of correct anticipations during the first six trials (NC).

Figure 1 shows the results for the first and third of these variables. The results for the stricter criterion were comparable with the one presented here. The data are in accord with the predictions. The Experimental group is superior in Stage III, while the Control group shows faster learning in Stage II. An analysis of variance shows a significant Group by Stage interaction, $F(2,86)$ is 6.19 ($p < .005$) for C1 and 11.39 ($p < .001$) for NC. On

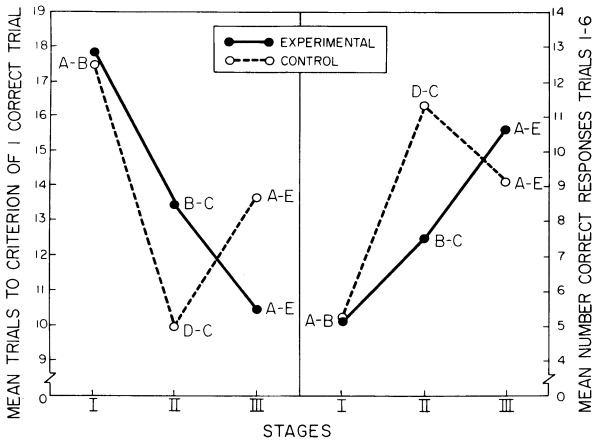


Fig. 1. Mean trials to one correct trial (C1) and mean correct responses in six trials (NC) for experimental and control groups in the three stages.

the A-E test list (Stage III) the Experimental group produces significantly faster learning under C1 ($t = 2.22$; $p < .04$); the same was found for C2 ($t = 2.10$; $p < .05$), but the difference is not significant for NC. For both C1 and NC the Control group shows significantly faster learning in Stage II ($t = 2.45$; $p < .02$, and 2.88; $p < .01$ respectively).

**Discussion**

The results show the expected pseudomediation effect. Given the first two stages of the mediation-chaining paradigm, the third stage showed facilitation even when a non-mediated, neutral response was used. The theoretical notions advanced above are further substantiated by the Stage II results. A B-C list was more difficult to learn than a new set of D-C pairs, suggesting associative interference in Stage II. Horton & Kjeldergaard (1961), using mixed lists, obtained similar results in Stage II of this particular paradigm.

The present argument is that the so-called mediation effect may be the result of decreased interference in the test stage due to unlearning or forgetting of the A-B association. This alternative interpretation is diametrically opposed to an argument based on associative mediation which states that the presence of the B association in Stage III facilitates acquisition. The general reasoning applies similarly to the other mediation paradigms discussed by Horton & Kjeldergaard (1961) and Jenkins (1963).

Finally, this particular analysis should not be taken as applicable to mediation studies which involve mediational processes inferred from language habits. These studies, in contrast to the associative model treated here, deal with highly overlearned language structures which, when available, function as conceptual rules. The mediating mechanism in these studies deals more with concept learning than with simple associative relations (cf. Mandler, 1963).

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**Note**

1. This research was supported by Grant GB-810 from the National Science Foundation and by Grant APA-64 from the National Research Council, Canada. The authors are most grateful to Shirley Singer for experimental assistance.